

THIRD ANNUAL MEETING  
of the  
WESTERN WEED CONTROL CONFERENCE  
HELD IN SEATTLE, WASHINGTON  
JUNE 21-22, 1940.

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Minutes of the Third Annual Western Weed Control Conference

Friday Morning June 21, 1940

Roosevelt Hotel, Seattle, Washington

The meeting was called to order by President G. R. Hyslop (Oregon) who welcomed the members and those who were in attendance for the first time.

Chairman Hyslop introduced W. J. Robinson, Director of the Department of Agriculture, State of Washington, who gave the address of welcome. Director Robinson presented a brief resume of the weed problems of Washington and stressed the importance of weed control and the many problems confronting men in the field of weed control. All were given a hearty welcome to Seattle and the State of Washington.

The chairman then asked for roll call by states:

Arizona	absent	
California	present	Mr. Ball representative
Colorado	absent	
Idaho	present	Mr. Spence representative
Montana	present	Mr. Morris representative
Nevada	present	Mr. Schweis representative
New Mexico	absent	
Oregon	present	Mr. Hyslop representative
Utah	present	Mr. Hutchings representative
Washington	present	Mr. Griner representative
Wyoming	absent	

It was moved and seconded that the Secretary dispense with the reading of the Minutes. Motion carried.

There were no additions or corrections and the Minutes were approved.

Chairman Hyslop called for the report of the Secretary.

Secretary Ball (California) reported that a good response had been received from the resolutions approved at the Second Annual Meeting of the Western Weed Control Conference. Although definite results cannot be cited, the letters received express the desire to cooperate, showing that interest is being taken. The correspondence with our Washington, D.C. representatives indicates that they are interested in our problems and are willing to assist where their services are needed.

The financial report by Ball follows:

1938-1939	Balance	\$146.38
1939-1940	Collections	124.00
Stamps and supplies		15.74
	Balance	254.64

Chairman Hyslop called for the reports of the States present.

## Ball (California):

"Weed control in California during the past year has been more or less a continuation of our regular program, taking advantage where possible of new developments.

"Cultivation has been encouraged in place of chemicals wherever such a program was justified. Under the Agricultural Conservation Program we have set up practices on Hoary Cress, Russian Knapweed and Austrian Field Cress for agricultural areas, and under the range program chemical control of Klamath Weed. All of this work proved not only effective, but has placed the weed control problem under the responsibility of the farmer or rancher himself. We hope that weed control practices under the Agricultural Conservation Program will continue.

"Chemical weed control has been confined primarily to the chlorates, arsenic, borax, carbon bisulphide, oil, Sinox, Sulphuric acid and common salt. A material known as bittern, obtained from salt beds, has been used this past year on state highways for the control of annual weeds, especially Yellow Star Thistle. The results so far indicate that the coverage and correct dosage need further study. The chlorates have been confined primarily to waste places where soil disorder is not a factor.

"Soil sterilization work on canal banks has been a very successful program. For this work the combination of sodium chlorate and white arsenic was used at the rate of 2 pounds of chlorate to 4 pounds of arsenic. Soil type, being a factor, altered these amounts a little. This work has stimulated interest by those farmers adjacent to and in the vicinity of these ditches; as a result cultural practices were started and in numerous cases large areas of Johnson Grass or Bermuda Grass have been cleaned up. The sodium chlorate-borax combination has continued to be our recommendation for the eradication of Klamath Weed, which is one of our major problems. One pound of sodium chlorate to 4 pounds of borax have proved effective. This is applied in the dry form, usually broadcast by hand. Time of treatment is governed chiefly by rainfall and soil types.

"Sinox for selective spraying has advanced beyond the experimental stage. Large areas of grain were treated this spring by plane as well as ground equipment. The addition of ammonium sulphate seems to show beneficial results.

"Carbon bisulphide applied with Mack's applicator has made it possible to use this material more extensively.

"Three of our major weed problems, namely: Camel Thorn, Austrian Field Cress and Wild Artichoke Thistle, are continuing satisfactorily. The jar method, using a 1% white arsenic solution and carbon bisulphide for cleanup work, seems to be doing the job in the Camel Thorn program. Clean cultivation, including deep plowing, has proved to be the best method for the control and eradication of Austrian Field Cress. A three-year program appears to be sufficient. We are making no predictions however, until our fall inspection. Common salt is the only chemical which gives results. It is necessary to use very coarse salt, otherwise it is lost by leaching. This type of salt goes into

solution slowly and is therefore available for the plants for a longer period, since many of the roots are confined to the first 8 to 14 inches of soil. The Wild Artichoke Thistle program will be completed so far as the State and Counties are concerned about next month, at which time all of the 18,000 acres will have been either grubbed or bladed. There will be a few seedlings to check for the next few years, but these will be the responsibility of the landowners. The program was one of cultural practices and was very successful.

"The Work Projects Administration state-wide weed program has run along very smoothly after we obtained final approval, which took a period of several months and much correspondence. It has been of great assistance in our sterilization work on ditches, the Klamath Weed program, Wild Artichoke Thistle and Camel Thorn and in the application of carbon bisulphide in some of our cleanup programs on Hoary Cress and other serious weeds.

"A great deal has been accomplished toward the revision of a new seed law and the quarantine regulations having to do with weed seed. The California Seed Council has had an active committee on this legislative problem and it is hoped a bill will be introduced in the California State Legislature which will enact provisions in a seed act that will bring about uniformity as well as enforceable measures.

"The University of California, through the Botany Division at the State Farm, Davis, has continued work on carbon bisulphide and other weed problems. They are carrying on with Sinox especially on lawns. Established test plots in various areas of the State demonstrate the uses and results of materials.

"General educational work is continually carried on through highschool agricultural classes, College of Agriculture weed contests and meetings with farm bureaus and granges. County weed committees have become more active. The educational phase of weed control, we feel, is very important, for education and regulation go, more or less, hand in hand."

H. E. Morris, Head of the Botany Department, Montana Experiment Station, Bozeman, was called upon to report for Montana. Mr. Morris expressed regrets of Mr. Mercer, who was unable to attend the meeting.

#### Montana report;

"Montana is sharing in her proportional annual loss by weeds, as is practically every other state. A recent survey, especially in the irrigated sections, indicated that the big-ten, blue lettuce, canada thistle, knapweed (Russian), leafy spurge, morning glory, poverty weed, quack grass, skeleton weed, sow thistle (perennial) and white top were widely distributed in the state, and one or more of them are the cause of alarm in many communities.

"Due to the rapid spread of some of these weeds with the attending economic loss, many people are already weed conscious and are demanding help or advice in learning to live with or eradicate these enemies. This is a good sign in that weed control programs are more likely to meet with success.

"Before 1938 most weed control work was of a rather local nature, and the methods were based upon the research work carried on by the Agronomy Department of the Montana Experiment Station beginning about 1927. The earlier research work was mainly testing out various chemicals which were being advertised for the eradication of weeds. Beginning in 1932 tillage and mowing were included in the weed research program.

"In general the results of this work were in accord with those secured in other states and which have been reported in this Conference. At this time special emphasis is placed upon tillage and the use of competitive crops for weed control.

"A distinct forward step in progress was made in 1939 when the State Legislature passed the Montana Weed Law. This act provides a method by which weed districts may be created, and the noxious weeds in said districts be included in a definite program of weed control. The area within a district may vary in size. Usually the boundaries are rather well defined such as section lines, irrigation canals, public roads, etc. A weed commissioner appointed by the County Weed Control Board supervises the control work within the county, and in cooperation with many groups formulates the control program for his country.

"On June 1, 1940 there were 9 weed districts in Montana created under this law. There were 3 districts in Yellowstone County, 1 in Meagher, 1 in Judith Basin, 1 in Fergus and 3 in Carbon. These districts varied considerably in area.

"At the present time morning glory is probably the worst weed pest in the state, and in many valleys where the soil is heavy it is most difficult to control. White top is spreading at an alarming rate, and already it has taken possession of some crop land, to the detriment of the owner.

"While Canada thistle is widely distributed and abundant, it is recognized that it can be controlled by one year of fallow, and cropped the following year with a cultivated crop in order to kill the few remaining plants.

"The other weeds are more or less in restricted areas, and are not generally distributed over the state.

"In our weed program special emphasis is placed on tillage methods, and the use of competitive crops such as winter rye and winter wheat.

"Chemical control is used as a tool to eradicate weeds along ditches and canals, in fence corners, in rocky land, etc. The recommendations for the use of chemicals, principally chlorates and carbon bisulphide are similar to those in other states.

"As a guide for County Agents a mimeographed publication on a weed control program has been published. In addition to some general information on policy, weed research, and recommendations for application of chemicals, there is a definite program for the control of morning glory by tillage and the use of competitive crops. This program is a suggested program which may be modified for the control of other weeds, or to make it adaptable for special conditions.

"Weed control in Montana is progressing in a satisfactory manner, and it is hoped that in the near future, some real practical results will be forthcoming from the results of the work in the newly created weed control districts, and the continuation of the research work on weed control.

"In our education programs, we are making use of printed pamphlets, riker mounts, newspapers, radio programs, exhibits at State and Local County fairs, etc., as it is believed that education must go hand-in-hand with any successful weed control program."

Paul Kahout was next called upon for the Idaho report.

"Idaho is well under way on the fifth year of its Statewide Noxious Weed Control Program. During the past year a new WPA project for approximately two and one-half million dollars was approved and put into operation. The nature and extent of the work permitted under this present project does not differ greatly from that permitted under previous projects, except that no Federal funds may be expended for materials to be used on private property.

"We have found that this new provision of project operation has not seriously affected the general Noxious Weed Control Program, but instead has proved to be a distinct advantage because it has helped to solve one of the most disturbing problems, i. e., weed eradication on public lands. There is little difficulty experienced in obtaining sufficient funds for materials that are used on private lands. These funds come from three sources: state, county, and individual landowners.

"In 1939 the State Legislature appropriated \$150,000 for weed control work for the biennium, all but \$5,000 of which must be used for the purchase of materials. These materials must be distributed to the various counties on a basis proportionate to the amount of materials used within the county for weed eradication purposes. This material is then distributed in like proportion to the landowners within the county. This fund provides about 20% of the material used within the State.

"Under the Idaho State Weed Law the County Commissioners are permitted to levy not more than one mill on all taxable property within the county for weed control purposes. Many of the counties in the state have availed themselves of this means to obtain funds. Funds from this source are generally used to pay for transportation of workers and materials, storage of materials, purchase and maintenance of county owned equipment, other incidental expenses, and in some cases for part of the material purchases. Because of this cooperative system of supplying materials with funds from various sources the average cost of carbon bisulphide to the landowner is thirty-five cents per gallon, and sodium chlorate about four and one-half cents per pound.

"During the last year approximately four hundred and fifty thousand gallons of carbon bisulphide, two and a quarter million pounds of sodium chlorate, and two hundred thousand pounds of borax were used in the State of Idaho.

"The present state weed law, which embodies many of the features of the previous laws, was passed by the 1939 session of the Legislature. It has been in operation for a long enough period to test its effectiveness.

"Although there are evidently some weaknesses in the law we believe that basically it will suit the demand for a workable weed law. We believe that the following eight provisions of the act are particularly valuable and they have been used in enough cases so that we know that they can be made to work advantageously.

(1) The county commissioners in each county must form a weed control district which may be a part or the whole county. At the time such district is declared the county commissioners, with the advice of the Extension Service, declare which weeds are noxious, and prescribe methods for their control. This list of weeds may be broken down into several classifications. It may name those weeds which must be eradicated immediately, those which may be controlled and eradicated over an extended period, those which must be prevented from seeding, and those which may be individually troublesome, and which the county will aid in eradicating.

"As an example of the working of this provision I will cite two counties, one in North Idaho and one in central Idaho. The northern county is so completely infested

with Canada Thistle that to insist on eradication would mean confiscation of many of the farms of this county. At the same time there are comparatively small infestations of morning glory, white top, and leafy spurge. Consequently, the commissioners of this county have declared that morning glory, white top, and leafy spurge must be eradicated, or that eradication must be started during the 1940 season. Since the immediate eradication of Canada thistle would be economically impossible, it must only be prevented from disseminating seed. In the central Idaho county the situation was reversed. Morning Glory was prevalent, and Canada thistle and white top only thinly scattered. So, Canada thistle and white top were placed on the number one weed list and morning Glory on the second list.

(2) The enforcement of the law is the duty of the Boards of County Commissioners. Since the Boards levy taxes, set up county budgets, sit as boards of equalization, and in general, have a thorough knowledge of conditions within the county, it appears that they are the proper officers to apply the provisions of the weed law.

(3) The law provides that the land upon which weeds are being eradicated may be classified as waste land, and the taxes thereon practically eliminated. This concession has encouraged placing land under clean cultivation programs. In addition to the elimination of taxes many irrigation districts have rebated water charges during the time clean cultivation was being practiced.

(4) The law recognizes that the eradication of noxious weeds presents many problems. It recognizes that the methods and program that fit one farm may be entirely wrong for the adjoining farm. Therefore, the law permits the Board of County Commissioners to make individual contracts with the landowners, which need not be uniform.

"These contracts may be made on an annual basis, or they may provide for performance over a period of years. The elasticity of these contracts makes it possible to balance final eradication of all noxious weeds with the landowners' ability to pay.

(5) Another provision of the weed law which has been found beneficial is that one which permits the county commissioners to extend the payment of weed eradication charges over a period of years. Since charges for weed eradication are of the same priority as general taxes, this provision has prevented tax delinquencies due to impaired production during the weed eradication program.

(6) The law gives the County Commissioners the power to enter any property and eradicate or control any noxious weeds found thereon, and to charge the entire cost of such eradication or control as a tax lien, against the property. This provision of the law has been used in only very rare cases, because it has been found that where a workable, economical program is presented voluntary compliance to the law is generally obtained. In nearly every case where resort was made to this provision the land ownership passed to the County because of previous tax delinquency.

(7) In the past considerable difficulty was experienced at times in certain counties in obtaining funds for weed control purposes, because these funds came from the county current expense fund. Regular county functions often used these funds and there was little left for weed work. Now, a special fund is established out of a general levy and payments for materials and services are returned to this fund. This system provides a permanent and readily accessible source of funds, and prevents expenditures for weed control activities from becoming involved in normal county expenses.

(8) The one mill general levy mentioned before provides a means of spreading the cost of weed control over clean as well as infested land. Many landowners look upon this tax as a cheap form of prevention or insurance.

"The new state weed law has helped in many ways to make our clean cultivation program more workable. At the present time we have about forty-one county owned and WPA operated cultivation units operating in the State. These units vary in size from Ford tractors with attached cultivation units to Diesel powered caterpillars. In general, we find that the tractors with the attached cultivation units operated by a power lift give a more uniform cutting level and less misses than do the trailer type of implement. We have under the WPA program approximately nine-thousand acres of clean cultivation handled by the above mentioned equipment. We discourage operation on areas smaller than one acre, but in cases where travel and rotation between jobs are not adversely affected, we have taken in areas of less than one acre.

"Our general recommendations and instructions provide that cultivation must be undertaken six days after plant emergence. From experiences gained on the project and from evidences obtained from the Federal stations we assumed that eight days after emergence to be the most practicable and efficient periods, but because of possible delays and interruptions of schedules we believed that a two day shorter interval would prevent more failures and in the aggregate the additional cost of operations would be negligible. During the operation of the program last year we showed an average of ten and one-half cultivations per farm and a cultivation interval of approximately fourteen days.

"We have found that in cultivating irrigated land the use of several irrigations during the season has greatly aided the mechanical operation of the equipment by providing an improved cutting service for the tool, and by hastening the decay of vegetable fibers in the soil. We have also noted that we get a greatly increased germination of seedlings after irrigations. The germination of seedlings after eradication continues to be our most serious problem. This is particularly true after the use of chemicals. This is also particularly true of morning glory. In only rare cases have we noted any seedling growth on areas of white top which were cultivated two or more years.

"Since several questions were asked regarding costs I am including a schedule of costs for the season of 1939. It must be noted that the costs as exhibited on the schedule do not include wages for the operators of the equipment. However, the number of tractor hours per acre is shown and the average hourly wage for tractor operators in the State is sixty cents.

"We have done considerable work in orchards. We have released approximately one hundred and fifty acres of orchard land on which eradication has been completed. Our costs on orchard land are about double that on open land. We have found it necessary to use hand labor adjacent to the trees trunks and during the harvest season. One county uses an offset drawbar in order to get closer to the trees and this has helped to reduce our costs.

"All land included under the cultivation program is covered by a contract between the respective Boards of County Commissioners and the landowners. Briefly, these contracts provide that the county shall have full use of the land for a period of three years; that the size of the area for which a service charge is made is as agreed upon; that if eradication is accomplished at the end of the second year a specified crop will be grown during the third year of the contract.

"We have done considerable burning on perennial weeds during the past year, with some good results. Briefly, our opinion is that burning will accomplish eradication on a basis comparable to clean cultivation. We have found that the costs and length of time are comparable to the cultivation method, but that there is an advantage in favor of burning in areas where it is mechanically inefficient to cultivate.



"Considerable borax was applied last year with indifferent results. We are satisfied that borax has a place as a herbicide on Klamath Weed and Puncture vine. On all other weeds, both perennial and annuals, we feel that considerably more work must be done before we can be sure that the material has a definite place as an efficient herbicide.

"In conclusion we believe that we have made definite progress in noxious weed control. Public opinion in many counties has it that we are beginning to enter a period when weed eradication work will definitely lessen, and that the problem is becoming one of control and prevention."

Next George Schweis was asked to give the Nevada report.

"Nevada has continued its weed control program in a modest way, such as we have been following during the past several years. We have not endeavored to high-pressure

any community or area into a large weed control program, owing to the fact that control methods have not been perfected to date insofar as the use of chemicals is concerned.

"We are carrying on limited programs in seven of our counties at the present time, using cultivation methods as the base of the control operations. Our results have been very satisfactory and we hope to be able to enlarge the scope of this campaign in the next year or two, as we are now able to show interested persons that perennial noxious weeds can be controlled providing the work is carried on systematically.

"Some lands which were entirely out of cultivation owing to the presence of these weeds, have now gone back into cultivation and crops are now being grown successfully. Some of these lands had gone entirely off the tax roll, but are now again in such shape as to produce crops and have since been restored to the taxable wealth of the State.

"One of the most helpful things that we have encountered during the past year is that the Bureau of Reclamation, U. S. Department of Interior, has interested itself in the weed program and is now taking a most active interest in getting farmers located on lands which are obligated to the Federal Government for water storage to take an active interest in the control of these weeds. This has been the first time that any Federal agency has manifested an interest in weed control, and I can see a bright future ahead insofar as these lands are concerned.

"I should like to call your attention to two publications which have been turned out recently by the Nevada Agricultural Experiment Station, one dealing with the use of grass in smothering out perennial noxious weeds, and the other a bulletin dealing with the spread of white top through the droppings of cattle. Both of these publications have a use in the library of all weed control officials, and may be obtained by writing to the Director of the Agricultural Experiment Station at Reno."

The Oregon state weed report was presented by Mr. Lawrence Jenkins, Assistant Extension Specialist in Farm Crops, Oregon State College.

"At the present time we have morning-glory and Canada thistle in every one of our 36 counties in the state. We have white-top in all of our 18 eastern Oregon counties and five of the western Oregon counties. Russian knapweed is in every eastern Oregon county. Leafy spurge so far is confined to one 25-acre infestation in one county and one small patch in each of two other eastern Oregon counties.

#### County Appropriations for Weed Control

"In the past it has been the feeling in Oregon, as well as other states, that weed control was entirely an individual problem. However, with the acreage of weeds increasing and land valuation going down on weed infested land, the county courts are realizing their responsibility toward weed control. The following table shows the county appropriations for the past five years and the number of counties cooperating:

<u>Year</u>	<u>No. of Counties Cooperating</u>	<u>Total Appropriation</u>
1936	6	\$11,815
1937	11	19,440
1938	14	38,380
1939	18	41,750
1940	21	40,000

Note: There are 36 counties in the state.

Amount of Sodium Chlorate Used

"Up to the last few years when cultivation and cropping methods of controlling weeds have occupied the center of interest, most of the weeds were treated with sodium chlorate. As a result, this chemical was used as an indicator of the amount of weed work done in a county or state. From 1934 to 1938 in Oregon we had a substantial increase in the amount of sodium chlorate used each year. Nineteen thirty-nine showed a slight decrease in chemicals used and an increase in cultivation. The following table shows the quantity of sodium chlorate used for the past six years:

<u>Year</u>	<u>Pounds Chlorate Used</u>
1934	79,021
1935	106,706
1936	282,881
1937	369,501
1938	386,778
1939	379,875

"In addition to sodium chlorate, an increasing amount of carbon bisulphide is being used each year. For several of our weeds, particularly white-top, it is the feeling that if a patch of weeds is small enough to treat with chemicals and conditions are right, carbon bisulphide is a much more effective chemical to use.

Acres of Weeds Treated in This State

"The following table summarizes the acreages of weeds treated with different methods for 1937, 1938, and 1939:

<u>Method</u>	<u>1937 - Acres</u>	<u>1938 - Acres</u>	<u>1939 - Acres</u>
Cultivation	9,458	8,437	11,389
Chlorates	770	805	791
Diesel Oil	140	133	132
Carbon Bisulphide	7.5	6.6	12
Sodium Arsenite	3.5	.5	1
Other Methods, including salt, grubbing, acid arsenical, borax, acid, etc.	25	30	35
<b>Total</b>	<b>10,404</b>	<b>9,412.1</b>	<b>12,360</b>

Weed Control Districts

"In 1937 the legislature revised the Oregon weed law. Under the present law, it is possible to form two types of districts. One is a county-wide district which is declared by the county court, and the other is special weed control districts embracing a definite area of land which has been petitioned by a majority of the landowners involved. It is possible under either of these districts to list the weeds to be included and specify the requirements for compliance. It might be that the district would stipulate eradication of certain weeds which have not gained a foothold in the territory as yet and merely the prevention of seed formation of weeds which infest a sizable acreage.

Research Program

"The legislature in 1937 passed the first appropriation for weed control work in

Oregon. Since that time, very definite progress has been made in this field. Mr. L. E. Harris who is actively in charge of the weed research program will discuss several phases of the Oregon research program during this conference.

#### Certification

"In Oregon the seed certification program is handled by the Extension Service. The rules in regard to growing certified seed in weed infested fields are very strict. For example, if any white-top is found in a field of clover, the field is immediately turned down.

#### Highway Seeding

"In eastern Oregon we have proven the merits of seeding right-of-ways along state highways in an effort to prevent weeds from being spread to adjoining croplands. It is also an effective method of controlling annual weeds and reduces the fire hazard to adjoining fields.

#### Educational Work

"As I am presenting a paper before this group later in the program on Oregon's educational program in weed control, I will not discuss that phase at this time."

The chairman next called upon Earl Hutchins, State Department of Agriculture, for the Utah report.

"The weed eradication project is carried forward under the direction of the State Correlation Committee, consisting of the commissioner of agriculture, the director of the Extension Service, director of the Experiment Station, executive officer of the State Farm Bureau Federation, state agronomist; a representative of the State Planning Board, Water Storage Commission, Crop Improvement Association; members of the ecclesiastic organizations; executive officers of the State Land Board, the A.A.A., and the Reclamation Service.

"Like committees are organized in each county. The county organizations function with the state organization as advising supervisors. Funds derived to conduct the work are obtained from the following sources: labor is furnished by the Works Progress Administration; supervision and chemicals from state appropriated funds; equipment and supplies from the counties and individual land owners.

"Land is generally placed under county contract which is drawn up by the various county organizations. The land is first plowed in the fall to permit cultivation to begin early in the spring. Our cultivation is conducted periodically at approximately fifteen day intervals, not permitting the plants to become green to exceed eight days. We have found that this is the best time to cultivate, as our experimental work has shown that when the plants are permitted to get some vegetating growth the root system is much easier to control. The results, however, received from the clean cultivation, chemicals and other methods of control are similar to those experienced by other states.

"Chemicals are used on small plots, or where cultivation is not practical, such as along ditch banks, rights of way, etc. Carbon bi-sulphide seems to give better control than any other chemical used. However, the cost is one factor which enters into the use of this chemical. Sodium chlorate seems to give a little better control than calcium chlorate. Again the factor of the loss of the use of the land is a factor which enters into the use of this chemical. Other chemicals used on an experimental basis seem to give about the same results.

"Once the land is entered into this project, it is not released until an inspection is made under the direction of the state agronomist, or the county weed committee. If the kill is from 90% to 95%, the land may be released for row cropping. With this method we have obtained very successful control measures. 3007 acres were released out of the program in the fall of 1939 and crops now being produced on this land show very excellent possibilities. We are, however, having considerable difficulties with seedlings growing if the irrigation waters are supplied. The returned acreage, from all indications, will produce an increased crop of from 20% to 50% over its production under the former infested condition.

"We are cultivating 6322 acres in 1940, which is slightly under that cultivated in 1939. In addition to this acreage, we are supervising 2206 acres being worked by the farmers under the A.A.A. program. In 1939 we used 4045 drums of sodium chlorate and atlacide. We also used 303 drums of carbon bi-sulphide, this being the first year this material was used to any extent. We have received splendid cooperation from our state, county and city road departments, canal and irrigation companies, railroads and others who have weed infested land. We have succeeded in receiving cooperation from our various educational institutions, as well as Church organizations. There seems to be quite an increased interest by the people of this state in the weed eradication and control programs.

"We have exhibited in schools, Churches, county and state fairs and in many other public meetings and gatherings mounts of the various noxious weeds and very often lectures have been given to acquaint the people with the various noxious weeds of the state.

"We have strengthened our weed program and now require that all seed entering the State of Utah be free of noxious weed seed, and all seed must be inspected by an authorized inspector of the State Department of Agriculture before such seed can be released to the consignee. We have also requested our district agricultural inspectors to make an inspection of all seed producing areas and where seed is being produced on noxious weed infested land the same is quarantined and unless such seed can be cleaned by our commercial cleaning plants, then the weed is destroyed either by grinding or burning.

"It was found that considerable seed, as well as feed grains entering Utah were heavily infested with noxious weed seeds. Only this spring we have found fifteen carloads of barley shipped into Utah from California which has been heavily infested with wild morning glory, thus requiring our inspector to quarantine such feed and require the recleaning of same and the screenings ground under his supervision. We are, therefore, very much encouraged with our weed control program as now operating in the state.

"However, we realize that weeds are spreading in some localities and growing continuously, even though the weed program is functioning in those districts. We have strengthened our seed law, and expect in the near future to revise our seed law and regulations so as to be in harmony with the federal seed law. We feel the necessity of greater uniformity in the seed laws and regulations of our various Western States and feel this should be one of the problems of the western weed control members.

"We feel that seed should be included in the terminal inspection of our U. S. postal regulations and efforts are being made to secure the cooperation of the third assistant post master's office to include seeds in their regular terminal inspection requirements, the same as is required on plant materials. We have found that the mail is a carrier of many seeds which contain noxious weed seeds.

"We have only touched in this paper some of the highlights of our weed control program and we would be happy to furnish any state with copies of our

program. We appreciate the splendid cooperation and assistance which we have received from the membership of this Conference. We also appreciate the cooperation of our various chemical companies and those who have assisted us with our various weed and seed problems."

The Washington report was presented by W. A. Harvey, of the State Agricultural Experiment Station.

"Until 1938 the weed control work of the Washington Agricultural Experiment Station consisted mainly of cooperative work with the Bureau of Plant Industry in the weed station operated by Mr. Seely. This work was confined to the Palouse region and most of the work was done on bindweed.

"A survey in 1938 showed that the irrigated section of the Yakima Valley was heavily infested with numerous weed pests. Since very little information was available on the control of weeds under irrigated conditions it was thought advisable to start our research program in this region. The most serious weed pests in the region appeared to be white top of which there are four species - *Lepidium draba*, *L. Repens*, *L. latifolium* and *Hymenophysa pubescens*. The most prevalent of these are *L. repens* and *H. pubescens*. These both go by the name "white top" although Hoary cress is sometimes used and the *Hymenophysa* is frequently called Siberian mustard. The next most serious weed pest is Russian knapweed. There is also considerable bindweed, Canada thistle, sow thistle, and some quack grass in this region. Two small areas of Camel thorn are present in the Valley but as yet have not reached serious proportions.

"In the spring of 1938 a lease was arranged with the Yakima Indian Agency for 15 acres of irrigated land heavily infested with white top. This land is on the Yakima Indian Reservation eight miles southwest of Toppenish in the heart of perhaps the worst weed infested area in the state. The leased tract had been abandoned to weeds in 1929 and had not been farmed since that time. Parts of the area are high in alkali as a result of a high soil water table and no surface irrigation during this nine year period. This combination of weeds and alkali has been noted in several other areas and appears to be common when the land is abandoned.

"Three main avenues of attack on the weeds are being investigated; chemicals, cultivation, and cropping methods. With Carbon Bisulphide we have obtained good kills on bindweed, Camel thorn, Russian knapweed, *Lepidium latifolium*, and *L. repens*. Our only failure was on a mixture of *L. repens* and *Hymenophysa* where the soil moisture was low and our application was too deep. Dead roots were found in the lower soil levels but the crowns and several inches of the upper roots were unharmed. Our results with chlorate are similar to those reported by some of the other states. The white top species have not responded to chlorates. We have some evidence that *Hymenophysa* is more difficult to kill with chlorate than is *L. repens*, but as we have results from only one year of trials we are not definite on this point. Chlorate has given good kills on most of the other weeds where it has been tried. Some borax and borax-chlorate mixtures have been tried but the kill on white top has been poor. However, there is some reason to believe that the kill may increase as the borax penetrates deeper into the soil so final judgment will be withheld until later.

"Our cultivation plots are just going into their second year so no definite results are yet available. The white top on the plots seems to be going dormant earlier this year than last and it will probably be necessary to irrigate it.

"We have been very successful with corn on white top land. The land is plowed early and kept cultivated until the corn is planted - about May 20th - and cultivation is continued in the corn as long as possible. There is often some growth of white

top after the last cultivation but usually no more than a low rosette which interferes very little with the corn. By using a one horse single row cultivator it is possible to continue cultivation until the corn is quite tall. Potatoes may also be used and handled much the same as the corn. Sugar beets are included in our crops this year for the first time and may be as good as corn or potatoes. Alfalfa yielded about three tons to the acre and sweet clover about  $2\frac{1}{2}$  tons for the first cutting this year. This would indicate that either of these crops may be used successfully in a rotation with corn or potatoes on white top land. Annual smother crops such as millet and Sudan grass have been grown successfully and with good yields on heavily infested land. In short, it seems that a wide variety of crops may be grown on land heavily infested with white top under our conditions and with little more attention than is normally given to the crops on clean land.

"We hope to pick up other areas of weeds as time and funds permit. A nearby area of Russian knapweed and an area of bindweed will probably be taken over next year. Some flooding experiments on knapweed will be started this year."

Mr. Ed. E. Birkmaier, Acting Chief, Division of Range Management, United States Forest Service, was introduced and asked to speak on weed problems of the National Forest.

"Noxious weed control work on the western National Forests has been limited largely to plants poisonous or toxic to domestic livestock. In range management, a noxious weed is generally taken to mean a plant which causes illness or death when eaten by cattle, sheep, or horses. There are many virulently poisonous plants on western ranges. Those of chief importance include water hemlock (*Cicuta*), larkspur (*Delphinium*), death camas (*Zygadenus*), western sneezeweed (*Helenium*). A number of others, less toxic, cause trouble only when eaten in large quantities.

"Livestock losses due to poisonous plants on National Forest ranges are considerable. Reports show that some 26,000 animals valued at about \$200,000 were lost during 1939. Doubtless a great many more which died from unknown causes could properly be attributed to poisoning on the range. This represents a serious loss to producers. Much of it can be avoided by proper control measures and the adoption of sound management practices.

"To date, a total of 138,580 acres of poisonous plant infested range land on the western forests have been treated by different methods. Control methods involve grubbing with frequent retreatment and the use of chemicals on species such as St. Johns Wort (*Hypericum*). Almost 10,000 acres were treated in 1939. Treatment by grubbing and spraying is expensive and not always effective. Financial and economic considerations preclude intensive work on the several million acres of range land infested in some degree and where losses of some importance are apt to occur.

"It has been proven that good range management practices can be depended upon to hold losses to a minimum even on badly infested ranges. Very often a change in kind of livestock will suffice - a change from sheep to cattle, or vice versa. Conservative use of the range in such manner as to encourage and insure a plentiful supply of good forage plants is most important. Losses are heaviest where range is short and hungry livestock is forced to consume species of low palatability. Adjustments in seasonal use, numbers, and distribution of animals on the range are frequently required to meet bad situations and overcome prohibitive losses.

"Infestations of weeds such as morning glory, white top, knap weed, Canadian thistle and others which present a serious problem on agricultural lands do not occur, except in very isolated instances, on the National Forests. High elevations, frost, short growing seasons, lack of moisture, competition with native vegetation, shade and other factors combine to produce unfavorable site conditions. In a few restricted

localities at lower elevations, especially on cut-over timber lands, it is reported that infestations of weeds on National Forest lands may be a contributing source to their spread on valuable agricultural lands.

"Where such a condition is believed to exist, the following procedure is suggested: A joint examination by the Forest Supervisor and the County Agricultural Agent, State official or others heading up unified weed control work in the district or area. This joint examination should result in agreement on the seriousness of the weed infestation, its effect as a contributing source of infestation on agricultural lands, need for control, and how action on National Forest land will fit into control plans for land in other ownerships. On the basis of these findings, the Forest Supervisor will be in a position to recommend inclusion of meritorious weed control projects in his work plans to the Regional Forester.

"It is realized that an effective weed control program must attack simultaneously all sources of infestation. Where some of these occur on National Forest land, the Forest Service will, within the limits of available resources, join with other agencies and landowners in a group control effort."

Mr. Birkmaier was asked how to get cooperation where infestations of certain weeds are on national forest lands as well as private and where the source of the infestation is often from federal lands. He advised that the state organization approach the national forest officials and the two attempt to work out a cooperative control program. The Forest Service will attempt to control the source of the infestation.

Mr. L. Ross, Supervisor of the Farm Security Administration, was called upon. He stated that he came to listen and learn, but did say that the agency stressed good farming practices and that they realized that no one can repay chattel loans if weeds are going to control the farm.

Dr. W. W. Robbins, University of California, was called on for a few words by Chairman Hyslop.

"I believe that we are all very much gratified in the reports that have been made from the various states that emphasis is being placed upon cultural and cropping methods in the control of weeds. There is every indication from the reports that success attends the use of these methods and that very often they can be used in place of chemicals.

"I recall a statement made by a noted weed investigator in Central Europe, who said that cultural measures form the basis of all weed control, while the various chemical measures should be regarded as auxiliary only. This is a viewpoint which I am sure we all strongly endorse. We must not relegate to oblivion the old art of mastering weeds by skillful cultural measures. More and more we must associate weed control with good farming practices."

Mr. Laurence Jenkins was again called upon for a paper this time entitled "An Educational Weed Control Program".

#### Introduction

"Some of us here today are directly concerned only with the research phases of weed control; some have the job of teaching weed control. It is hard to say where one begins and the other leaves off. Both phases, I believe, are equally important. Before the results of the research worker's many carefully worked out experiments can be of most value the fellow out here who has the weeds must have the desire to



control them. It would do little good for the extension man to try and create desire in the farmer to control his weeds if he could not tell him how to do it. All of the different systems which the extension program makes use of have one main objective, that of putting the findings of research to work out on the land.

"Probably a more fitting title for my talk would be "Oregon's Educational Weed Control Program". I know many of you are doing some of the same things that we are doing and you could no doubt add to our program and materially strengthen it. However, throughout this paper I will try to explain some of the things that we have found effective in furthering the cause of weed control in Oregon.

#### Mounted Weed Specimens

"Realizing that very few farmers and others directly concerned with weed control were able to recognize many of the more serious weeds in their section, over 2,000 weed mounts have been prepared. A set of mounts, including the weeds considered most serious in each section was sent to all county agents and experiment station superintendents. Over 300 different weeds were mounted for use of the farm crops department in resident instruction work and for the Extension specialists' use in weed meetings over the state. These exhibits have been used extensively by the county Extension agents, farm organizations, Smith-Hughes instructors, fair boards, and others. A mimeograph on the mechanics of making these exhibits is available.

#### Growing Specimens of Weeds

"Dried specimens of weeds are, of course, not equal to the growing plant for exhibit purposes. Several of our county agents, each spring, plant roots or seeds of a few of the worst weeds and exhibit the growing plant in flower pots or boxes in store windows, at county fairs, and like places in their counties. The interest in this type of display is very good.

#### Colored Weed Slides

"We are preparing a series of colored slides showing pictures of weed infestations with color film. These color pictures are much superior to black and white, as the natural color of the plant can be seen. Colored slides can be taken, developed, and mounted for about fifteen cents a piece. To my knowledge there are no up-to-date slides or films of this nature available.

#### Exhibits at Local and State Fairs

"Farm organizations, Smith-Hughes departments, 4-H clubs, county agents, and the College all frequently prepare and arrange weed exhibits at local and state fairs. Growing weeds are particularly desirable for such an exhibit. A weed exhibit is not an easy one to arrange so that it will attract interest, but many weed displays have been used to effectively tell the story.

#### Up-to-date Weed Bulletins

"In order that we may put out up-to-date information on the control of various weeds without rewriting or revising a large bulletin, we are trying a different system. In 1938, a 72-page general bulletin on weed control was published. This bulletin does not discuss the control of specific weeds. Thirty-nine two or four page bulletins are being written, illustrating, describing, and giving the control of individual weeds. As these leaflets become out of date we will revise them. As new information becomes available on certain weeds we can publish that information by revising the individual leaflet at a much smaller cost than revising the large bulletin.

### Weed Identification Contests

"Frequently our Granges have meetings devoted to weed control. They have their members bring to the meeting weeds from their farms or community which they cannot identify. The county agent or some of the rest of us help identify them, after which the members have a contest to see who can remember the names of the most weeds. Prizes such as a hoe, can of sodium chlorate, liniment, and so forth are given.

### Weed Tour

"We have found that unless there are a great many outstanding things to be shown, a tour devoted entirely to weed control is likely to lack interest. Weed matters can often times be handled to a better advantage as part of a general crops tour. In some of the counties we follow the practice of writing the neighbors in a community that certain results have been obtained on the control of certain weeds in their area and can be seen at a community meeting at a given hour. That way farmers in a community do not have to travel far nor spend much time to see the results of weed work which is of most concern to them.

### Weed Council

"During 1936 and 1937, weed councils were organized in 12 counties in the state. These bodies were assembled for the purpose of developing a weed control program for their counties and to advise with the county court and county agent's office on desirable and needed weed control activities. An effort was made to have a representative from all agencies in the county concerned with the weed problem on the council. Some of the agencies represented are Grange and other farm organizations, county court, highway commission, railroad, agricultural loaning agencies, chamber of commerce, irrigation district, Smith-Hughes instructors, Indian Service land representatives, Forest Service, Extension Service, and other agencies operating in the county. These councils meet once or twice a year, going over the results of the preceding period's weed program, discussing amount of funds needed from the county for continuing weed work, outline the next year's weed control program, and other related matters.

### Farm Organizations

"Granges, particularly, and to a lesser extent other farm organizations in the state are playing an important part in the state weed control program. Through weed exhibits, weed identification contests, control demonstrations, weed control lecture hours, and numerous other activities, the Grange is doing a vast amount of good in the fight against weeds. The State Grange has taken an active part in securing desirable weed legislation, weed research appropriations, and has backed the county weed council

### 4-H Clubs

"In several counties 4-H weed control clubs have been organized. The club members map the worst perennial weeds on their farm and in their area, make weed exhibits, establish weed control plots, collect and identify miscellaneous weeds in their community, and so forth. Classes for 4-H club members on weeds and their control are given at the College each year during the 4-H club summer school.

### Smith-Hughes

"The Smith-Hughes students carry out many of the same activities as do the 4-H club members. Several of the departments have collected, pressed, dried, and mounted weeds and made a collection of them similar to the mounts previously described.

Weeders Readers

"From time to time during the year a mimeograph entitled "Weeders Readers" is sent to all Extension workers and experiment station superintendents in the state. The publication summarizes outstanding new information on weed control from Oregon and other states, lists new weed publications, new treating equipment, information on new chemicals, and any other pertinent facts along weed control lines.

Radio Talks

"Each year members of the Extension Service and Experiment Station give from 15 to 50 radio talks on weed control. These talks may be on new weeds which have just come into the state, progress in the control of weeds, loss from weeds in the different areas, and various other phases of weeds and their control. We prefer to have two or three parties participate in an informal discussion. Written script is seldom used.

News Articles

"The press is, of course, used to carry the same message in print that is carried by voice over the radio.

Weed Dramas

"We have adapted for use in Oregon the script from the play, "War on Weeds", developed in Minnesota. This has been mimeographed and distributed to Granges and other organizations. A well written and well presented play is an entertaining and effective way of sugar-coating the message to some groups.

County Cultivation Program

"Recognizing that no large scale progress could be made on reducing the acreage of weeds without an intensive cultivation program, several of our counties have started on this method of attack. Malheur county, over in the southeast corner of Oregon, was our first county to start cultivation work with the county cooperating, so I will explain a little about their set-up.

"One area, which was well defined geographically, was set up as a compulsory weed control district under the Oregon Weed Law. The area included about 75 farms and a hundred acres of the perennial weeds specified as noxious in that district. The district specifications were that all listed weeds had to be eradicated. The county provided a new tractor with cultivator and a man to do the cultivating work. The landowner signed an agreement with the county weed inspector agreeing to have his weeds cultivated for two, and if necessary, three years. Actual cost not to exceed \$10 per acre, exclusive of depreciation on the tractor and cultivator, is paid by the farmer. The plan received practically 100 percent approval by the farmers, as they are sure their weeds will be cultivated at the right time and they won't have to worry about doing it. Similar plans are being started in other counties. In some counties the farmers stand one-half of the cost of cultivation, or chemical work, and the county stands a half. It is expected that the cultivation program, with the county cooperating, will be undertaken in at least 10 of our 36 counties within the next three years."

Mr. Jenkins' paper indicates the importance of the educational phase of weed control. A lengthy discussion followed which showed that all present were much interested.

The discussion was closed for noon recess.

The afternoon session was called to order by Chairman Hyslop at 1:40 pm.

The Chairman called upon another Oregon man, L. E. Harris, of the State College, to present a paper entitled, "Spraying Annual Weeds in Grasses."

"During the past few years the control of annual weeds in grass and grain crops has received a great deal of attention in Oregon and California. The need of some successful method for the elimination or control of such annual weeds has been apparent. Various methods have been used, but the results usually were not satisfactory. Interest in this phase of the weed program has been greatly stimulated during the last few years with the discovery of the herbicidal qualities of a chemical known as Sinox. I will not attempt to go into any details concerning the history, development and early uses of Sinox as that was adequately covered by Mr. W. A. Westgate at our meetings in Berkeley last year, but I do hope to present data that will show the more effective use of this selective spray.

"For the benefit of some of you gentlemen, however, who may not be familiar with Sinox, I will review a few points relative to it. Sinox, chemically, is sodium-dinitro-ortho-cresol. It is a basic dye compound made from coal tar. It is a paste-like compound, yellow in color. It contains 30 per cent dinitro and 70 per cent water is readily soluble, noncorrosive, and only slightly poisonous. It is, however, classified as a poison and of course is not for use internally.

"We have been working with Sinox at the Oregon Experiment Station since the fall of 1937. During the season of 1938, numerous tests were conducted with several different chemicals. In every trial established, Sinox was definitely superior to any other chemical used as a selective spray. The results during this year were very gratifying, and in many cases 95 per cent or more of most annual weeds were eliminated. During the season of 1939, additional trials were established on various weeds. At that time it seemed advisable to determine the effects of other chemicals when mixed with Sinox and used as a selective spray. In this connection we were particularly concerned with the value of adding a nitrogen fertilizer to the Sinox, as previous research in Oregon had demonstrated good herbicidal qualities in ammonium sulfate.

"From the beginning of this program in 1938, ammonium sulfate and other chemicals were used as selective sprays. Results with ammonium sulfate in weed killing have been variable, but it usually stimulates crop growth. Most crops are grown on land that is often deficient in nitrogen.

"Oregon produces substantial amounts of various grass seeds. Rye grass seed, Lolium species, is one of the most important crops. Common rye grass is usually grown on low or wet lands, which are usually deficient in nitrogen, and in many areas infestation of annual weeds is a problem. With these conditions in mind, various trials were established to determine the feasibility of using a combination of chemicals that would not only kill weeds but would fertilize the crop at the same time. One of the first trials with Sinox and fertilizer was on a crop of common or Italian rye grass, Lolium multiflorum, in which there was an extremely heavy infestation of weeds, mostly vetch, Vicia species. Technically the cultivated varieties of vetch cannot be classed as weeds, but in many areas of the Willamette Valley in Oregon, the hairy vetch which volunteers in grain and grass crops causes considerable damage. In this particular field, the problem was intensified due to the mixture of wild and cultivated species of vetch. There was also a small percentage of miscellaneous weeds, mostly corn cockle, Agrostemma githago. The percentages of weed plants in this rye grass field as determined before treatment are as follows:

Hairy vetch, <u>Vicia villosa</u>	38 per cent
Purple vetch, <u>Vicia purpurea</u>	4 " "
Four-seeded or wild vetch, <u>Vicia tetrasperma</u>	30.7 " "
Wild vetch, <u>Vicia lathyroides</u>	21.6 " "
Corn cockle, <u>Agrostemma githago</u>	5.7 " "

"The treatments or sprays used were combinations of ammonium sulfate and Sinox, calcium cyanamid and Sinox and the three chemicals used alone. Each treatment was applied with a hand knapsack sprayer on duplicate plots measuring 16 feet by 32 feet. The amount of chemical used was 7, 8, 9 and 10 pounds of Sinox per acre, and each of these rates was used with 100 pounds of ammonium sulfate, and with calcium cyanamid. The results of this trial are presented in Table 1. This shows that the ammonium sulfate-Sinnox mixture was superior to other sprays used as determined from the percentage yields of clean rye grass seed. The average yield of clean rye grass seed from all plots that were sprayed with Sinnox-ammonium sulfate was 921 pounds per acre; from all plots sprayed with calcium cyanamid-Sinnox, the average was 873 pounds per acre; and for all plots where Sinnox was used alone, the average was 614 pounds per acre. The yield of all plots sprayed with ammonium sulfate alone was 316 pounds per acre, of all plots with calcium cyanamid when used alone 352 pounds per acre. The untreated check showed an average yield of clean rye grass seed of only 161 pounds per acre. The percentage of weed seeds was inversely proportional to the yield of clean rye grass. The weed seed content for average of all plots with ammonium sulfate-Sinnox was only 1.4 per cent, whereas the untreated check had 75.5 per cent weed seeds. Ammonium sulfate-Sinnox was only slightly superior to calcium cyanamid-Sinnox when compared on yield of clean rye grass seed. However, the use of calcium cyanamid with Sinnox was not satisfactory because a heavy precipitate formed which made spraying extremely difficult.

Table 1.

Effect of Dinitro Cresol - Commercial Fertilizer Combination as a Selective Spray and Yield of Rye Grass Seed. 1939.

Sinnox	Pounds Chemical per Acre		Total Yield	Per Cent Clean seed	Pounds per Acre	Per Cent Weed Seeds
	Ammonium Sulfate	Calcium Cyanamid	Pounds per Acre	seed	Clean Rye Grass	Seeds
7	100	None	930	98.3	914	1.4
8	100	"	890	97.4	867	2.3
9	100	"	940	98.5	926	0.8
10	100	"	994	98.5	977	1.2
		Average	933	98.2	921	1.4
7	None	100	1005	95.3	958	3.9
8	"	100	852	96.6	823	2.7
9	"	100	896	94.9	850	4.0
10	"	100	908	95.0	863	3.7
		Average	918	95.4	873	3.8
7	None	None	759	78.2	594	21.0
8	"	"	724	85.3	617	14.7
9	"	"	691	88.2	509	11.6
10	"	"	710	93.7	665	6.2
		Average	721	86.3	614	13.4
None	100	None	862	36.8	316	58.0
"	None	100	905	39.0	352	57.5
Check	- - - - -	- - - - -	926	17.4	161	75.5

"In this particular trial, no attempt was made to determine the minimum amount of fertilizer required to activate or increase the weedkilling ability of Sinox. In each case, the amount of ammonium sulfate and calcium cyanamid was constant and relatively high amounts per acre were used. It was found, however, that ammonium sulfate definitely activated the Sinox for weed-killing purposes when comparison was made of the per cent of weed seeds in the plots where seven pounds of Sinox and 100 pounds of ammonium sulfate were used and the plots where only seven pounds of Sinox were used. The percentage of weed seed in the threshed sample was 1.4 per cent in the Sinox-ammonium sulfate plots compared to 21 per cent where Sinox only was used. Calcium cyanamid also showed activation of the Sinox. The value of these fertilizers as activators on the Sinox is further brought out in comparing the average weed seed content of the threshed samples. The percentage of weed seed in all ammonium sulfate-Sinox plots was 1.4 per cent, in the calcium cyanamid plots 3.8 per cent, and in the plots where Sinox was used alone the percentage weed seed content was 13.4 per cent. The average increased returns per acre on these plots over the cost of application as compared to the untreated check were \$16.42 per acre for the Sinox treatments, \$24.18 per acre for the calcium cyanamid-Sinox treatments, and \$26.20 per acre for the ammonium sulfate-Sinox treatments.

"It should be kept in mind that these trials undoubtedly represented extreme conditions. As mentioned previously, the crop was very heavily infested with vetch and other weeds, much greater in fact than would be found for average conditions throughout this growing area. The increased returns per acre, therefore, can be considered in excess of the average that might be found for fields generally.

"During the past year, a number of field tests have been made with ammonium sulfate and other chemicals to determine their value as activators for Sinox in the control of annual weeds. It was desirable to know the minimum amount of ammonium sulfate required to produce activation. If small amounts of ammonium sulfate or other chemicals would activate the Sinox to the point where less Sinox or less total chemical was necessary for killing broad-leaved annual weeds, the value would be two-fold. First, the cost of application of materials would be less, and in many areas of low rainfall, large amounts of ammonium sulfate per acre cannot be used because of burning. Trials of three different chemicals used as activators on Sinox were made on hunger-weed, Ranunculus arvensis, that was growing in a field of Chewink's fescue. The infestation and growth of this weed plant was exceptionally heavy. There was an average of 82 weed plants per square foot. The Chewink's fescue was seeded in the fall of 1939 and treatments were made in the spring of 1940. The growth of this weed was such that it was definitely competing with the grass for moisture and soil nutrients, and it was also adversely affecting the young grass seedlings by shading. Because of weather conditions the treatments were not made until the plants were fairly well advanced; approximately 50 per cent of the weed plants were in bloom at time of treatment. The percentages or ratios of the chemicals used as activators with the Sinox were started at low concentrations for one series of plots, and the ratios were increased until a maximum of 20 pounds of Sinox, 80 pounds of ammonium sulfate and sodium bisulfate, and 10 per cent sulfuric acid were used per acre. Because of the size and condition of the weed plants at the time of treatment, the low amounts used were not satisfactory as far as kills were concerned. None of the plots showed relatively any plant kills until rather heavy rates of chemicals were used. The trials listed in Table 2, therefore, are only those plots where the effect of the treatment began to show results. The amount of Sinox required to kill the weed plants was rather high, as 20 pounds per acre or approximately two gallons of Sinox were necessary. This heavy rate would not be considered an economical one to use under general field conditions, but as previously mentioned the size of the plant would very definitely affect the amount of chemical required to obtain results. The value of this treatment is designed to show the differences of the chemicals used as activators on the Sinox.

"As will be seen from Table 2, Sinox when used alone, even in large quantities, had no appreciable effect on the weed plants. There was a slight burning of the leaf tips in some cases, but from the standpoint of eradication or kill there was very little effect. It was found that ammonium sulfate and sodium bisulfate were practically of equal value as determined from percentage of plants killed. Definite activation of the Sinox was produced when small amounts of each of these chemicals were used, but results increased as the amount of the chemicals that were used as activators increased. There was a definite percentage of plants killed with both the ammonium sulfate and sodium bisulfate when used at the rate of 15 pounds with 20 pounds of the Sinox per acre. Not until the activators were used at the rate of 45 pounds per acre did significant kills result. When 60 pounds and 80 pounds were used there was 100 per cent kill of weed plants. The two chemicals were practically equal in nearly all ratios used, but ammonium sulfate was definitely superior to the sodium bisulfate in the subsequent effect on crop growth. The grass seedlings were more vigorous with a better color in the ammonium sulfate plots than in the sodium bisulfate plots. The value of the chemicals used as a combination is further brought out when it is observed that the Sinox or activators when used alone were not effective for killing weed growth.

"Sulfuric acid did not cause any appreciable activation of the Sinox. The sulfuric acid was used at various percentages computed by weight basis, and not until 8 per cent and 10 per cent were used was there any definite sign of plant kill. However, even at these rates, the percentage kill was significantly inferior to any of the plots where either ammonium sulfate or sodium bisulfate was used.

"These results, even though they are not conclusive, would indicate that a highly acid reaction does not necessarily activate the Sinox from the standpoint of weed kill. Sodium bisulfate is more acid than ammonium sulfate and when added to solution of Sinox produces a very rapid physical change, as measured by color of the solution. Approximately three pounds of sodium bisulfate when added to 100 gallons of 1 per cent Sinox solution will change the color from orange yellow to a "milky" or colorless solution. Ammonium sulfate produces only a slight change in color. Sulfuric acid at low percentages produces a more rapid change in color than sodium bisulfate. However a highly acid solution has not increased plant kills. This is further substantiated from the fact that in every case where sulfuric acid was used, the results were definitely inferior to ammonium sulfate or sodium bisulfate. Further tests are being conducted with a number of other chemicals used as activators with various degrees of acid reaction.

"The effect of ammonium sulfate as an activator on Sinox is further brought out in Table 3. This shows the results of various test plots conducted on nightshade, Solanum nigrum, growing in canning peas. Sprays were applied at various rates, using Sinox alone and Sinox with the addition of ammonium sulfate. The treatments were made at low concentrations of 1/2 of one per cent solution and increasing the rate up to two per cent solution on a weight basis. It is noted that where Sinox was used alone the percentage kill is negligible or at the best, even at a two per cent solution is only slightly above 50 per cent. When ammonium sulfate was added, even in the low ratios of 1/2 of one per cent of each of the two chemicals, the percentage of plant kill was significantly greater than in those trials where as much as two per cent Sinox alone was used. A solution made up of 0.8 per cent of each of the chemicals was very effective in killing nightshade plants, as 90 per cent or more of the plants growing in the plots were killed at this rate. It will be further noted that as the solution increased in concentration above 0.8 per cent, all trials were 100 per cent effective, but it was also found that the higher concentrations, notably the two per cent solution showed a definite injury to the pea plants. This is further evidence of the activation from the ammonium sulfate because the two per cent solution of the Sinox when used alone showed very little if any injury to the pea plants.

Table 2.

Comparison of Chemicals used as Activators with Dinitro  
Cresol as a Selective Spray

Weed - Ranunculus arvensis.			Crop - Chewink's Fescue		
Sinox	Pounds Chemical per Acre		: Sulfuric Acid	: Per cent	: Plants Killed : Average per : Quadrat
	: Ammonium Sulfate	: Sodium Bisulfate			
20	-	-	-	-	0
20	15	-	-	-	15
20	25	-	-	-	56
20	45	-	-	-	88
20	60	-	-	-	100
20	80	-	-	-	100
-	80	-	-	-	0
20	-	-	-	-	0
20	-	15	-	-	12
20	-	25	-	-	58
20	-	45	-	-	98
20	-	60	-	-	100
20	-	80	-	-	100
-	-	80	-	-	0
20	-	-	4	-	0
20	-	-	5	-	0
20	-	-	6	-	0
20	-	-	8	-	30
20	-	-	10	-	47
-	-	-	10	-	0

Table 3.

Effect of Dinitro Cresol - Ammonium Sulfate Spray  
on Nightshade Solanum nigrum Growing in Field  
Peas

Per Cent Solution 100 gallons per acre	: Ammonium Sulfate	Number Nightshade plants per square foot		: Per Cent Kill
		: Before Treatment	: After Treatment	
0.5	None	8	8	0
0.8	"	10	9	0
1.0	"	11	9	18
1.5	"	17	15	11
1.8	"	20	15	25
2.0	"	15	5	66
0.5	0.5	9	2	77
0.8	0.8	23	1	96
1.0	1.0	19	0	100
1.8	1.8	13	0	100
2.0	2.0	26	0	100
1.5	5.0	17	0	100



"It might be well to mention at this time a definite characteristic of the nightshade plants in regard to their reaction to the spray. The nightshade plants, even though the leaves are killed by the spray, have the ability to send up new shoots from the crown of the plant unless the spraying is done when the plants are small. After the plant attained from four to five leaves, this plant characteristic was found to exist for all tests that were made.

"Additional information where low concentrations of ammonium sulfate gave activation to Sinox for weed-killing purposes is shown in Table 4. Three different rates of Sinox were used. Five and eight pounds of Sinox per acre when used alone showed little or no kill. Even at 10 pounds per acre, the percentage of nightshade plants that were killed was only 18 per cent. It was found, however, that with the addition of only one pound of ammonium sulfate the effectiveness began to increase and the percentage of plants killed increased with the increase of the ammonium sulfate. However, the rate of five pounds, of Sinox was too low even when 10 pounds of ammonium sulfate were included. The plants killed at this rate were 76 per cent. Eight pounds of Sinox when used alone gave a negligible kill of nightshade plants, but when one pound of ammonium sulfate was added to the eight pounds of Sinox, the percentage kill was 41 per cent. Here again at this rate of Sinox, the increase of plants killed showed a definite response as the ammonium sulfate was increased, and where equal amounts of Sinox and ammonium sulfate, namely eight pounds per acre, were used there was 100 per cent kill of the nightshade plants. The results with 10 pounds of Sinox were comparable as regards activation with the ammonium sulfate. The percentage of plants killed when 10 pounds of Sinox were used alone was only 18 per cent. Where one pound and three pounds of sulfate were added, the percentage of plants killed was 27 per cent and 83 per cent respectively. All other rates of ammonium sulfate with the 10 pounds of Sinox gave from 93 to 100 per cent kills.

Table 4.

Effect of Rates of Application of Ammonium Sulfate with  
Dinitro Cresol on Nightshade Plants, *Solanum nigrum*  
Growing in Peas.

Pounds per Acre		: Average Number of Nightshade:		Per cent Kill
Sinox	: Ammonium Sulfate	: Before Treatment	: After Treatment	
5	None	10	10	0
5	1 lb. per A.	17	15	11
5	2 " "	14	9	35
5	3 " "	10	4	60
5	4 " "	19	7	63
5	5 " "	14	5	64
5	10 " "	13	3	76
8	None	9	8	0
8	1 lb. per A.	22	13	41
8	2 " "	15	4	73
8	3 " "	17	5	70
8	5 " "	21	4	80
8	8 " "	19	0	100
8	10 " "	13	1	100
10	None	11	9	18
10	1 lb. per A.	26	19	27
10	3 " "	18	3	83
10	5 " "	11	0	100
10	7 " "	31	2	93
10	10 " "	17	0	100

"The results of a large number of experimental and demonstrational trials with the use of activators, principally ammonium sulfate, have definitely shown that the combination of this fertilizer with the Sinox greatly stimulates the ability to kill broad-leaved annual weeds over the method where Sinox is used alone. There are undoubtedly other chemicals that will show this ability to activate the Sinox for this purpose and it has been shown that sodium bisulfate is one chemical with apparently the same degree of activation as the ammonium sulfate. However, the advantages of ammonium sulfate over the sodium bisulfate have already been pointed out. Further investigations are underway with a number of different chemicals to test other phases of this work. Laboratory trials for the study of the chemical reaction that takes place when ammonium sulfate is added to the Sinox are also underway.

"There are many advantages to be considered when using ammonium sulfate as an activator for Sinox. The cost of the materials for the spray program is significantly reduced. At present prices, approximately 10 pounds of ammonium sulfate are equal to one pound of Sinox in cost. Ten pounds of ammonium sulfate will replace two pounds of Sinox in the spray solution and will give equal if not better results. Under average conditions, the difference will be greater, which will be definitely in favor of the Sinox-sulfate combination as far as price is concerned.

"The reaction of the combination on plant vegetation is greatly accelerated over the use of Sinox alone. This is an important factor when weather conditions are considered. Sinox used alone requires from one day to three or four days and even longer before the maximum chemical reaction takes place with vegetation, causing complete death. With the addition of ammonium sulfate, this reaction is greatly accelerated and even a few hours after application the results are definitely noticeable. This factor is significant and important when rains and dews occur. At the time of year when spraying will be done, the weather conditions are often unsettled and it is not always possible to find the two or three days of good weather following application that are required when Sinox is used alone. It is, therefore, possible to reduce the interval where successful treatment may be made to only a few hours as compared with days with the earlier method. Size of plant growth does not limit the use of this combination to the same degree as when Sinox is used alone. It is, however, still effective on weed plants that have reached a growth that cannot possibly be killed if Sinox is used without the ammonium sulfate. One notable example was found at the Oregon Station this year in which common mustard, Brassica species, was sprayed when it was in bloom, and gave at least a 95 per cent kill of the weed plants. Because of this fact, the spraying operation can be conducted over a longer period of time, and more economical use can be made of the spray equipment.

"Another important factor and one which is probably the most important is the stimulating effect of ammonium sulfate on crop production. The amount of ammonium sulfate that can be used will depend on growing conditions, principally the rainfall. It is not always possible to use large amounts of sulfate in areas of low rainfall, but at least some sulfate can be used to good advantage. In many localities at least 50 pounds of ammonium sulfate per acre can be used, and this definitely has shown a great stimulating effect which increases crop yields more than enough to pay for the material added. Even in areas of low rainfall, as demonstrated this past year, as little as 25 pounds of ammonium sulfate can be added to good advantage."

At this time the President appointed the Nominating and Resolutions Committees.

The Nominating Committee:

Earl Hutchings, Utah, Chairman.  
George Schweis, Nevada.  
Charles Gaines, Washington.

Resolutions Committee:

Harry Spence, Idaho, Chairman.  
Walter S. Ball, California.  
George Stallins, Utah.

Dr. S. C. Salmon, Bureau of Plant Industry, U.S.D.A. was called upon to report on the Weed Research Conference held in Nebraska in February, 1940.

"The conference of weed research workers at Lincoln, Nebraska, in February, 1940, was for the purpose of giving critical consideration to the various research programs under way and make such modifications, changes, and additions as circumstances seemed to justify. Nearly all States from Minnesota and Montana to Nebraska and Kansas, and from Illinois to California were represented. Every representative reported freely of his experience or experiments and as a result the latest information was made available for such use as might be made of it in developing a better and more effective program.

"Approximately two full days were spent in hearing reports from various workers, one day in a general discussion of objectives, changes, and future plans, and a fourth day in discussing specific ways and means of putting the various suggested changes into effect.

"Research work under way was reported upon from Hays and Manhattan, Kans., York, Nebraska, Cherokee and Ames, Iowa, Urbana, Illinois, Lambertton and St. Paul, Minn., Brookings, So. Dak., Bozeman, Mont., Fort Collins, Colo., Logan, Utah, Davis, Calif., Fallon, Nevada, Pullman, Wash., and Moscow, Idaho.

"One of the outstanding facts brought out at this conference is the remarkable agreement in most experimental results secured at various locations. Differences in calendar dates, climate, and weather must of course be considered, but when this is done it appears that the principles determining control or eradication are much the same wherever weeds grow.

"Perhaps the most outstanding and immediately useful results reported were those pertaining to frequency of cultivation. All who reported on such experiments agreed that cultivation every two weeks (less frequently in some cases) is as effective in eradicating bindweed as cultivating as soon as the weeds emerge, which was the standard recommendation until about three years ago. Some data suggest that the less frequent cultivation may be even more effective than cultivation at emergence. It was indicated, also, that cultivation at the less frequent intervals is being recommended and used in several States. In Kansas, for example, about 50,000 acres were so cultivated in 1939 and it is anticipated that as large or perhaps a larger acreage will be cultivated in a similar manner in 1940. The number of cultivations required for eradication by this method is approximately only half that required when cultivated at emergence.

"It was pointed out, also, that the experimental data indicate that the most effective interval between cultivations is probably not the same for all seasons of the year, and is probably quite different after the bindweed is weakened by successive cultivations than earlier. To what extent these facts may modify practical recommendations, remains to be determined.

"Data relating to the time of the year at which a cultivation program should begin was reported from a number of States. As might be expected, the variation from season to season has been much and the fluctuations have had a marked effect. Results, however, agree with the root reserve curves in suggesting the spring of the year and between two and four weeks after emergence of the bindweed as probably the best time to begin cultivation. It was suggested that beginning after small grain harvest, as many farmers would prefer to do, is probably a desirable practice so far as bindweed control is concerned, and especially so if there is sufficient moisture in the soil to promote the growth of the bindweed.

"Marked differences in the period required for eradication were reported. At Cherokee, Iowa, for example, some plots have been cultivated for four years without

complete eradication, whereas at Hays, Kansas, two years' cultivation is always sufficient and a shorter period is often fully effective. Also marked differences between fields on the same farm or patches in the same field were reported. These differences appear to be related to the age of the bindweed, the depth of root penetration, and the quantity of reserve materials stored in the roots.

"Perhaps the most significant results in relation to future progress reported at the conference were those relating to competitive crops. The data reported were - to say the least - encouraging. It was shown that good crops can be grown on bindweed-infested land with very little extra expense; also that cultivation is just as effective in an alternate fallow and crop system as with continuous cultivation, and that some crops, as would be expected, are much better competitors than others.

"At all other stations from which data were reported, it is apparent that a good crop can be grown on bindweed-infested land if conditions are such that the crop gets started in advance of the bindweed and because of shading or other effects is able to maintain a lead over the bindweed. Winter wheat and winter rye, for example, start off ahead of bindweed in the spring. If sown on ground previously fallowed, they grow vigorously and barring winterkilling serious damage from rootrots or poor stands due to other causes soon shade the ground so thoroughly that the bindweed makes little growth until the crop is nearly mature. Alfalfa also appears to compete satisfactorily if sown on fallow. Soybeans appear to be especially satisfactory for those areas and conditions where a rapid and sustained growth can be depended upon. Likewise sorghos and sudan grass have indicated ability to compete satisfactorily. Millet has generally been unsatisfactory, though there are one or two apparent exceptions reported. Check rowed corn, sorghums drilled in rows, and cultivated, are generally unsatisfactory because of the opportunity for bindweeds to grow in the hills or rows where they cannot be reached by the cultivator and also because of the excellent conditions for rapid growth of the weeds after the crop is laid by for the season.

"Significant data were reported for experiments with herbicides. The most important from a practical point of view were those indicating almost universally that dry applications of sodium chlorate are as effective as the spray applications. The saving in cost (for those not having spraying equipment), and the reduction in fire hazards, are obviously important. Late summer or fall applications were universally reported as giving the most satisfactory results. Rates of application were shown to be quite variable. It appeared to be agreed that it is not generally practical to apply enough chlorate to assure a 100 percent kill with one application, and that follow-up spotting treatments will generally be necessary.

"Data were reported for several other herbicides but except for carbon bisulphide none appear to be more effective than sodium chlorate.

"Much work was reported with root reserves, especially as regards trends during the season, trends after cultivation, relative quantities of reserves in different soil horizons, etc. These studies have been very useful in providing a better understanding of the life history of perennial weeds, especially as regards the most vulnerable periods of growth and means of attacking them. Studies of the disappearance of sodium chlorate in soils containing different quantities of organic matter, and at different temperatures and with moisture contents, are also providing a better understanding of the action of sodium chlorate which in turn will lead to more effective usage. The discovery of the effect of nitrates on chlorate toxicity is being applied to practical problems such as the residual effect of chlorates.

"A number of changes in the research program were agreed upon which should make it more effective in the future. Among these it was agreed to discontinue the trend of reserves during the season study; also the trends after cultivation as soon as some

of the apparent discrepancies between these trends and the empirical experiments on frequency of cultivation can be cleared up. The trends during the season, remarkably uniform at each location from season to season (providing differences in growth due to moisture) are taken into account, and from one location to another (providing differences in the beginning of spring growth in relation to calendar dates are accounted for). While it is apparent that there are some points not entirely clear, it was agreed that the point of diminishing returns had been reached and that funds could be more usefully employed elsewhere. There appears to be some discrepancy at certain points between the trends of reserves after cultivation and the frequency of cultivation experiment. This appears to be due in part at least to the irregularity of emergence after cultivation, sometimes observed. It seemed desirable to continue this study until the relations can be clarified.

"The time of beginning cultivation experiments was simplified somewhat and a few changes of minor importance were made in the frequency of cultivation experiments.

"The desirability of more work relative to competitive crops, including a study of root reserves under competitive crops, was emphasized, and steps were taken to insure such studies."

Following this paper, the possibilities of having stations established on irrigated areas was quite thoroughly discussed. It was pointed out that some of the most serious problems are on irrigated lands, where greatest expenditures are involved.

Dr. Salmon stated that some work was being carried on under irrigated conditions in Nevada. Lack of funds, however, was the final answer.

Mr. C. I. Seely, Associate Agronomist, Bureau of Plant Industry, United States Department of Agriculture, in charge of the Idaho Station, reported on Root Reserve Studies at Genesee.

"Root reserve studies have been made at the Federal Weed Experiment Station at Genesee, Idaho, in cooperation with the experiment stations of the Pacific Northwest on wild morning glory, white top, Russian knapweed, and Canada thistle. Of these studies those on morning glory have been the most extensive since it was desired to establish the relation between root reserve trends and actual control measures and the area of morning glory was much better suited to this type of work. It has been found that on morning glory the time of beginning cultivation is correlated with the normal trend of root reserves and that the frequency of cultivation is correlated with the trend of reserves following a single cultivation. It has also been shown on morning glory that root reserve studies are an excellent measure of the relative effectiveness of different methods of control and in many cases gives results two or three seasons previous to actual eradication. Working from this knowledge obtained on morning glory, studies of normal trends, trends after cultivation, and the effect of various frequencies of cultivation on the root reserves have been made for the other three weeds to obtain quick results on the control of these weeds. At the same time actual experiments on frequencies of cultivation are being run to check the results obtained by root studies.

"In general the reserve trends of these four weeds show that we have essentially two types of root reserve trends. Strangely enough, morning glory and white top fall within one group and Russian knapweed and Canada thistle in the other. Although from casual observation one would think that morning glory and white top have about the least in common of any two weeds they agree in the one essential factor in control, i.e. their reserve trends are the same. The two groups are distinguished by the relative length of time between the starting of growth in the spring and the time they start blooming. In white top and morning glory this period is usually a month or six

weeks, while in Canada thistle and Russian knapweed the period is usually about three months, i. e., twice as long.

"The reserve curves of the short period plants are characterized by a rapid drop in root reserves for about a month after emergence (to the early bud stage), and this is followed by a sharp rise in reserves until the first seeds are ripe which is usually followed by a slow drop until the next spring.

"The reserve curve of the long period plants differs in that after the initial drop in reserves for a period of about a month in the spring there is usually a rise in the reserve level until the early bud stage, a month or six weeks later. At this point a second drop occurs which is not as great as the first reduction in reserves. After the second drop the reserves rise very rapidly until the seeds start to ripen and then usually fall slowly until the next spring.

"It can be seen that the major difference between the two types of weeds is that in the long period plants there are two low points in the reserve curve, while in the short period plants there is only one. This difference is directly associated with the control of the two types. In general the cultivation of the short period plants should start relatively early in the season and continue at relatively frequent intervals. The recommendation at present is every 14 days although a frequency of 12 days after emergence has been the most satisfactory and on morning glory has saved one season of cultivation over any other frequency. It is apparently possible to kill with cultivations made every 21 days but the margin of safety in this case is small and the period required to kill is somewhat longer, and hence 14 days is recommended as a convenient and safe interval. It is recommended that cultivation start two weeks after first emergence in the spring although again one month is satisfactory. By starting two weeks after emergence a margin of safety is provided and at the same time conserves moisture for later in the season if available moisture becomes a factor in control.

"At the present time the recommendations for the long period plants are the same as for the short period plants to prevent confusion in the minds of the farmers, but in the long period plants cultivation may start relatively late in the season and continue at relatively wide intervals. Under non-irrigated conditions it is probably desirable to start relatively early to conserve moisture, but under irrigation or where moisture is not a limiting factor it may start at the early bud stage. We have found that cultivations made every 28 days on Canada Thistle and Russian knapweed were as effective or more effective than those made more frequently. Under our conditions a growth of about five inches on Canada thistle and about seven inches on Russian knapweed is desirable before starting cultivation and between cultivations. The amount of growth, however, is not a safe guide to frequency of cultivation since this varies rather markedly with the conditions under which the plant is growing. It is given here merely as an indication of the relative time between cultivations.

"A method of control of morning glory involving the use of an alternate fall competing crop and heavy cultivation which was developed at the station is coming into rather wide use, and consequently, it might be well to mention a few of the things involved in this method. This is particularly true since in a number of cases persons with little knowledge of the method have modified the recommendations to the probable detriment of the farmers. The recommendations at present for this method are to plow immediately after harvest and cultivate every 14 days the balance of the season, if the morning glory makes any re-growth. Cultivation is started two weeks after first emergence the next spring and continued at a 14 day interval until time to seed in the fall. Just previous to seeding, the fallow is plowed deep, eight to ten inches, and is then seeded at a somewhat heavier than normal rate of seeding. This method gives very satisfactory crops of winter barley, winter rye, and winter wheat, and for control

purposes they are preferred in that order. The data on this method obtained to date indicate that eradication can be obtained with approximately the same number of cultivation seasons as if continuous cultivation is used. If properly handled there should be little if any seed produced in the first crop and none thereafter under this system. Another interesting point in this connection is that there does not seem to be any relation between the amount of morning glory in the first crop and the time required to kill by this method. In fact the method which has given the least plants in this system has for us given the least final control.

"A point which has come up on the cultivation of white top probably deserves some comment. White top frequently goes into a semi-dormancy or complete dormancy during the summer months in a cultivation program. This dormancy has been associated with lack of moisture in the minds of many people, although this apparently is not the case. The dormancy seems to be produced by high soil temperatures and hence, under irrigation, it is frequently possible to start growth again by lowering the soil temperature with irrigation. As far as the control is concerned, it seems desirable to prevent this dormancy if possible, but if it cannot be prevented, then the frequency of cultivation can be widened. It seems to be desirable in most cases to continue cultivation during the dormant period, but the interval between cultivations can be widened to probably once a month as long as the plants are dormant. The actual degree of dormancy is the factor and the frequency should be designed to give cultivations about 12 days after first emergence.

"Another factor in the cultivation of white top in many localities is that growth starts a month or six weeks before the ground is dry enough to work in the spring. A device which can be used to prevent this is a deep plowing late in the fall. This will usually delay growth enough in the spring to make it possible to start cultivation at the right time, which has a marked tendency to delay the summer dormant period and hence shortens the period required for eradication.

"The question of burning for weed control has come up frequently during the past few years, and since we have been running both root reserve studies after burning and actual burning studies, it might be well to mention the conclusions we have arrived at up to the present time. These conclusions are entirely tentative, since this work was not started until the spring of 1939, but is given as the best information that we have at the present time. Burning seems to be more effective than cultivation at the same frequency since it depletes the root reserves more rapidly. This appears to be the result of a stimulation of bud production on the roots which produces more growth in the same period of time. The frequency of burning should probably be about the same as for cultivation, i. e., every 14 days. The cost of control by burning is much greater than for cultivation and seems to be about the same as for chemicals. For this reason, it would seem to be desirable at the present time to use burning only where other methods cannot be used satisfactorily. Examples of this would be ditch banks, dikes, orchards, rocky soils, and heavily sub-irrigated lands. We have used both the "searing method" and the black burn and have not been able to find any great advantage for the black burn. Since the "searing method" is by far the cheaper of the two, it seems to be the logical method to use, although under our conditions we usually do not get any kill below the surface of the ground with this method. We have enlarged our tests of burning this year and hope to have some rather definite information on this method in another year or two."

Mr. W. O. Passmore, County Agent, Kittitas County, Ellensburg, Washington, reported on Weed Control Under the Agricultural Conservation Program in Washington.

"The Agricultural Conservation Program has been an outstanding factor in assisting weed control work in Washington. Cooperating farmers carried out approved weed control practices under supervision on 33,650 acres during the four years 1936 to

1939 inclusive. Thirty four of the thirty nine counties participated to some extent in this total. Participation by years follows:

Participation in Weed Control				
	1936	1937	1938	1939
Counties participating	26	29	10	9
Total acres approved	8359	6074	8285	10924

"Rules and regulations for weed control payments under the Agricultural Conservation Program have varied somewhat during the four years but several have been constant.

1. Payments for weed control are limited to the Soil Building Allowance for the farm.

2. Prior approval of the practice and of the plot by the County Committee is required.

3. Inspection throughout the season is provided.

"The principal variable factors which are believed most important in their effect on the adaptation of the weed control practice have been --

First -- The type of land on which the practice could be carried out. In 1936, 1937 and 1938 it was applicable on cropland only. In 1937, orchard land and non crop pasture were included and for 1940 no restrictions are made on the type of land on which control measures may be approved.

Second -- The list of specific noxious weeds on which the weed control practice might be carried out to earn payments. Eleven weeds were listed for 1936; six for 1937 to 1940. Weeds included for all five years are: Canada Thistle; Bindweed or Wild Morning Glory; White Top or Hoary Cress; Leafy Spurge; and Russian Knapweed. Those included in 1936 but subsequently dropped from the list are: Perennial Sow Thistle; Blue Flowering Lettuce; Siberian Mustard; Poverty Weed; Wild Snapdragon; and Perennial Ground Cherry. Most Washington folks were sorry to see some of these omitted but felt that they had pressed the issue as far as was desirable for fear of losing the weed control practice entirely.

Third -- The Weed control practice was accepted in any area in 1936 and 1937 but in 1938 it was restricted to "organized weed control areas". Where 26 and 29 counties had participated in 1936 and 1937 respectively, this change seems largely responsible for the reduction in 1938 and 1939 to 10 and 9 cooperating counties. Although the wording is unchanged a more liberal interpretation may result in wider participation again in 1940.

Fourth -- Payment per acre under the program in 1936 and 1937 was \$10.00 for chemicals and \$5.00 for periodic cultivation; in 1938 to 1940 the payment has been \$7.50 per acre for either chemical or tillage control. The change in rates has had little apparent effect on the extent of the practice because the total payment is limited by the soil building allowance. Furthermore, many farmers have been encouraged by this help to carry out weed control work on a larger acreage than that on which they could be paid at these specified rates. In 1936 and 1937 a total of 3,785 acres were treated with chemicals, as compared to 10,648 acres of periodic cultivation. No segregation is available for the last two years.



"Specifications for the weed practice are revised each year, making such changes as seem necessary or advisable. Recommendations originating in the counties are transmitted to the State Committee by the County Committee. These are reviewed by the State Committee with the assistance and advice of the Agricultural Experiment Station of the State College. Final specifications are made by the State Committee with the approval of Western Region of the Agricultural Adjustment Administration.

"Regulations for 1940 are quoted as follows:

"Controlling Noxious Weeds"

"\$7.50 for each acre on which seriously infested plots of perennial noxious weeds, in organized weed-control areas, are controlled by tillage methods or by the use of chemicals. Credit under this practice will be given for control of the following weeds: Canada thistle, bindweed or wild morning glory, white top or hoary cress, leafy spurge, Klamath weed or St. Johnswort, and Russian knapweed. Prior approval of the county committee must be obtained.

"Specifications--Note.--An organized weed-control district is an area defined under State statute as an area wherein designated officials are authorized to require effective weed-control practices to be instituted on all land on which such practices are necessary to control or eradicate noxious weeds in such area, or any other organized area comprising all or a substantial part of a county wherein the State committee finds that effective weed-control practices will be instituted on all land on which such practices are necessary to control or eradicate noxious weeds in such area.

(a) Filing location of infested plot with the county committee.--The exact location of the seriously infested plot or plots, together with a statement regarding the nature of the infestation, shall be filed with the county committee prior to the institution of weed-control measures; provided, however, if control measures have been instituted in accordance with the foregoing specifications, such statement shall be filed with the committee not later than 15 days after the appearance of the weeds in the spring.

(b) Perennial noxious weeds shall include: Canada thistle, bindweed, or wild morning glory, white top or hoary cress, leafy spurge, Russian knapweed, and Klamath weed (St. Johnswort, goatweed).

(c) Control by chemical treatment of plots seriously infested with perennial noxious weeds.--Chlorates or other chemicals accomplishing equivalent results shall be used. If chlorate is used, application shall be made at the rate of not less than 300 lbs. per acre, or 2 lbs. per square rod. Atlacide 3 lbs. per square rod. Carbon bisulphide, 2 ounces per hole, the holes to be 18 inches apart each way, holes not more than 8 inches deep, and should be covered and thoroughly tamped after application of chemical. Chemical treatment with chlorates will not be approved for areas where there may be considerable loss of the chemical in drainage water, nor for swampy or constantly subirrigated areas, nor for areas subject to overflow or washing from irrigation water or stream flow.

"During the crop year in which the chemical treatment is effected, the soil of the weed-infested chemically-treated area must not be plowed, disced, harrowed, or otherwise stirred. Weeds must be cut sufficiently early to prevent seed maturity, and the weed-infested crop, if any, on the chemically-treated land should be mowed and destroyed in the infested area.

(d) On all areas with a slope in excess of 5 percent where chlorates are applied the treated area must be protected from erosion by trench above and below the area to

be treated, or the incorporation of straw on the surface of the treated area, or the application of  $1\frac{1}{2}$  pounds of gypsum per square rod is recommended to prevent the soil from becoming slick and eroding.

(e) Control by periodic cultivation of plots seriously infested with perennial noxious weeds.--The first tillage operation shall consist of plowing or discing in order to loosen the soil, aid in subsequent tillage and destroy first growth of weeds. Subsequent tillage must sever plants below the surface of the soil, and must be repeated at such intervals as are necessary to prevent green growth from being visible, and as late in the fall as the weeds continue to recover. In the case of wild morning glory, cultivation must begin at the time the plants are budded and before they come out into full bloom. A duckfoot cultivator, blade weeder, rod weeder, where they will do satisfactory work, or some other implement which will do work of equivalent character must be used. The disc harrow and the spring tooth harrow shall not be considered satisfactory implements in the control of perennial noxious weeds. In the event that surface cultivation creates a dusty surface into which weed tops are dragged down rather than cut off, the land shall be replowed deeply enough to bring firmer soil to the surface. Any perennial weeds missed in cultivation must be kept load off.

(f) The control of perennial noxious weeds according to the foregoing specifications must be accomplished in a thoroughly workmanlike manner and subject at all times to supervision by the county committee. Additional information relative to proved methods of accomplished weed control may be secured through the county committee from the Extension Service.

(g) Size of area to qualify for weed control.--Payments for noxious weed control practices shall not be less than a quarter of an acre of noxious weeds for any farm. It is not necessary, however, that this acreage be in one patch, but smaller patches may be combined in order to satisfy this requirement. When the infestation is complete or when individual patches are so close together in any area that omission of chemical treatment or cultivation between patches is impracticable, the entire area occupied by the patches, including 6 feet outside actual infestation, shall be considered the infested area. Where patches are sufficiently scattered to justify treatment or culture in patches, the infested area shall include 6 feet outside the place where any plants show. All areas shall be sufficiently marked so that there will be no difficulty in knowing just where the boundary of each patch is located at any time.

(h) Infested areas must be inspected at least twice, at the discretion of the county committee, during the summer, but preferably once a month after cultivation starts.

"During 1939 and 1940, control of water hemlock and larksour has been added to the Range Conservation program as a supplemental practice to deferred grazing. Up to the amount available, payments are offered for eradication of larksour at 35¢ per square rod and of water hemlock at \$1.00 per square rod. Only a very limited use has been made of this practice.

"Numerous recommendations were made by the County Committee for improvement of the weed control specifications for 1941 but, regardless of the outcome, the Agricultural Conservation Committee has been an important factor in securing more and better weed control work in Washington."

The meeting adjourned at 5:00 P. M.

## Third Annual Western Weed Control Conference.

Saturday Morning, June 22, 1940.

Meeting called to order at 9:10 A.M.

The first paper was that of H. E. Morris, Head of Botany Department, Montana Experiment Station, Bozeman, entitled "Seed Inspection for Better Weed Control".

"The Montana Seed Growers Association, in cooperation with the Agronomy Department of the Montana Experiment Station and the Montana Extension Service, has fostered a rigid program of seed standardization. This program provides for a recognition of superior varieties from the standpoint of adaptation and other desirable characteristics, and the recommendation of these as standard varieties for the state. Under this selective program the standard varieties have been held to a minimum, yet not excluding varieties which have proven of value in other states after they have been tested and proven desirable under Montana conditions.

"The standard varieties for 1940, as recognized by the Montana Seed Growers Association include six varieties of spring wheat, four of winter wheat, four of oats, two of barley, one of flax, three of rye, three of alfalfa, one of red clover, two of crested wheat, and one of beans.

"This procedure has had the effect of restricting the number of varieties that can be certified and at the same time the field inspectors can become more familiar with them than if a great number were on the list.

"Our certification service, briefly outlined, is about as follows: The Montana Seed Growers Association is governed by a Board of five Directors, whose term of office is two years; one from each of three districts, and two from the fourth district. These districts were determined when the association was first organized. The election of the Directors is so divided as to make the board a continuing one. The Secretary of the Association is Ralph D. Mercer, with whom many of you are acquainted.

"At the annual meeting of the Directors, usually held early in the year, recommendations are received for any additions or deletions from the previous list of standard varieties. These recommendations are given thorough consideration and a decision rendered regarding each recommendation. By this method the list of standard varieties is being yearly revised according to the best information. In submitting recommendations to the Directors it is necessary to also submit all supporting evidence in order that the Directors may have all the information available before them in rendering their decision. Rules for certification are also considered and modified if necessary at the annual meeting of the Board, but subject to the final approval by the Agronomy Department of Montana State College.

"All growers must be approved by the County Agent, as only a limited number of registered small grain growers are allocated to each county. There is some slight variation from this regarding registered growers for alfalfa and other crops. All registered growers must be members of the Montana Seed Growers Association and be governed by the laws of the association. Growers must apply for inspection before a stated time and the stipulated fee must accompany each application. All fields must be carefully rogued to eliminate weeds, other crop plants, etc., and this work must be done before the inspector arrives.

"After the crop is harvested and milled a representative sample of the seed offered for sale must be submitted to the Secretary for purity and germination tests.

These tests are made in the Seed Laboratory located on the campus of Montana State College. On the basis of this test the seed is classified as registered Blue or Red Tag, depending upon the requirements of these grades.

"The field inspection work is done by experienced men who are familiar with the standard varieties. Each field is visited at least once and if the occasion demands a second visit may be made. In all the inspection work, special emphasis has been placed on variety purity, absence of noxious weeds, absence of diseases, especially loose smut of wheat and barley and approved cultural methods. A rigid inspection has been the rule and laxity of the grower in the observance of the rules has not been tolerated. Crested wheat grass and alfalfa seed are cleaned in authorized mills and elevators and sealed in the sack when they meet requirements.

"In addition to the inspection work the association has supported and fostered local, county, district, state and national shows where pure seeds are exhibited and they have also been very active in conducting an educational program for pure seed in the state.

"It is believed that Montana stands very high on the list in the pure seed work of the western states."

At this time Ball called for a discussion of burning for control and eradication of perennial weeds, stating that it had been mentioned by Mr. Seely in his paper; and that in the May, 1940, issue of *The Reclamation Era*, C. L. Corkins, our Wyoming representative, published a very interesting article on burning. Ball suggested that, inasmuch as Mr. Corkins was not present to lead the discussion, the article be read and, with the consent of the group, Ball read the following:

"Continuous Burning to Eradicate Noxious Weeds

By C. L. Corkins, State Entomologist, and A. B. Elledge, County Pest Inspector, Powell, Wyoming.

"In the January 1940 issue of the *Reclamation Era* brief mention was made of the use of continuous burning for noxious weed eradication. Since this method seems to have a practical appeal to many people, especially farmers, and numerous questions have been raised about it, an enlargement upon the subject seems desirable.

"Continuous burning is still in the experimental stage, but it offers hopeful prospects of becoming cheaper and more practical and efficient than the chemical methods for small patches of weeds under certain conditions. As yet we are only sure of our ground in saying that it is a better eradicator than chlorate on White Top, *Lepidium draba*, and Canada thistle, *Cirsium arvense*. It will kill other noxious weeds, but refinements in our methods will have to be made before it will be cheaper than chlorate on bindweed and Russian knapweed. But refinements are possible, for this method is new and our experience yet very limited. Our test work was started in 1937. Extensive field operations were started for the first time during the spring of 1939. No fundamental research has yet been made and such important questions as (a) the longest possible allowable interval between applications, (b) the best time to start treatment, (c) the proper time to renew treatment the second year, and (d) the exact optimum degree of burning are yet incompletely or wholly unanswered. So it is hoped that this article may not only stimulate practical trials elsewhere, but also initiate research.

"When the test plots were inaugurated in 1937, it was thought that continuous burning might work very much like continuous cultivation by depleting the starch and sugar reserves in the root system and by preventing their manufacture in the leaves of the plant. As a consequence, we started by completely burning the plants down to the ground, which was referred to by the workmen as a "tight burn." The reaction

of the plants was very similar to a clean cut by a tool at the surface of the ground. In a day or two, new growth "popped" right up and they quickly reestablished themselves. A 10- to 14-day interval seemed to be as long as could be left between treatments. The regrowth was so rapid and persistent the first year that we became a bit discouraged with the project. This continued until midseason the second year and then results began showing up rapidly. None of the test plots which showed complete eradication has ever since produced any signs of return of weeds. However, the necessity of such frequent treatments made the method doubtful as to practical value. And then one of the county pest inspectors reported the unusual results of an entirely accidental experience. Herein lies a little story of stumbling onto an important fact which has its counterpart in much of the history of progress.

"John Hendreschke, county pest inspector of the Eden Valley, Wyo., was burning a patch of bindweed which had developed mature seed. The growth was heavy and thick and John was doing a good job of burning it all up. In fact, he was doing such a good job that by the time it was half done, his burning fuel had been three-fourths used up. So it was a matter either of making a long trip after more fuel or taking a chance on getting the job done with a rapid, light burning. He chose the latter and proceeded to quickly sear the tops of the plants on the rest of the patch.

"John got his surprise when he went back to treat this patch the next summer. The part which he had given a "good job" of heavy burning seemed to have been stimulated by the treatment and the growth was heavier and ranker than before. The part that he had given the "poor job" of light searing of the top foliage was thinned out at least half and the remaining plants were sickly and weak.

#### The Searing Process

"Thus John Hendreschke became the father of the light searing process, which has led the way to the practical application of the burning method. In treating 839 patches of weeds at Powell last year, aggregating 18½ acres over a 101-mile route, the intervals between burnings were lengthened out to 3 to 5 weeks, and none had more than 5 treatments. And the results were far better than with twice as many applications of the light burn.

"It seems that there is some action produced by the light sear besides starch starvation. After treatment, the roots die down into the ground several inches and the plants have a physiological set-back. Just what the action may be is not known. When the deeper roots start dying, they appear as desiccated as if they had been dried out in a hot oven. They look entirely different from the dark brown decayed roots, which have been beset with bacterial rot, produced by continuous cultivation.

"The first burning is given at the pre-budding stage in the spring. This is when the starch reserves are the lowest and the roots in the poorest condition to stand a shock. Whether it is safe to let the plants regrow this long before a second treatment is given is not known. We take no chances and sear them again a couple of weeks ahead of the pre-budding stage. It is believed there should be a fair amount of foliage always present to sear. The plants are allowed to reach the pre-budding stage again the second spring of treatment before burning is started.

"With this method, as with continuous cultivation, there is a wide variability, even on a given weed species, in their resistance to treatment. It is impossible to predict just how long it is going to take to kill a patch of weeds. During the 1939 season of initial treatments, when 5 burnings were given from May to October, 43 plots were eradicated, 267 more than 90 percent killed, and the balance of 579 showed definite signs of weakness. It is indicated that the average number of burnings required will be about 8 or 9 over a 2-year period for White Top and Canada Thistle. Some will

doubtless require more treatments and a few will probably take 3 seasons to completely eradicate. There has been one very prominent factor of variability noted. Weeds on dry areas react more quickly to burning than those in moist or wet situations. This may be correlated with volume of root system, but such does not yet appear to be at certain.

"We now feel very hopeful about one important experience with the burning process, namely, that when eradication is indicated as completed by no return growth over a season's period, eradication is really an accomplished fact. Surface readings of results apparently tell an accurate story. Such is not the case with the chlorate method, for it has been our sad experience that regrowth shows up too frequently when the job was thought completed. Re-treatment of chlorated areas often drives the cost of this method two to three times as high as the initial treatment. One cannot be sure for several years after no new growth has come up that a chlorated weed patch is eradicated, and at times we are doubtful if one ever can be sure.

"The lay-out of the plots for a burning job is exceedingly important. An entire unit of infestation must be completely treated. If one burns only part of an infestation, it will be found that on the edge next to the untreated area, unharmed roots from the untreated plants will grow underneath and into the treated area at least 6 feet a year. So if burning is being used along a fence row or ditch bank adjacent to an infested field, it is imperative that the field be treated by continuous cultivation at the same time.

"Unit statistical data on field operation can be based on only the one initial year of experience we have had so far. This was under public operation in a pest district, where all cost factors had to be considered and the project placed on a large scale of operations over a wide area. Large power equipment, which is described later, was used. An average of 0.95 gallon of burning oil was consumed per square rod. With refinement in the burning equipment, this was cut to 0.42 gallon per square rod for the last treatment. The total average time required per treatment per nozzle per square rod was 6.4 minutes. It is estimated that loss of time in moving the equipment between patches and the making of records accounted for at least half of this time. One man can and should actually light sear a square rod in 2 to 3 minutes. The average cost factors per square rod per treatment were: Labor, 5 cents; burning oil,  $2\frac{1}{2}$  cents; machine and mileage, 2 cents; and administration  $1\frac{1}{2}$  cents; making a total of 11 cents. If the number of applications necessary is 8, the total cost of eradication would be 88 cents per square rod.

"This method is especially applicable to the individual farmer's use, as the only important cash item of expense is the fuel. The necessary equipment is cheap, as a home burning outfit can be rigged up for \$15 or \$20 and may and should be used for other purposes, such as burning annual weeds in waste areas and spraying the garden and orchard. Thus, if this method of eradication is put on a cash outlay basis for the individual operator, it will run only about 16 to 20 cents per square rod for eradication.

"The equipment is designed to burn a very low-grade fuel. Perhaps the most satisfactory fuel is furnace oil, which costs 4 cents per gallon in our area and is generally cheap in the Western States. The more common fuel used in Wyoming is refinery bottom refuse, which is ordinarily a waste product of small cracking plants and runs from 28° to 38° Baumé. To the lower grades is added from 5 to 10 percent distillate to thin it and raise the flash point. This product usually sells at about 2 cents per gallon. Our experience indicates that it is very little cheaper than furnace oil, because it does not completely burn up and more is used per unit area. Some feel that the residue left on the foliage from the use of this oil may be of herbicidal value, but this is doubtful.

"This fuel is burned by running it through a pressure spray pump at 75-pound pressure for the furnace oil and 125-pound pressure for the refuse. The burning gun is merely a 12-foot  $\frac{1}{4}$ -inch iron or copper alloy pipe, with a Chipman or other spray gun cut off at the operator end and a  $\frac{3}{64}$ -inch Chipman weed disk in the flame end. A loop is placed in the rod at the flame end in order to preheat the fuel with its own flame before it is ignited. This loop should be constructed so that the oil is thoroughly heated, but not vaporized. It is important that the Chipman type of disk be used, as it will throw a broad, flat flame that cannot be secured by any other type. It should also be pointed out that extensive trial has shown that the size of the disk outlet cannot be smaller than indicated and a larger one will simply waste fuel.

"Three types of spraying equipment are used to meet varying conditions.

1. The junior size model, 2 horsepower, high pressure spray rig is adaptable to public programs, and will easily run two guns. Larger equipment is unnecessary. This rig is mounted on a truck, and is particularly adapted to use on roadsides and dry waste areas. This outfit can be rigged up for about \$300, without truck.

2. A light power spray rig with a  $\frac{1}{2}$ -horsepower air-cooled motor, mounted on a rubber wheeled light trailer and drawn by a single horse, is best adapted for public programs on irrigated farms and waste areas inaccessible to the truck equipment. The wheel mountings of the trailer should be adjustable, so that the rig can be taken through row crops without damaging them. This is a one-man outfit and can be made for about \$100 complete.

3. The hand orchard type of sprayer is cheap and handy for the individual farmer. The pump may be mounted on a steel drum and constructed complete for not more than \$20.

"Of course the common generator types of burners may be used, but they are both slow and dangerous to operate. We have eliminated them as being entirely impractical.

"The degree of burning of the foliage of the weeds is so important that it should be re-emphasized in closing. The flames should be passed rapidly over the tops of the plants so that they are so lightly seared that they will not wilt until the next day following treatment."

Discussion followed relative to comparative costs, the interval and tonic of burning, and the effects of burning on the root system. It was suggested that intensive study be carried on in an attempt to find what took place in the plant following searing, and whether or not a toxic substance is formed which brings about the kill. It was suggested that Dr. Crafts of the University of California be requested to make such studies. Ball stated he would take it up with the Botany Division at Davis.

The Federal Seed Act and a uniform seed law were next discussed by Professor Hyslop.

"This proposed law follows in some respects the Federal Seed Act and in some respects does not, and I note it provides for primary noxious weeds and secondary noxious weeds; it also provides that the state seed law enforcing agencies may add to or subtract from the list of weeds that may fall in the primary noxious and secondary noxious groupings. Some of the States do not have it, and some do and are trying to get away from it. The labeling requirements are substantially the same as set up in the Federal Seed Act, but I note that the name and approximate number per ounce are required. A good many of the state laws require the number of seeds per pound. In our requirements we are using the number per pound, which means more

to growers than the number per ounce. Some of the seed dealers have tried to specify number of noxious weeds per gram, which gives such a small figure available at present that they will think none present. In this case labeling would be required when they exceed a certain number. From my own point of view I feel that it is necessary if any appear that it should be on the label. I would not be in accord with a state law which would require labeling for noxious weeds only when they exceed a certain tolerance. Since we are concerned primarily with weeds, I think laws that require showing the presence of any noxious weeds are quite desirable. Any agricultural seeds containing noxious weeds are prohibited, and it is unlawful to sell packages containing primary noxious weeds subject to tolerances; but if it is the desire to segregate into primary and secondary groups it would be a good place to institute prohibitions. Primary weeds may be prohibited weeds. In the case of prohibited weeds, I think there should be no tolerance, even though very small traces show noxious weeds, inasmuch as we shall have an immediate problem on our hands. We must establish very definite prohibitions and it is to our interest to do so. Certain exemptions in the provisions of any law should be made and no person shall be subject to the penalties for having sold, offered or exposed for sale, any weeds which were incorrectly labeled which seeds cannot be identified, unless he has failed to take all precautions. There are a number of points that might be made in connection with that exemption."

Mr. Spence added:

"There have been three or four drafts of uniform seed laws, the last draft I have not received yet. There would be a distinct advantage in having a uniform seed law, especially by areas, so far as the Western States are concerned. The first thing that should be emphasized, and this is difficult to do, is to build a uniform list of noxious weeds. That list should contain all noxious weeds in primary and secondary groupings. Thirty-six or thirty-seven States have laws now. Weeds noxious to one are not always noxious to another. The other thing not right from the standpoint of enforcement through this law is that everything depends on additions to the list of noxious weeds after public hearings. From a practical standpoint this is a hard thing to handle, although some think that such leeway is needed. I am not in favor of various things being covered by public hearings as it slows down procedure too much. So far as tolerances are concerned, when we get together the difficulties will be there. One or two States in the West are attempting to tighten up on seed laws. A few years back one or two States had no laws; now the opposite extreme exists. We must take the seed trade into account when making laws and protect the farmers themselves. It is desirable to have a type of law which is fair and will work to prevent groups passing unworkable laws through the legislature."

Mr. Gaines stated:

"There are quite a number of things to be said in favor of uniform seed laws for States. We find many weed seeds noxious in other States shipped into this State. So far as primary and secondary lists of noxious weeds are concerned, it is desirable to make segregations on the primary and secondary weeds and have limitations on certain weeds. Just what weeds we should consider as noxious probably will take some thought and consideration. In regard to public hearings, before any action is taken the retail seed stock moves; it takes 2 or 3 months to go through a hearing and no action on the seed is possible, thus defeating the purpose of the law. Action must be AT ONCE. In checking over this outline Hyslop mentioned some time ago, I believe, that there are desirable features in it but that some must be modified. We should meet on common ground and give and take."



Professor Hyslop continued:

"On the question of noxious weeds, I do hope the Western States can get together and simplify labeling. Regarding screenings, there is nothing about screenings in the proposed uniform seed act. There is in the Federal Seed Act. In the Oregon law there is a provision whereby screenings containing noxious weed seeds are subject to regulation, and we have accomplished quite a little on our own problem in the State as a result of screening regulations. Heretofore a large percentage of the screenings found their way into the sowing of pastures, but this is being reduced by the regulations having to do with screenings containing noxious weed seeds. Quite a number of seed cleaning establishments burn screenings, but the law is being modified, not because of any serious trouble that has arisen, but because of what may arise. Some difficulty was experienced in the beginning because of the difficulty of getting screenings sampled in time. It is to the interest of the seed trade in all States to eliminate noxious weed seeds. The proposed amendment to the seed law will place the responsibility on the grower. Heretofore the responsibility has been on the dealer and the question of legality has arisen there. Oregon allows moving under permit."

Ball stated that the 1937 legislature passed screenings provisions as follows: (Reading from the Agricultural Code of California)

"154.3. Any seed screenings or cleanings from crop seed containing the seed of any pest shall be deemed a public nuisance and shall not be moved from the place they may be unless they have been processed by grinding, or otherwise, to render the seed of any pest incapable of reproduction; said processing to be under the supervision of and to the satisfaction of the commissioner; provided further, that the commissioner may permit the movement of such seed screenings or cleanings for the purpose of destruction or processing. All seed screenings or cleanings from crop seed containing the seed of any pest shall be disposed of by the owner as provided in this section within thirty days after inspection of said crop seed. In the event the owner does not so dispose of said screenings or cleanings, then the person in possession shall immediately so dispose of said screenings or cleanings and shall not be held liable therefor by the owner. (Added by Ch. 857, Stats. 1937; amended by Ch. 614, Stats. 1939.)"

Mr. Ball continued: "The enforcement of this section is under the supervision of the director of agriculture and he can make such rules and regulations as he deems necessary to properly carry out the provisions of this section."

A short discussion followed. The Chairman asked for new business.

Mr. Jenkins asked if it would not be helpful to have the Secretary mail a list of those persons interested in weed work to each state representative so he may submit it to his state extension service and experiment station, requesting that the names listed be placed on their mailing lists. This would keep everyone up to date.

After a short discussion it was properly moved, seconded and carried that the Secretary be instructed to submit such a list to each state representative.

Professor Hyslop called for the report of the Resolutions Committee.

Report of the Resolutions Committee:

Resolution introduced relating to the continuation of Agricultural Conservation Program. Passmore moved adoption, Peters seconded, carried.

Resolution introduced regarding continuation of request that every effort be made to maintain experiment stations by the Federal Government on irrigated areas. Spence moved adoption, Stallings seconded, carried.

Resolution introduced expressing appreciation to officers, etc., for the splendid effort in building the program which we have had the last two days. Spence moved adoption, Seely seconded, carried.

Hyslop suggested the matter of removal of tolerances on imported seeds be written into a resolution. Spence moved this be done, Jenkins seconded, carried.

Ball mentioned certain States have not been able to get WPA setups as have California and Idaho. Spence read the resolution adopted last year re this matter. Stallings moved, Spence seconded, that last year's resolution be adopted again: carried. The Secretary was instructed to mail these resolutions to the proper agencies.

Copies of the resolutions adopted will be found following the proceedings of the meeting.

The Chairman then asked for the Report of the Nominating Committee.

Report of the Nominating Committee:

Recommended: C. L. Corkins, Chairman  
 George G. Schweis, Vice Chairman  
 Walter S. Ball, Secretary-Treasurer

It was moved and seconded that the recommendations of the Nominating Committee be accepted; carried.

There being no further business, the meeting adjourned at 12 Noon.