

SECOND ANNUAL WESTERN WEED CONTROL CONFERENCE
Friday Morning -- June 9, 1939
Meeting Called to Order 9:30 a.m.
Hotel Claremont, Berkeley, California

Chairman Spence(Idaho): Please come to order so we can get under way. Like all conferences, we are about a half-hour late in getting started and we do have a rather full program. I think, however, with all the attractions that there are in this district to keep the boys burning the midnite oil, we have a pretty good turnout for 9:30. We are going to start out this morning with Mr. Jacobsen of the Department of Agriculture of the State of California who will give us a few words of welcome.

Mr. Jacobsen(California): Thank you, Mr. Chairman. Members of the Second Annual Western Weed Control Conference, for a good many years I have looked for a chance to get back at some of those fellows who give addresses of welcome and you are going to be the victims because the ones I have aimed to get back at can't be here today. I look at this address of welcome business as a kind of kickoff at a football game. The addressor can be likened to the ball. Now, a football is one of those things necessary to the game. It is generally pointed at each end, a little larger in the middle, ordinarily has a tough and rugged exterior, but in the last analysis is merely a bag of wind.

A person that gives an address of welcome tells you about the wonders you might encounter in the vicinity. First of all, I welcome those from the East out here to the West, those from the Western States to California, and those from California to the Bay Region. A Californian is supposed to boast a little about the things that we have here. However, we can't talk too strongly about how wonderful our weeds are, but we can talk about the fine things we have and do in weed control. I am reminded of a fellow down in Phoenix, Arizona, who was head of the volunteer fire department which, in the interest of modernization, was to be changed over to mechanical fire-fighting apparatus. He went over to Hawaii on his vacation and among the sights they showed him their famous volcano, commenting that they bet there was nothing like that near Phoenix. He said "No, but our Phoenix Fire Department could sure put that out in a hurry."

So, while it isn't good taste to brag about the extent and volume of weeds, I can tell you something about our weed control set-up in California of which we have good cause to be proud.

Those of you who will have an opportunity to go to the Fair (and we are proud of that too), will find some exhibited evidence of weed control and our work. It, further, is an indication of one of the trends in weed control which we think is important, namely, that it is extensively educational.

We like to see conferences of this sort. We think that correlation of interest, uniformity in ideas and methods, as well as education and research, are far more important than merely to enforce laws and regulations which might have been passed or adopted. We know that they are important to substantiate weed consciousness and to develop a sound public interest. Our situation here in California is what we think is an excellent combination of all. You will have an opportunity to hear

from some of those folks who are associated with farm organizations and with research work on weed control at the state university. Our research and educational facilities to that end are gradually expanding and work in excellently "in a cooperative way."

I want to welcome you all here. Hope you have a good meeting. Glad so many were able to come.

Chairman Spence: Thank you, Mr. Jacobsen, and I am sure that I speak for the entire group when I say that we especially appreciate the opportunity of visiting California this year. We think the folks here, Mr. Ball and those who have spent their time and effort in preparing this meeting (and it is no small task), have done an awfully good job, even with the weather.

In starting off this morning, I'd like to say a word or two relative to this organization and the meetings. This is really the 3d annual meeting. It is the second annual meeting since we officially organized as the Western Weed Control Conference.

For those of you who are not acquainted with our organization it may be of interest to know that two years ago we had a meeting in Tacoma for the discussion of weed control problems. That meeting was attended by representatives from some five or six States. It was decided at that time that something could be done in weed control work if we could correlate as far as possible the activities along weed control lines in different states. As a result of this meeting, the first annual meeting to which this program was set up was held at Denver, Colorado, June 16 and 17, 1938. There we went into it rather blindly. We didn't know how much support we would get as far as attendance was concerned, but at our meeting at Denver we had representatives from 11 western states, Kansas and Nebraska, and we had a very good meeting. This is the second annual meeting. The purpose of this meeting is entirely one of cooperation--an interchange of ideas and an attempt to correlate our activities in the interest of weed control work. As we go along, there is one thing which was one of the principles we set up last year and one which I hope we can maintain in our meetings this year, that is to hold our meetings entirely informal. Will you call the roll, Mr. Ball?

Mr. Ball(California):

Arizona	(not here)
California	(Mr. Ball, State Department of Agriculture)
Colorado	(not here)
Idaho	(Mr. Spence, Extension Agronomist, Boise, Idaho)
Montana	(not here)
Nevada	(Mr. Schweis, State Department of Agriculture, Reno, Nevada)
New Mexico	(not here)
Oregon	(Mr. Harris, Oregon State College, Corvallis)
Utah	(Mr. Earl Hutchings, Department of Agriculture, Salt Lake City, Utah)
Washington	(Mr. Griner, Department of Agriculture, Olympia)
Wyoming	(not here)

Mr. Spence(Chairman): Now, will each of you stand and introduce yourself so we can become better acquainted. (Everyone does so.) That is fine; now let us keep our discussions entirely informal. If you want to break in, do so. Next on the program is the report of the Secretary. If it is satisfactory with the group we will dispense with the reading of the minutes of last year's meeting as most of you have copies of that meeting. Mr. Ball, will you give us a report?

Mr. Ball(California): Mr. Chairman, I shall give you our financial report first. Last year, as many of you know, we set up certain rules and regulations pertaining to dues. To date five states have paid up, also several single memberships and one commercial company. Total received--\$140.50. Paid out \$19.87 for stamps. Balance--\$120.63.

The most important thing that we could report on at this time in a few brief words is that Dr. S. C. Salmon of Washington, who was at our meeting last year and took a very active part, was unable to be here, also Mr. L. W. Kephart of Washington, who regrets that he cannot be here. Professor Hyslop of Oregon writes saying that he is very busy but sends two representatives. Dr. Corkins could not be here due to other meetings. We regret that these men are not here, because they all are taking a very active part in weed work.

I am very happy to report that of the resolutions adopted last year having to do with the Federal Government, responses have been received from every resolution sent to Washington, which shows that they are interested in our work. I am going to read one of these having to do with the CCC organization which was discussed at length at our last meeting, inasmuch as many of us felt that this organization should become more active in weed control work. This letter is from Mr. Robert Fechner, which I quote.

"CIVILIAN CONSERVATION CORPS
Office of the Director
Washington, D. C.
January 4, 1939.

Mr. Walter S. Ball, Secretary-Treasurer
Western Weed Control Conference
Department of Agriculture
Sacramento, California

Dear Mr. Ball:

I have your letter of December 21, 1938 to which was attached copy of Resolution No. 6 adopted at the Western Weed Control Conference held in Denver, Colorado June 17, 1938.

I have carefully read this Resolution and I want to assure you that I fully appreciate the interest that prompted its consideration and adoption and also the importance of the subject to which it refers. Almost from the very beginning of the CCC camps in 1933 we have attempted to be helpful wherever possible in the eradication of noxious and poisonous weeds. There is no doubt in my mind but that present legislation under which the Civilian Conservation Corps operates authorizes this type of work as a proper work project for

CCC camps.

There is some question as to the extent to which this work should be undertaken by the Civilian Conservation Corps on private lands. That, however, is a problem which I believe could be easily solved by conferences. So far as I know all of our noxious weed eradication work has been carried on in cooperation with the Bureau of Entomology and Plant Quarantine of the Department of Agriculture. In my judgment, this policy has brought about the best practical results. I, therefore, want to suggest that your Conference handle the matter with Honorable Lee A. Strong, Chief, Bureau of Entomology and Plant Quarantine, Department of Agriculture, Washington, D. C.

Sincerely yours,

ROBERT FECHNER
Director"

All responses indicate willingness to cooperate. Lack of funds or authority seem to be the important factors.

That, I believe Mr. President, gives the high lights as to the results of our first annual meeting.

Mr. Spence(Chairman): Thank you, Walter. Again, like all organizations, I don't know why they have three or four or five officers, because the responsibility of the work is usually done by the Secretary. Now let us have a few brief words from each representative as to their activities in the preceding year, limiting the time to about five minutes. In these statements state what activities have been carried out both as to research and education and what we might term commercial programs. Mr. Ball, we will start out with you.

Mr. Ball(California):

"One of the most important steps in weed control here in California the past year was the action taken by the county agricultural commissioners, who, as most of you know, are our regulatory officers. After several meetings over a period of many months, the quarantine committee submitted a report which placed all commissioners on record as to the action they would take on certain weed seeds when found in commercial seed. An attempt was made to make this action as uniform as possible, the result being that 17 weeds were named as serious, and commercial seed will be rejected whenever these seeds are found therein. A second list of some 20 weeds was compiled. The seed of these weeds would be accepted only when "commercially clean," which is defined as "containing not in excess of two seeds per quantity of crop seed examined." The commissioner may add to this second list, but such additions must be recorded with the State Department of Agriculture, such recorded lists of weeds to remain unchanged for one year. This action may be termed commercial as well as educational. However, we think it is a very good step toward the planting of clean seed.

"Along this same line, and in the educational field, the California Seed Council and the State Department of Agriculture have an exhibit in Agriculture Hall on Treasure Island stressing the importance of planting clean seed.

"Our state-wide W.P.A. project has run along very smoothly and work has been started and completed under this project that could not have been done had it not been for this assistance. The outstanding projects have been soil sterilization--working with some fifteen irrigation districts--and Klamath Weed control in Sonoma and Mendocino Counties. Other counties have carried on similar work, but they have not had as extensive problems as the two counties mentioned.

"Under this program we have had very satisfactory results on out-lying infestations by the use of carbon bisulphide, and have been successful in getting rid of certain serious perennials in some of our good agricultural areas before these weeds could become established, thereby saving the areas concerned the high cost of weed control and loss of crops, which would have resulted had they been permitted to spread.

"Of our three special weed problems, namely: Camel Thorn, Wild Artichoke Thistle and Austrian Field Cress, only the latter presents a serious problem, the first two being well under control with the infestations greatly reduced. Austrian Field Cress is confined, so far as we know, to one county. However, it is located at the head of the South Fork of the Pit River. The plant is more or less aquatic and is growing in peat soil under very moist conditions. Due to these existing factors, chemicals have been unsatisfactory, with the exception of large quantities of common salt. The program has been a cultural one, with clean cultivation and in some cases the planting of grain to encourage weed seed germination. Good results have been obtained. We work a great deal along educational lines, cooperate with the University in its research work, and attempt to handle the general field problems to the best of our ability."

Mr. Spence(Chairman): Thank you, Mr. Ball. Now, Mr. Kohout, will you give us your report?

Mr. Kohout(Idaho): "Last year we completed the third year of our state weed program. We operated in 32 out of 44 counties in Idaho.

"During 1938 Idaho completed its third year under the statewide WPA Noxious Weed Control Program. As in the past, three general methods of control were practiced, namely, chemical eradication with carbon bisulphide and sodium chlorate and clean cultivation with power equipment.

"Thirty-two of the State's forty-four counties are now operating under the statewide program. Approximately 28,000 gallons of carbon bisulphide and a million and three quarters pounds of sodium chlorate were used during the 1938 season. In addition about 100,000 pounds of borax were used for soil sterilization, Klamath Weed and Puncture Vine control.

"All our activities during the past three years with chemicals had been directed to the eradication of small infestations of noxious weeds with the purpose of cleaning as many farms in the State as possible before the weed problem on the farms became too large. We believed that we had reached the point, however, where it became necessary to do something about large infestations, of which we have many in most of our counties. Consequently, during the latter part of 1938 and the early part of 1939 and ~~the early part of 1939~~ we concentrated our efforts on building a clean cultivation program. As a consequence, 17 counties in southern Idaho have purchased power equipment which consists of, in most cases, wheel tractor and an approved type of clean

cultivation tool. These units handle approximately 200 acres each. During 1937 and 1938 four counties in Idaho had operated a clean cultivation program with very satisfactory results. Several hundred acres of land have been turned back to the growers and are now producing crops.

"During the past year a new gun for injecting carbon bisulphide was developed by one of the workers on the project, and although this gun still requires a few changes, we believe that it shows great promise. We have several hundred of these guns in use now. We have noted more uniformity of results from carbon bisulphide and a lower cost of application because of the use of these devices.

"As in most states, the problem of eradication of noxious weeds on watershed areas is one that must be met before satisfactory cooperation can be obtained from individual growers. We have demonstrated the flexibility of our type of program by setting up several watershed control projects. The largest of these has been the control of White Top on a group of islands in the Snake River lying between Ada, Canyon and Owyhee Counties. Water is pumped from the river for several irrigation districts; since this particular area is a waterfowl refuge and is inhabited by thousands of waterfowl, it is believed these birds spread this weed to adjacent farm lands.

"During the 1939 session of the legislature, amendments were made to both our weed and seed laws. An appropriation was made by the state legislature in the amount of \$150,000 for the purpose of aiding in noxious weed control work.

"We believe that our state weed law now meets most of our requirements. The law now places the enforcement of the weed law in the hands of Boards of County Commissioners and gives the Boards almost unlimited power in dealing with the situation. The law further permits the County Commissioners to make individual contracts calling for control and eradication of weeds on individual farms which need not be uniform, but may be changed to fit the particular needs of the individual farms because the law now recognizes that the control of noxious weeds is a varied problem and depends upon many factors.

"Under the WPA program, which has for its main objective the employment of labor, it was possible to give the grower, who had his weeds treated under the program, materials at a lower rate. It was felt that the landowner who wished to cooperate on the weed eradication program by taking care of the small infestations himself was not receiving fair treatment. Therefore, most of the counties for this year have made it possible for the landowner who wished to do his own work to buy materials at the same rate charged when the work was done under the WPA program. In every county in the State, requests for work far exceed the available labor, and it was thought necessary that some inducement be given to the individual to cooperate in treating the small infestations on his farm."

Dr. Robbins(California): Could you give us something on the weeds themselves?

Mr. Kohout(Idaho): Much of our work is on Morning Glory and we have had some good results. We also have had some very interesting results with Knapweed. Morning Glory, of course, is our main weed. White Top is the second and I would like to state that in North Idaho we have comparatively small infestations of this weed and think we have the Whitetop situation under control north of the Snake River because we could use sufficient chemicals to effectively eradicate it. We have

used as much as 100 pounds of chlorate on a small patch. We also have in North Idaho considerable Klamath Weed. To date we haven't done a great deal except by cultivation. We hope that we shall be able to keep it out of South Idaho, in that this is our ranging country.

Mr. Schweis(Nevada): I should like to hear a little more about the cultivation methods.

Mr. Kohout(Idaho): Briefly, this is the way we operate. The counties have purchased equipment, in most cases field tractors with attached cultivators. Labor is supplied to operate the tractors up to 24 hours a day and 7 days a week. From 150 to 300 acres form each unit, depending upon the location of the patches. The work is started in the spring by plowing. Our regulations on cultivation are that cultivation shall be done approximately 6 days after the plants show, which varies approximately 8 days in South Idaho and 16 days in Northern Idaho. In Washington County we have some large infestations of White Top and this particular county has purchased two units. To date our results have been very good.

Mr. Schweis(Nevada): May I ask what the charges are?

Mr. Kohout(Idaho): The landowner is charged for the operation cost and the average is about \$6.00 per acre. The operating cost last year was about \$4.50 per acre for each unit, with the WPA supplying the labor and the counties the equipment. The general charge will be about \$12.00 for a two year program. All of the work is done under a contract with leases on the land for three years; however, the majority of it is turned back after two years. When we go on those areas the fences are taken out, the ditches are turned in, and the whole thing is turned into a unit. During that period of three years all taxes are removed, the land being classified as grazing land. In addition, the majority of irrigation companies have taken off the O & M, or water charges, during the period that the unit is under cultivation.

Mr. Stodieck(Nevada): What about AAA payments?

Mr. Spence(Chairman): The majority of those who have been cooperating with the statewide program haven't received AAA payments. I don't know whether they would be eligible or not, although I think with the present provision in AAA they would be eligible this year. May we have a report from you, Mr. Schweis?

Mr. Schweis(Nevada):

"The weed control program in Nevada has been carried out quite satisfactorily during the past year. A survey of the weed-infested areas in the State has been practically completed and control programs have been in effect in several counties with good results obtained. Most of the control work has been by the cultivation method.

"We were unable to get a WPA weed control project established, as most of this type of labor has been used in civic improvement projects and there has been a comparatively small reservoir of common labor available in the agricultural districts to carry on an effective weed control program.

"The most outstanding development in weed control in the State of

Nevada, and for which this department has worked consistently for years, has been the establishment of a weed research laboratory at Fallon, Nevada, under the immediate supervision of Dr. Richard S. Rosenfels. This laboratory is being operated under the direction of the Bureau of Plant Industry of the U. S. Department of Agriculture, and, according to Dr. Rosenfels, they are finding many interesting problems. Apparently much information will be available from this laboratory within the next few years, and it is sincerely hoped that recommendations will be made from the experimental work accomplished whereby we can be assured of economic control of some of our most injurious weeds."

Mr. Spence (Chairman): Mr. Harris of Oregon, will you report please?

Mr. Harris (Oregon): I have a more or less haphazard report here. I am going to report very briefly on research work in Oregon. During 1937 the legislature appropriated money for research activities and we started late in the year 1937 and have been carrying on since. We confined our activities to Canada Thistle and Morning Glory. We have two extremes so far as climatic conditions are concerned. In Western Oregon the chief weed is Canada Thistle. In our work with Canada Thistle we have confined our activities for the major part to cultivation and cropping, starting out by following more or less some experiments that they set up at the university station in Idaho. We found that we should start cultivating Canada Thistle just before the plant came into full bloom and get our best results. Our work on Morning Glory has not been going along so well.

"Seasonal Trend of Root Reserves in Canada Thistle, 1938.

"This experiment was started in the spring of 1938. Root samples were taken every 12 to 14 days throughout the growing season. All roots were taken from a depth of 12 to 14 inches. The percentage of readily available carbohydrates (total sugars, soluble starches, and dextrans) in the uncultivated plot decreased after emergence in the spring until plants were approaching full bloom, or about July 5th. There was a gradual increase from then on until the end of the sampling period on October 20. The high point of readily available carbohydrates was 24.67% at the beginning of the season, and 24.73% at the end of the season. The low point was 15.34%.

"The trend of root reserves or carbohydrates in the cultivated or fallowed plot showed a gradual decrease throughout the season. The high point in the beginning of the season was 24.70%. The low point was reached on October 18 with a percentage of 8.82. The sample taken on November 2 was so small as the result of cultivation that chemical analysis for carbohydrates could not be made. Ninety-nine per cent of the thistle plants were eradicated on this plot during the one season. The dry weight from five cubic feet of soil decreased from 13.5 grams at the beginning of the season to 0.02 grams at the end of the season. The percentage of dry matter and the percentage of readily available carbohydrates followed the same general trend. The low point of the dry matter content, however, was reached a little over two weeks earlier than was true for the carbohydrate content. The percentage of dry matter was greater throughout the season than the percentage of carbohydrates in the fallowed or cultivated plot. The percentage of dry matter and carbohydrate content again followed the same general trend with the exception that the percentage of readily available carbohydrates was greater throughout the season. The fallowed plot

was cultivated every six or eight days after plant emergence. There was a total of ten cultivations on this plot during 1938.

"The Trend of Food Reserves in Canada Thistle Roots After Cultivation

"These plots were started in 1938. One was cultivated and sampled on April 11, 1938, and sampled subsequently at four day intervals for 28 days. The low point of readily available carbohydrates was reached 8 days after plant emergence, after which there was a rapid increase. The low point has a percentage of 21.20% and the high point was reached at the end of the sampling period at 27.62%. The percentage of dry matter content of the roots followed rather closely the percentage of carbohydrate content, with the exception that the low point was reached four days earlier. This plot was left undisturbed after the initial cultivation, and the plants were allowed to grow to bloom stage. The plot was again plowed and sampled in the same manner. The total percentage of readily available carbohydrates was significantly lower at this period than it was at the beginning of the season. The high points were 27.62% and 19.72%, respectively. The low points were 21.20%, and 11.0%, respectively. The low point in carbohydrate reserve was reached twelve days after plant emergence. The percentage of dry matter followed an identical trend, the low point being reached 12 days after plant emergence.

"The second plot in this series was plowed at the beginning of the bloom stage and the roots were sampled in the same manner at four day intervals for 28 days. A low point was reached four days after plant emergence. There was a more rapid increase following the low point on this plot than was found on the plot that was cultivated in the spring. The low point in the percentage of dry matter was reached eight days after plant emergence.

"The third plot was plowed at full bloom, or on July first. The average percentage of readily available carbohydrates was greater on this plot than for the other two plots, but the low point was reached twelve days after plant emergence. The percentage of dry matter followed rather closely the same curve.

"Time of Beginning Cultivation.

"This experiment was started in 1938 to determine the best time to begin cultivation as measured by plant growth. Thirteen duplicated plots were used. The first cultivation was started at the first emergence in the spring, or approximately April 11. The succeeding plots were started at different intervals throughout the growing season until after the plants had reached full maturity. The thistles were eradicated at least 98% on the first five plots, that is, from those plots that were started at first emergence in the spring and until the plants had made 18 to 20 inches growth, the percentage of plants increasing from plots where cultivation was started at the beginning of bloom and progressively increasing on the remainder of the plots. It will be recalled that the low point in carbohydrate reserve was reached when the plants approached full bloom. However, the results from the actual cultivation showed that the best time to start was before this period or just before the plants started to bloom. There was no significant difference in the amount of survival on the plots where cultivation was started immediately with plant growth in the spring, or where cultivation was started when the plants reached approximately 18 to 20 inches growth. In every case the duplicated plots of this experiment showed practically identical results. From these results the

approximate date of beginning cultivation on Canada Thistle is around June 5. There were four fewer cultivations on this plot than on the plot where cultivation was started at emergence in the spring.

"Root samples were taken on September 5th on these plots at one foot intervals to a depth of six feet. Twelve cubic feet of soil were sampled at each interval. The percentage of total carbohydrates and dry matter was less on the plots where cultivation was started when plants were 18 to 20 inches high. However, there was not a great difference in carbohydrate content on plots where cultivation was started at emergence and up to and including when started at 18 to 20 inches. There was a decided increase on the plots where cultivation was started after this date. The amount of carbohydrate content, percentage of dry matter, and dry weight was greatest in the second foot of soil. This was true on all cultivated plots as well as the uncultivated check plot.

"Frequency of Cultivation.

"In this experiment two series of plots were used. In series one, all plots were plowed at time of first emergence in the spring and subsequent cultivations were made immediately upon emergence, 4, 8, 12, 16, 20, 24, and 28 days after emergence. The thistles have been practically eradicated on all plots up to and including the 16 day interval. There is no significant difference between plots that were cultivated 8, 12, and 16 days after emergence. They are slightly superior to the plots that were cultivated at emergence, and at 4 and 8 day intervals.

"The plots that were in full bloom were decidedly inferior to those that were plowed at the beginning of emergence in the spring. There has been no eradication on any plots in this series, although the plots cultivated at 4 and 8 day intervals are superior as regards survival of plants. The percentage of total readily available carbohydrates, percentage of dry matter, and total dry weight were determined on these plots at one foot intervals from 1 to 6 feet. Twelve cubic feet of soil were sampled at each interval. The plots that were cultivated at 8, 12, and 16 days show the lowest percentage for all these materials. However, the plots where cultivation was made 12 days after emergence were slightly superior. All three of these plots were lower in carbohydrate content than the plots where cultivation was done more frequently, and decidedly superior to those plots where cultivation was done less frequently.

"Cropping Trials.

"During the fall of 1937 three series of 15 plots each were prepared for cultivation and seeded. On one series the plots were plowed approximately 5 to 7 inches deep. The second series was plowed 7 to 14 inches deep, and the third series was double disked. On each series barley, rye, and vetch were seeded alone and in combination. During the spring of 1938 half of each plot was fertilized with 280 pounds of sodium nitrate. The yield of forage was at least doubled on all plots that were fertilized as compared to the untreated check. The yield of forage in both the unfertilized and fertilized plots was greatest on the series that had been plowed deep in the fall of 1937. The total weight of thistle roots was less on the deep plowed plots and greatest on the disked series. The highest yield of forage was obtained on all plots when vetch and rye were used in combination. This particular plot also showed a greater yield on the deep plowed series than on the shallow plowed or disked series. Of the crops used, barley when sowed alone gave the poorest yield of forage, and showed the least result in checking the growth of thistles. The percentage of total readily available carbohydrates, dry matter,

and dry weight on Oct. 1 was least on all plots that were deep plowed, and planted to either rye and hairy vetch or barley and hairy vetch. These determinations were made on roots sampled from 12 cubic feet of soil at one foot intervals to a depth of six feet.

"Depth of Cultivation.

"Deep plowing in the fall on both Canada Thistle and Bindweed delayed plant emergence the following spring approximately 28 and 31 days respectively. The yields of both rye and wheat on bindweed plots were greater where plots were deep tilled in the fall. This was also true of Canada Thistle, as has already been indicated."

Mr. Spence (Chairman): Thank you, Mr. Harris. Now, may we hear from you, Mr. Hutchings?

Mr. Hutchings (Utah): Mr. Chairman and gentlemen: I have my report prepared here so I will make some comments prior to the report. I might state that in Utah we have a State Weed Supervisor. It is difficult to get too many people out of the State and therefore they felt best that I represent Utah at all three conferences. We have carried on during the past season a very vigorous campaign on seed inspection work. We have found that noxious weeds are being spread by being imported into our State and also from seed produced and sold within the State, which justifies such a program. We succeeded in getting through our past legislature a change in our seed law whereby our law does state that seed containing noxious weeds cannot be imported into the State of Utah, the names of which are listed in the law. This list was revised and approved by our State Board of Agriculture. Therefore, our noxious weed list is a new one and we have divided it into a primary and a secondary noxious weed list. Seed offered for sale must be free of the primary noxious weed seed. Seed may be offered for sale which contains 1% of the secondary noxious weed seed. No seed can be offered for distribution in the State of Utah which contains more than 1% weed seed. Our noxious weed program will now require that there be a revision made in our Quarantine and we have not revised this Quarantine to date nor have we changed the regulations. These changes will be made in the very near future now that the law is printed and in our hands. We succeeded in getting a State Seed Council organized about two months ago, which is made up of all seed trades, members of the Department of Agriculture, the Utah State Farm Bureau, a member of the Utah Crop Improvement Association, and any other agency interested in seed. It is a new step in Utah and we hope it will be one to aid in the control and spread of weed seeds. Our weed program has operated in all counties of the State during the past season. The counties have all participated and cooperated with the State program.

"Organization: The State organization consists of the Utah State Farm Bureau, State Board of Agriculture, Director of Extension and Director of Experiment Station of the Utah State Agricultural College and the Assistant Director of the W. P. A., with a State Supervisor. Each County has a county committee consisting of the president of the County Farm Bureau, the District Agricultural Inspector, the County Agricultural Agent, County Commissioners, a member of the Utah Crop Improvement Association and zone engineer of the W. P. A. (and others if desired), with a county supervisor. "During the winter months organization work is conducted throughout the State, together with educational meetings and all preliminary

work that can be completed before the season.

"Cultivation: As nearly as possible, all preliminary work, consisting of plowing and leveling, is done in the fall. Much importance is attached to this because the winter mellows the soil so that it is much more easily handled. It has been the aim to cultivate all tracts of land larger than 1/4 of an acre. The equipment used in cultivation consists of various types of blade weeders and duck foot cultivators, team and power drawn. Team cultivation is largely being replaced by power. Cultivation has begun as early as the plants have shown growth in the spring and cultivated at intervals of fifteen days apart, making a depth cut from four to six inches beneath the surface. As hand labor becomes less available, single horse drawn cultivators have been constructed to take their place and have proven very successful to get close to fence lines, canal banks and mountain streams. Each cultivator can take the place of approximately six men. If cultivation begins early in the spring, as soon as the plants begin to grow, it is possible to reduce the infestation of the most serious weeds so that the land can be cropped on the third season; especially is this true of White Top, Wild Morning Glory, and Russian Knapweed. Canadian Thistle, Sow Thistle and plants of such resistance can be completely eradicated in one season.

"Hand cultivation: Hand authorization is used only where it is impossible to use machinery and much of the hand labor used in our State could be dispensed with if all counties could purchase equipment or purchase chemicals to take its place. Hand labor is used only on canal banks, mountain streams and fence lines and for the removal of brush, etc., where infestation exists. Some hand labor has also been used out in fields where small patches exist and it would be impossible to cultivate by power. Land successfully cultivated two years, either by hand or power, and planted to row crop in the third year will entirely eliminate any slight remaining infestation. We have some fields in our State that have been planted to crops after this procedure and are entirely free from infestation. This, however, depends upon the integrity of the farmer to properly weed his row crop. Fifteen thousand seven hundred ninety-five (15,795) acres were cultivated by hand and power in 1938.

"Chemicals: It has also been our aim to reduce areas of all kinds of infestation with cultural methods and treat with chemicals the narrow strips on fence lines, streams, ditches, steep banks, rocky spots, etc. The kinds of chemicals mainly used were Atlacide, sodium chlorate and small amounts of carbon bisulphide. Results were very satisfactory when applied to dry areas and in amounts as follows: Eight pounds to the square rod for White Top and Russian Knapweed, and six pounds to the square rod for Wild Morning Glory. Smaller amounts have not made successful kill. There were five hundred and fifteen (515) acres treated.

"Equipment: All equipment used has been furnished by the individual or the county. Power equipment has shown to be much the cheaper method. Drawn power cultivators are more expensive than attached cultivators. Land owners are required to pay back to the county for the use of its equipment from \$5.00 to \$12.00 per acre per season, depending upon the scale of charge set by the counties.

"Labor: Most labor has been furnished by the Works Progress Administration. Much labor, however, has been furnished by the counties to operate the county equipment. The counties prefer to hire rather

than to depend upon the frequent changes in the W. P. A. labor. We have not been able to use this labor as our judgment would dictate because of certain rules set up by the W. P. A. that would not permit of such. We are quite sure that much more could have been accomplished had we been permitted to use our judgment with respect to labor."

Mr. Schweis (Nevada): How much money has Utah available for this program?

Mr. Hutchings (Utah): \$100,000.00 per annum.

Mr. Jacobsen (California): Haven't you used salt quite extensively in your weed control program?

Mr. Hutchings (Utah): We have discontinued using it. The only place that salt is used at the present time is by state highway commissions on bare land.

Mr. Ball (California): What time do they plow?

Mr. Hutchings (Utah): Early in the Spring. The plants grow early and are plowed under. I would like to make one statement here which I omitted in the early remarks. Our law now states that noxious weed infested seed cannot be moved within, into, or out of the State. That means this: that any type of seed which contains those noxious listed weeds will no longer be permitted to be shipped out of the State of Utah as has previously been permitted. That applies to every type of seed. If they can't clean it, we are going to burn it. It has been the practice of Utah to allow such seed to be taken out of the State before it had been cleaned.

Mr. Griner (Washington): Mr. Chairman, I haven't any report but would like to say that the State of Washington is entirely in sympathy and behind the movement of this organization and we think it is one of the best moves in the work of various states. The State of Washington is very backward in its seed laws. It has been only in the last year or two that they have been active in cooperating in weed control. I am glad to be here and maybe we can get better action when I get back.

Mr. Spence (Chairman): Have any other states come in since we called roll? Colorado? Arizona? New Mexico? Wyoming? Well, I think that gives us a picture of the weed situation in these six states and there is a great deal to bring up in our discussion. I noted in these reports, as we go along, that pretty nearly every individual brought out the importance of seeds and the way our seed and weed laws are tied together. I think that we have all been vitally interested in the question of seed laws or preventive measures. During the last year there has been an effort made to obtain federal seed legislation and I think most of you have followed that work. I get quite a kick out of the original bill that was printed--it had 294 pages. It is now down to about 30 pages and, I understand, it has some possibility of enactment. Most of the states in recent years have made changes in their seed laws in an effort to tighten

up the loopholes. Professor G. R. Hyslop of Oregon has been very active in seed legislation. We are sorry that he is unable to be here but he has prepared a paper which Mr. H. E. Finnell of Oregon State College will present.

Mr. Finnell (Oregon):

"The last revision of the Federal Seed Bill, which was to be on the calendar of the House of Representatives for June 7, is a comprehensive bill. It will go far in improving the quality of seed for sale in connection with the movement of seed in the United States. It combines definite restrictive measures with a comprehensive labeling requirement. While it does not go far enough to suit the West, it will regulate the movement of foreign seeds into the United States in a much more satisfactory manner than has been true in the past.

"The U. S. Department of Agriculture adopted a constructive method in the development of this bill and appointed a departmental seed committee. This committee worked out a draft of the bill and has held numerous conferences with many interested groups during a period of approximately two years. The measure now in Congress has the rather general approval of the various factors in the seed industry. There is definitely stronger regulation of foreign seeds coming into the United States. There is new and definite regulation for seed moving in interstate commerce and the law is so written that it is very unlikely to interfere with the established seed laws of the states. It will tend to clarify and make for more uniform state legislation.

"Agricultural seeds are named and the list of names is a very comprehensive one with all of the common field seeds listed except sugar beets. However, the Secretary of Agriculture has authority under the bill to add to, or to take from, the list of agricultural seeds, when in his judgment it is desirable to do so.

"Vegetable seeds are also included in the provisions of the bill. This is a new and very desirable feature in federal seed legislation. It should have been in effect long ago when we had congressional distribution of free seeds.

"For the purpose of the interstate movement of seeds the term "weed seed" means the seeds or bulblets of plants recognized as weeds either by the law or rules and regulations of the state into which the seed is offered for transportation, or is transported. The same is true with reference to noxious weeds and the Secretary has further authority to designate other weeds than those covered by state legislation as noxious for the United States or any designated area thereof.

"In the case of imported seeds, weed seeds may include seeds or bulblets of plants which are found by the Secretary of Agriculture to be detrimental to the agricultural interests of the United States or any part thereof.

"With further reference to imported seeds, the law specifically names as noxious the seeds of all three species of White Top, Canada Thistle, Dodder, Quack Grass, Johnson Grass, Bindweed, Russian Knapweed, Perennial Sow Thistle, and Leafy Spurge, and gives the Secretary authority, after investigation, to include others. Imported seed is declared unfit for seeding purposes if it contains in excess of 2% weed seeds, or noxious weed seeds at a rate in excess of one

noxious weed seed in each ten grams of the agricultural or vegetable seed of the smaller sizes, as from bent grass up to clovers; or one noxious weed seed in each twenty-five grams of the intermediate sizes, as sorghum to buckwheat; or one noxious weed seed in each 100 grams of the larger sizes, as small grains and corn.

"The importation of seed unfit for seeding purposes is prohibited. While this group objected to the tolerances for both weed seeds and noxious weed seeds, at the Denver meeting in 1938, this represents a distinct addition to the present list of noxious weeds regulated under the federal seed act and it further represents a substantial reduction in the tolerance for noxious weed seeds. The bill extends and makes comprehensive the list of agricultural and vegetable seeds regulated in connection with importation. Some one accomplished the elimination of Quack Grass seed, but upon being advised of this the writer contacted about 25 individuals and organizations who raised a storm of protest and Quack Grass is back in the bill. Some of the foreign interests, through importers, had apparently gotten Quack Grass seed removed from the list of noxious weed seeds. Quack Grass is rather common in Canadian and Danish seeds.

"With further reference to importations, it is well to note that adulterated seed or seed that is unfit for seeding purposes, or that is required to be stained and is not stained, or which is false or misleading as to label, is prohibited importation. Screenings of any seeds except those of the cereals and closely related crops designated for cleaning, processing, or manufacturing, and not for sowing, are prohibited entry. This is a real victory. The maximum tolerance for total weed seed in imported seed is cut from 3% to 2%, which is important but not enough. The per cent of pure live seed required for imported lots is stepped up to 75% instead of the former 65%. This is also a great improvement. The Secretary of Agriculture has authority to adjust this 75% under certain conditions when, after investigation, it may be deemed desirable.

"Staining of certain seeds including alfalfa and red clover is continued much as before. When the bill becomes a law it will undoubtedly improve the quality of seed imported into the United States and help to keep out more of such imported pests as Knapweed, Quack Grass, and the like.

"All agricultural seeds or mixtures thereof for seeding purposes, entering interstate commerce, must be labeled showing (1) the kind and the percentage by weight of each component present in excess of 5% of the lot, (2) a lot number or other identification, (3) origin, in the case of kinds of seeds designated by the Secretary as those in which it has been found that origin is of importance, (4) the percentage by weight of weed seeds including noxious weed seeds, (5) the kinds of noxious weeds and the rate of occurrence which is to be expressed in accordance with and shall not exceed the rate allowed for shipment, movement or sale of such noxious weeds as indicated by the law of the state into which the seed is offered, (6) the percentage by weight of other agricultural seeds, (7) the percentage by weight of inert matter, (8) the percentage of germination exclusive of hard seed, (9) the percentage of hard seed, (10) the calendar month and year the test was completed, (11) the name and address of the person who transports or delivers for transportation, or the person to whom the seed is sold or shipped for

resale. The required label is a rather comprehensive one but has been agreed to by the seed trade. It will be well for state certifying agencies to remember that certified seed moving in interstate commerce must also meet all these requirements.

"Vegetable seeds are required to be labeled with (1) the kind and variety and for seeds germinating less than the latest standard established by the Secretary of Agriculture; must show (2) the percentage of germination exclusive of hard seed, if present; (3) hard seed; (4) month and year of testing; (5) the words "below standard"; and (6) the name and address of the shipper or the person to whom the seed is sold or shipped for resale.

"There is a further provision that any germination tests for any agricultural or vegetable seeds shall have been completed within a 5-month period exclusive of the calendar month in which the test was completed. In other words, if a sample is tested on January 1 that test is good until July 1, and the same is true if the test was completed on January 31.

"The secretary has authority to shorten or to lengthen the period of validity for any germination test of any particular kind of seed if after investigation he finds that it is warranted. In other words, if a germination test for any specified kind of seed is not safe for a 5-month period the Secretary may designate a shorter period. On the other hand, if certain seeds do retain their germination for a period of more than five months the Secretary is authorized to extend the period for such seeds, but may not extend it to exceed nine months. The requirement to show the percentage of pure live seed, which includes both germinable seed and hard seed, was stricken from the bill, largely at the request of the eastern cooperatives.

"All persons transporting or delivering seed for transportation in interstate commerce are required to keep records which the Secretary or his agents have the right to inspect. Since labeling by origin is required for some seeds, and since the Secretary has the right to inspect records, this will undoubtedly do away with the farce of seed verification which has been carried on under a voluntary plan for some years, and which has been open to very severe criticism.

"It is also unlawful to transport or deliver screenings in interstate commerce unless they are not intended for seeding purposes and unless it is stated that they are for cleaning purposes or manufacturing and not for seeding.

"Common carriers not in the seed business are exempted from the labeling and record keeping provision, and very unfortunately some one slipped in an amendment to the effect that the labeling and record keeping provisions covering seeds moving in interstate commerce "shall not apply to seeds produced by any farmer on his own premises and sold by him directly to the consumer provided such farmer is not engaged in the business of selling seeds not produced by him". There has been a lot of opposition to this clause by the seed trade and I think the seedsmen are right. It can only hurt Oregon in case of material shipped by mail. With the Post Office Department not cooperating with the states in this matter it can be possible for an out-of-state farmer to send seed that will not comply with the law, into the state, by mail and probably our

regulatory officers will not find it out. That exemption should be eliminated from the bill.

"The bill is very sanely drawn and gives the Secretary of Agriculture authority to prescribe seed testing methods and tables of tolerance in connection with seed testing. It prohibits the use of false advertising. It carries quite a substantial fine and the possibility of imprisonment in certain cases, and provides for penalties of various sorts for violators. Part of it goes into effect immediately, part in 180 days, and the rest one year after passage. It is believed that this is an excellent piece of legislation and that it should pass even though the suggested changes are not made.

"It might be possible to get a resolution to the western senators, asking (1) the inclusion of sugar beet seed as an agricultural seed, (2) that the 2% tolerance for weed seed in imported seed be reduced to 1%, (3) that the exemption for farmer-to-consumer sales be eliminated."

That concludes the paper that Professor Hyslop prepared.

Mr. Spence (Chairman): Thank you, Mr. Finnell. I think this matter of seed legislation is something we should all spend some time on. If this federal bill goes through, naturally it is going to bring up the need of correlating state seed laws so that they will fit in with this federal law. You can see where there are going to be a number of conflicts. From the standpoint of tolerance, we already have a number of states that have removed tolerance entirely, such as Utah and Idaho. I would like some discussion as to what work has been done up to the present time as regards other various laws. Mr. Jacobsen, what are your plans for legislation along with the federal law.

Mr. Jacobsen (California): Mr. Chairman, several months ago the County Agricultural Commissioners, who are our co-enforcing officers, met with representatives of the State Department of Agriculture and of the California Seed Council (representing the seed sales group) in anticipation of this federal seed legislation, bearing in mind that our laws should be put as nearly as possible into order. The plea of the seedsmen was that we did not know as yet just exactly what the federal seed legislation was going to be and they would greatly appreciate our awaiting the final enactment of that measure before we attempted to correlate our laws. The County Agricultural Commissioners and the Department have been working through our Weed Control Service office, the Seed Inspection branch of our Bureau of Field Crops, and the Bureau of Plant Quarantine in the interest of establishing the weeds that were being subjected to quarantine enforcement into a category comparable with those of the Seed labeling law. That has been in a large measure accomplished. We have revised our list of primary and secondary noxious weeds in the seed labeling provisions of our Agricultural Code to correlate with the views expressed by the Agricultural Commissioners as to those weeds (1) that were not to be permissible in shipments at all, and (2) others that were to be permissible if found in limited quantities commercially free and destined to counties or areas in counties where the particular weed or weeds already occurred. The

Governor signed this bill the day before yesterday on that phase of the legislation.

We have before him another bill at the present time which would improve the wording of the seed screening provisions of the Agricultural Code. It is now illegal to move weed seed infested screenings except for treatment or destruction. We ran into some difficulty with that because no time limit is set on the period in which disposition should be made of those seed screenings by the owner or the cleaner. The new bill would give the owner 30 days in which to make disposition of such screenings after inspection by the County Agricultural Commissioner, after which the responsibility falls upon the owner of the cleaning establishment and he will then not be liable to the former owner of that seed for such disposition as he may make of the screenings, such disposition to be under permit also. We have a variety of laws which can be used in weed abatement work.

We have worked on those phases but we have not yet accomplished entirely what was desired so far as correlation with the federal law is concerned.

Another law which was attempted which would have been very satisfactory was one the California Farm Bureau Federation introduced pertaining to the cleaning of livestock trucks. The trucking interests of the state and a few of the livestock people themselves rather bitterly opposed the measure and it was not passed.

Mr. Schweis (Nevada): Are the farmers prohibited from hauling their own screenings back?

Mr. Jacobsen (California): They are permitted to haul them back to their own farms for processing in some manner specified by the department or commissioner so as to prohibit any weed seeds remaining in them to become reestablished. We found that some of these seed cleaning establishments were located on rivers or canals and they just dropped the screenings or cleanings in the river where ^{they} could be picked up by irrigation pumps or carried back and forth by tides. Also, there has been rather an extensive practice of selling seed screenings for livestock feeding purposes. Now these cannot be moved until a permit is issued giving the disposition, which must be complied with.

Mr. Spence (Chairman): There are a number of states that have that screening provision in their law. I know Utah and Idaho have it. The majority of our screenings are usually fed with beet pulp.

Mr. Ball (California): Are fine seeds like white top being destroyed by grinding?

Mr. Spence (Chairman): Yes.

Mr. Stallings (Utah): May I ask this question? How uniform are we on our noxious weed list?

Mr. Jacobsen (California): It would seem to me, Mr. Chairman, that that is a very good question in the case of states where there is a similarity of soil and climatic conditions. A large number of

states in the western area could get together on a uniform list. But there are soil variations and climatic conditions. Some states might have to include some noxious weeds on their lists which would definitely be in addition to those of the other states, but I can see no good reason why there shouldn't be a high degree of uniformity where similar objectives are sought.

Mr. Schweis (Nevada): Could I ask a question here? Is an official of the Seed Analysts of America here?

Mr. Ball (California): Is there an official here of the Seed Analysts of America? They are having a meeting in San Francisco and I don't imagine they are represented here.

Mr. Schweis (Nevada): I ran up against a very peculiar situation this spring. One of our seed "hounds" made a purchase of certified alfalfa seed in Oregon. When the seed came down it showed a percentage of weed seed so the man rejected the seed and sent it back to the house where purchased. They raised quite a row about it because he had purchased seeds labeled "Free of noxious weed seed" instead of "Noxious weed free." I can't see why such a thing should be possible.

Mr. Ball (California): I shall take that up with the Seed Council and get the seedsmen's interpretation of the two terms. Inasmuch as Harry Spence has taken such an interest in weed work in Idaho and has cooperated so closely with Senator Clark on national weed legislation I have asked him to report on the Clark bill, Harry Spence.

Mr. Spence (Chairman): The subject of federal weed legislation is something which I think carries a lot of variation in our interpretation of ideas. In setting up our work I know there was a feeling created that the primary purpose was legislation. While we feel that legislation is a definite part of the interest of this organization, yet we have not nor do we intend to make that our major purpose. In discussing federal weed legislation, I am giving my own personal viewpoints on this subject and the experiences that we have gone through in the last 4 or 5 years. I don't want these remarks to be taken as an expression of this work in particular. I hope to very briefly present this material to you and then open the meeting for discussion. We can then formulate very definite resolutions in an attempt to guide the type of legislation which we believe will take place.

"It is very gratifying to be able to report distinct progress in the attempt to obtain Federal recognition and financial aid for the noxious weed problem. During the past ten years realization of the seriousness of noxious weeds has steadily grown throughout the Western States. Following research and educational programs many states or subdivisions thereof took steps to establish machinery for conducting extensive weed eradication programs. At the beginning of most of these programs the entire expense incurred was carried by the individual landowners. With the growth of active weed eradication programs it was soon generally acknowledged that no

program, adequate in scope, could be developed without financial aid from the state and Federal Governments. A number of states requested and obtained financial backing from the counties and state governments, which aided in lightening the load of the individual landowners and permitted an increase in the weed eradication program.

"The effort toward obtaining Federal aid for weed eradication dates back some five years, when the first measures were introduced in the National Congress, requesting Federal funds for direct aid to the states for conducting weed eradication work. Since the original bill a number of similar measures have been introduced in the National Congress, each embodying in the whole the same fundamental principles. This legislation did not deal alone with Federal aid for what might be termed 'commercial' eradication programs, but also attempted to make available funds to be used for educational and research activities relative to this problem.

"There is little doubt that the main interest in the support of weed eradication work still lies in the area of the eleven western states. Consciousness of the problem has spread rather rapidly and now includes most of the states extending west of the Mississippi River. Apparently the weed problem is less serious east of the Mississippi, as evidenced by lack of interest in that section. In addition to the lack of interest in the weed problem in a large part of the United States, the United States Department of Agriculture has not until recently seen its way clear to sponsor or support Federal aid for noxious weed eradication. In the Department of Agriculture appropriation bill for 1936, a provision was made for investigational work for the control of field Bindweed and other noxious weeds. As a result of this appropriation, five Federal cooperative Experiment Stations were established over various sections of the United States. This was the first opportunity of the Department of Agriculture to conduct investigational work of a scope comprehensive of the problem. The first published report of these investigations has recently been made available, and a great deal of valuable information presented which will serve as a guide for the development of eradication methods in the various sections of the country. Unfortunately none of these five stations is located in the irrigated areas of the west, and it is hoped that steps will be taken for the establishment of Experimental programs for these areas. Other departments of the Federal Government have also become aware of the growing menace of noxious weeds, especially the Bureau of Reclamation. The Farm Credit Administration, Farm Security Administration, and other Federal agencies, likewise have a direct interest in the permanency of agriculture and in the protection of farm lands from those things which interfere with the success of farm operation.

"On January 17, of the present year, Senator D. Worth Clark, of Idaho, introduced Senate Bill No. 771, which embodied most of the principles which were contained in the several bills which he introduced while a member of the House of Representatives. This bill was referred to the Agricultural Committee of the Senate and in turn transmitted to the Secretary of Agriculture for departmental comments and judgment. After the bill reached the Department of Agriculture, Senator Clark was invited to the Secretary's office for a conference in regard to this measure. As a result of this conference a second meeting was scheduled which was attended by a representative of the Secretary's office and included the heads of the various

Agricultural Bureaus, and those men within the Department who were responsible for the weed control activities. It was brought out in this meeting that the Department objected to a number of the provisions contained in the Clark bill, but that it was in sympathy with the broad principles of the measure and was prepared to support some type of weed legislation. As a result of this conference, arrangements were made for the Department of Agriculture to draft a weed bill which would be transmitted to Senator Clark for introduction, provided it met with his approval. This suggested bill has recently been submitted to Senator Clark and will be presented here for your discussion and judgment.

"While a number of changes have been made from the original bill introduced by Senator Clark, this measure still embodies the general principles and, in my judgment, is a distinct step forward in obtaining Federal recognition and financial aid for weed control. In my opinion there is still a gross misunderstanding relative to the problem of noxious weeds in most sections of the United States. The weed problem is so much more serious and so different in the Western States, as compared to those states further east, that full significance of its effect upon public welfare has been commonly overlooked. Noxious weeds, under irrigated conditions in the west, present a very complex problem. Spread is more rapid, accelerated through water courses used for irrigation purposes, and damage to crops much more severe. In this area of the United States a vast portion of the land is publicly owned, with agriculture being confined to the fertile valley areas where irrigation water is available. The majority of irrigated lands have been developed by the Federal Government, which still maintains large investments and debts against landowners for reclamation construction charges. Certain agricultural areas in the west have already been abandoned due to noxious weeds rendering the land unprofitable for crop production. When this condition exists the Federal investments are wiped out, and, in addition, local and state taxes, as the land reverts back to state and Federal ownership. Likewise, a large percentage of the Federal Land Bank loans are endangered as noxious weeds move in. It is a fact that weed infestations are the primary cause of a high percentage of foreclosures and the turning back of mortgaged farms to lending agencies.

"Federal and private lending agencies alike now greatly reduce or refuse loans on noxious weed infested farms. The entire noxious weed problem is so closely correlated with public welfare, due to reclamation and Land Bank loans, loss of taxes, etc. that unless concerted efforts are continued to eradicate and control noxious weeds, the entire agricultural industry in the west stands to diminish. The problem is far too great and too complicated to expect an adequate solution by the individual landowners, but instead must be met by a unified program with county, state and Federal participation. The introduction of Federal aid for weed control activities, in addition to state and county participation, will, in nearly every state, permit the development of a far-reaching and efficient program to cope with the weed problem. Federal aid should not be limited to commercial eradication programs but should also aid in developing adequate research and educational fields, so vital to the successful operation of any program.

"The interest of the individual landowner in the weed problem

must be maintained at any expense. Regardless of the degree of financial aid from state and Federal Governments, no weed eradication program can hope to be successful unless a thorough and sincere interest by the private landowner is maintained. Also any eradication program must be closely correlated with a program of prevention of new infestations. Federal seed legislation now pending and the strengthening of seed laws by the several states can and will aid in this problem. However, here again a thorough knowledge of the seriousness of the weed problem, together with full cooperation from the individual landowners, will be needed to prevent future infestations.

"I sincerely hope that this organization will give thought and consideration to this measure and lend its support in obtaining speedy enactment. Senator Clark has requested our study of the proposed bill and solicits our suggestions, so that the bill will be conclusive and cover as far as possible the mechanics of a well-rounded weed control program."

Of the bill which will probably replace Senate Bill 771, I think many of you have received a copy. This bill was prepared by the Department of Agriculture and about three weeks ago was submitted to Senator Clark with the suggestion that it replace Senate bill 771. From what little time I have spent in studying the bill, it embodies about the same fundamental principles that have been contained in the former bill. The original bill, I believe, called for the handling of federal participation in weed control by the Department of Plant Quarantine. Previously it was in Plant Industry and they definitely stated that they didn't believe it was part of their problem. In this measure it is left for the Secretary to set its enforcement or its operation according to his own judgment and can be placed in any number of the several bureaus. In addition, it does not establish definitely the relationship of either educational or research work. I should like to see existing agencies which are equipped and have been handling reserach work in noxious weeds benefit under federal aid. I think the bill should provide that the research work in the various states which might be subsidized with federal funds be carried out by the agricultural experiment stations. When it comes to the educational field it will vary in some states but can be tied to the existing extension service. I should like to read through this bill. It has not been introduced as yet and probably will not be for the next week or two.

A BILL

"To provide for assistance by the Federal Government in the control and eradication of noxious weeds.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Noxious Weed Control Act".

"SEC. 2. In order to effectuate the policy of the Congress to assist in providing for the control and eradication of noxious weeds, and thereby to conserve the farm, grazing, and forest lands of the Nation, the Secretary of Agriculture is hereby authorized, from time to time -----

"(1) To furnish financial or other aid to any State or administrative agency thereof, subject to such conditions as he may deem necessary for the effectuation of plans and programs submitted by such State or administrative agency and approved by the Secretary of Agriculture, for the control or eradication of noxious weeds; Provided, however, that the contribution made by the Secretary of Agriculture to the costs of operations in any State undertaken pursuant to this subsection shall not exceed 50 percentum of the total cost of such operations. The computation of such costs shall be made by the Secretary of Agriculture, shall exclude all administrative expenses, and shall be conclusive upon the accounting and other officers of the United States:

"(2) To carry out measures for the control or eradication of noxious weeds, including, but not limited to, applications of chemicals and poisons, methods of cultivation, crop rotations, engineering operations, and changes in use of land, and in connection therewith to cooperate or enter into agreements with, or to furnish financial or other aid to, any agency, governmental or otherwise, or any person, subject to such conditions as he may deem necessary, for the purposes of this Act;

"(3) To conduct surveys, investigations, and research relating to noxious weeds and to the measures needed for their control or eradication, to publish the results of any such surveys, investigations or research, to disseminate information concerning such measures, and to conduct demonstrational activities or projects in areas subject to infestation by noxious weeds.

"SEC. 3. The Acts authorized in SECTION 2 of this Act may be performed -----

"(a) On lands owned or controlled by the United States or any of its agencies, with the consent and cooperation of the agency having jurisdiction thereof; and

"(b) On any other lands, upon obtaining proper consent or the necessary rights or interests in such lands.

"SEC. 4. As a condition to the extending of any benefits under this Act to any lands not owned or controlled by the United States or any of its agencies, the Secretary of Agriculture may, insofar as he may deem necessary for the purposes of this Act, require -----

"(1) The enactment and reasonable safeguards for the enforcement of State and local laws containing suitable provisions regulating the marketing and sale of seeds to prevent the dissemination of seeds of noxious weeds, and provisions for the control and eradication of noxious weeds:

"(2) Agreements or covenants as to the permanent use of such lands; and

"(3) Contributions in money, services, materials, or otherwise, to any operations conferring such benefits.

"SEC. 5. The term "noxious weeds" as used in this Act shall be held to mean such perennial weeds as the Secretary of Agriculture,

after due investigation, and after consultation with the principal agricultural administrative officer and the Director of the Agricultural Experiment Station of the State concerned, shall designate as noxious within a particular State or area thereof.

"SEC. 6. So far as feasible, the labor of those employed on relief and work relief projects administered by, or under the supervision of, the United States; and the labor of enrollees in the Civilian Conservation Corps, may be made available for employment on operations undertaken pursuant to this Act, but the cost of such labor shall not be included in the computation of the respective contributions that may be made under the provisions of sub-section (1) of Section 2 of this Act.

"SEC. 7. The Secretary of Agriculture, in administering the provisions of this Act, shall utilize the officers, employees, and facilities of agencies within the Department of Agriculture, and may allot to such agencies or transfer to such other agencies of the Federal Government as he may request to assist in carrying out any of the provisions of this Act, any funds available for the purposes of this Act.

"SEC. 8. For the purposes of this Act, the Secretary of Agriculture may -----

- "(1) Secure the cooperation of any governmental agency;
- "(2) Make expenditures for personal services and rent in the District of Columbia and elsewhere, for the purchase of law books and books of reference, for printing and binding, for the purchase, exchange, operation, and maintenance of passenger-carrying vehicles, for supplies and equipment, for traveling expenses and for other administrative expenses;
- "(3) Make any purchase, or procure any service, without regard to the provisions of section 3709 of the Revised Statutes (41 U. S. C. 5), when the aggregate amount involved is less than \$300.00 and;
- "(4) Perform such acts, and prescribe such rules and regulations as may be necessary.

"SEC. 9. To carry out the provisions of this Act, there is authorized to be appropriated not to exceed \$_____ for the fiscal year ending June 30, 1940, and such sums as Congress may deem necessary for each fiscal year thereafter."

(Meeting is adjourned until 1:15 p.m.)

SECOND ANNUAL WESTERN WEED CONTROL CONFERENCE

Afternoon Session -- June 9, 1939

Meeting Called to Order 1:15 p.m.

Chairman Spence: Before starting the afternoon session I wish to announce the names of those who are on our Nominating and the Resolutions Committees.
Resolutions Committee - Robbins, California, Chairman; Stallings, Utah; Harris, Oregon; Griner, Washington; Kohout, Idaho; and Stodieck, Nevada. Nominating Committee - Hutchings, Utah, Chairman;

Crafts, California; Hill, Oregon; Rich, Washington; and Hunt, Idaho. Will you please meet and be ready to report before noon tomorrow. Now, I am going to go over the federal bill rapidly and throw the meeting open to discussion. We hope that we can get an expression from the various states and their attitude toward federal legislation. My idea is that it is a step in the right direction. We have won a big point when we have recognition by the Department of Agriculture. Personally, I should like to see the existing organizations used that are now set up to take care of research and educational work.

Mr. Ball (California): I don't think that it is necessary to add a great deal. If federal aid is what we want, recognition from the Department of Agriculture is a very encouraging step. The one thing badly needed is the research and educational phase of this work. I think that it is necessary that those agencies capable of handling that part of the work be given the job. We have a Mr. E. Johnson in our Department who could give views on this Bill.

Mr. Johnson (California): I don't know that I can. I was about to ask a question, though. In looking over the bill and also the Senate Bill 771 I note that the original bill was written apparently to take advantage of existing agencies, and the present bill instead sets up an entirely independent separate agency. Is there any reason why that was done in the new bill?

Mr. Spence (Chairman): I do not know. I have had no explanation other than that this is the bill drafted by the Department of Agriculture and it completely overcomes the objections they had to 771.

Mr. Johnson (California): There is just a slight difference in the arrangement of the paragraphs. Section 2 reads that the Secretary of Agriculture is authorized to furnish financial aid to the State for the control or eradication of noxious weeds. In the second, the Secretary of Agriculture is authorized to carry out measures for the eradication of noxious weeds.

Dr. Crafts (California): It seems to me there is a more fundamental point involved. It seems that the Secretary of Agriculture and the Department of Agriculture have consciously put it in because they are out of sympathy with the existing agency. Is it going to accomplish much to change the very thing they have changed? May I ask one question: Why was it they went to the Department of Agriculture for this new bill?

Mr. Spence (Chairman): It seems to be Congress' procedure that when a bill is introduced it is first referred to an agricultural committee. They send it to the Secretary who sends it to the bureau that is interested in the measure. They went into conference on this bill and it was finally decided that the Department of Agriculture would draft a bill which would be submitted to Clark. Senator Clark has referred this to the various interested agencies for suggestions before introducing it.

Dr. Robbins (California): There isn't anything in the present set-up of the Department of Agriculture which prevents the development of

research work and educational work in every state and with federal aid. Any state that has a project on weeds which is approved can do research work on weeds from federal funds. So, we've got the whole set-up from all the educational and research work that we need at the present time. I don't see the point in making a special bill to cover all that. I am inclined to think to kill a bill like this-- that there would be more chances of furthering research under the old set-up. Another thing I don't understand is in reference to federal moneys being spent in the states for the control of weeds, going so far as to say you can spend federal and state funds for the control of weeds on federal lands, state lands, and other lands, which would mean the parcel of land that is owned by an individual. That is going pretty far. We are getting into politics.

Dr. Crafts (California): If we do send in a resolution we will have to do it recognizing that it is a mere gesture because the Secretary will have his way or not.

Mr. Ball (California): I should like to ask Dr. Robbins one question. If that money has been made available why haven't state agencies taken advantage of it?

Dr. Robbins (California): You have made a very important point. One thing that we could well do is urge the Department of Agriculture to spend more money on research and educational work.

Mr. Ball (California): We have attempted to get universities to do research and our answer has been in most cases that it could not be done due to lack of funds. I believe the importance of research has been brought to the attention of the universities, who should have made use of the present federal set-up. At a meeting held in Idaho two or three years ago, which Mr. Jacobsen of our Department attended, Secretary Wallace was present. He very definitely was opposed to weed work, especially on private lands. He has apparently reconsidered the problem inasmuch as this has come out of the Department of Agriculture. I feel that if plant diseases, insects, etc. have been considered in our national set-up, weeds have a place and are just as serious in the pest field.

Mr. Spence (Chairman): I think this bill is 95% all right. We have had, up to the present time, very little cooperation from the agencies. This bill will make some provisions to take care of this. It is also definitely stated in the bill that CCC labor can be used for weed control work. Perhaps there are some good suggestions we could make that would help.

Mr. Harris (Oregon): The chief reason the Bureau of Plant Industry refused to carry on the work mentioned in the original bill was that they didn't know enough about weeds. I notice here on Section 7 that it authorizes the Secretary of Agriculture to definitely use other agencies within the Department of Agriculture to carry on all the activities in connection with the bill. Wouldn't that take care of some of the things that we have talked about?

Mr. Spence (Chairman): (Reads Section 7). I can see lots of

reasons why it may be best to leave it open.

Mr. Hill (Oregon): There is one other point, I think, to which we should give consideration in connection with the whole weed problem. Section 5 of the bill reads:

"The term "noxious weeds" as used in this Act shall be held to mean such perennial weeds as the Secretary of Agriculture, after due investigation, and after consultation with the principal agricultural administrative officer and the Director of the Agricultural Experiment Station of the State concerned, shall designate as noxious within a particular State or area thereof."

In other words, this is confined to primary weeds. Now, for the purpose of this act it may be all right. We sometimes lose sight of the fact that weed problems are not always perennial weeds and that the control of annual weeds is a real problem. I think we shouldn't lose sight of the fact that we have an annual weed problem and we should be looking to the time when we may want some help to control annual weed problems in certain areas.

Mr. Spence (Chairman): That is a good suggestion, Mr. Hill. Any other discussion?

Mr. Stallings (Utah): Yes. Where it says that the Secretary of Agriculture will furnish financial or other aid. We are already getting other aid. Could that be construed to mean money or WPA help? Shouldn't the "or" be changed to "and".

Mr. Spence (Chairman): That question is a little legal. If any of you have explanations which will help to guide the Resolutions Committee, will you contact the Chairman or members of that committee. We shall try to spend a few minutes on this tomorrow morning after you have had time to think it over. Our first speaker this afternoon will be Dr. A. S. Crafts of the University of California at Davis, who will speak on the "Principles of Chemical Weed Control".

Dr. Crafts (California): Mr. Chairman, and members of this conference: I am going to introduce the subject and leave it to some of the boys who are doing the field work to give you the details.

"California with its variety of climates, soils, and crops has many weeds. Problems just arising in other states have been acute here for many years and farmers have been forced into field scale weed control. Using prescribed methods they early discovered that conditions in many of our agricultural regions favored weed growth and that the older methods often proved inadequate. For this reason and also because of our large scale mechanized farming, chemical weed control had a strong appeal and attracted wide interest.

"California has pioneered in the large scale use of herbicides. Bolley's iron sulfate was tried in the early days but failed because of our low humidity. Sodium arsenite was used on our railroad systems and we have had our share of law suits from stock poisoning. Salt was early tried to control morning glory but proved ineffective on our deep alluvial soils.

"The first hint of our present development of chemical weed control came with the discovery by Gray in 1915 that sodium arsenite

sprayed on the leaves of morning glory would kill the roots for many feed into the earth. This attracted much attention but failed to give satisfaction. Then Bensel at Salinas used a combination of acid sludge and arsenic with some success and Hughes patented the arsenic trichloride sulfuric acid mixture sold under the trade name of K.M.G.

"Meanwhile Mayhew had shown that carbon bisulfide injected into the soil would kill morning glory roots and a new method, temporary soil sterilization, was initiated.

"In 1926 Aslander introduced sodium chlorate as a herbicide and the practice of chemical weed control became established in this country. The spray tests in Kansas and the field work in Idaho soon proved the feasibility of field scale chemical control and the results during the past few years have shown the practicality of chemical methods.

"Among the numerous workers who have contributed to our knowledge of weed control should be mentioned P. B. Kennedy who gave early encouragement to the use of K.M.G. and who worked on the identification of weeds particularly of the rice areas. Ethelbert Johnson pioneered in the control of puncture vine with oils and encouraged the program of roadside spraying for fire control along highways. With the initiation of cooperative work between the University of California and the State Department of Agriculture by Robbins and Ball, chemical weed control has progressed steadily until now, if I should attempt to name the active cooperators in the work I should have to list most of the County Commissioners and Farm Advisers in the State, a host of federal and private agencies and an almost innumerable group of farmers. Probably the unique contribution of this state to chemical weed control has been the development of a comprehensive plan to meet the great variety of problems that confront us here. Ten years ago we needed, above everything, methods to meet our numerous perplexing situations. Within those ten years we have provided the following:

- (1) A cheap and effective acid arsenical at about 1/10 the cost of those commercially available.
- (2) Rational chlorate methods for arid western conditions.
- (3) Soil sterilization methods with recommendations for wide scale application.
- (4) Improved methods for applying sulfuric acid.
- (5) The borax treatment for Klamath weed control.
- (6) An experimental and demonstration program for the introduction of Sinox as a selective spray.
- (7) Basic information on carbon bisulfide diffusion in soils that should eventually lead to revision of recommendations.

"An adequate program for the use of chemicals in weed control should include the following methods:

- (1) Contact sprays for seasonal control of all weed growth.
 - (a) Sodium arsenite should be used only where no poison hazard exists. A spreader increases the kill on tules or grasses.
 - (b) Sulfuric acid with a spreader. Kills thistles and other broad-leaved weeds but not grasses. Requires special equipment.
 - (c) Diesel oil. This is the best material now available but it is expensive and illogical to use from a conservation standpoint.

These are two possibilities for improvement:

(1) By using soil sterilization around structures, signs, etc., where spraying is inconvenient.

(2) Introduction of superior materials of higher toxicity, unsaturates or aromatics alone or in an oil carrier to reduce cost per gallon, or volume required, or both.

(2) Selective sprays for controlling weeds in crops. Two herbicides are used at present.

(a) Sulfuric acid. This is cheap and effective and has a wide range temperature tolerance. It requires expensive spray equipment.

(b) Sinox. Also cheap and effective. It has a wide concentration tolerance, consequently may be applied by airplane in high concentration. It fails at low temperatures but requires no special spray equipment. It has a higher selectivity than acid and has been very effective in flax.

(3) Translocated sprays

(a) The acid arsenical method is proved and has been adequately described. Results can be improved by increasing the volume to 6 gals. per square rod. The method offers promise as a combination treatment preliminary to chlorate, carbon bisulfide and clean cultivation under certain conditions. It has given encouraging results on one species of white top--Lepidium repens.

(b) The jar method. Saved the state many dollars in Camel Thorn eradication. Continues popular among gardeners, strawberry growers, etc. Ten percent NaClO_3 solution may be used to avoid poison hazard where desirable.

(4) Soil Treatments - temporary

(a) Sodium chlorate toxicity is inversely proportional to nitrate availability in the soil. Chlorate not economical in extremely fertile soils. Dry applications are most satisfactory. There is a machine on the market which applies dry chlorate successfully. Autumn is the best season to apply chlorate.

(b) Carbon bisulfide. Experiments in progress indicate a revision of recommendations. Texture, moisture, and temperature are all important factors in CS_2 distribution in the soil.

(5) Soil Sterilization - Permanent

(1) Sodium arsenite. This is a proved method with published recommendations. The great need is for education in the handling of the chemicals and the use of the method.

(2) Dry treatments As_2O_3 NaClO_3 . This is a proved method with published recommendations. Workers should be familiar with its advantages and use it wherever possible. The hazards are reduced to a minimum.

(3) Borax and borate ores. These chemicals alone and with chlorate are finding wider use particularly against the weeds of leached and acid soils. They are very effective against Klamath weed in range lands and on bear clover and other shallow rooted perennials in the forests. They usually stimulate the growth of grass in succeeding years and offer aid in a combination of weed and erosion control.

"The Future in Chemical Weed Control.

There will be new weeds and old weeds in new places. New studies should aim at the discovery of new chemicals. This will require critical testing technics and many controlled experiments.

Workers can look at the brilliant work on arsphenamine, aspirin, novacain, insulin, sulfanilamide, and sulfapyradine for inspiration and hope. The field for constructive research in chemical weed control is unlimited."

Mr. Spence (Chairman): Thank you, Dr. Crafts. I am sure we all appreciate the work which has been carried out by the California station. I know that many of you have questions which you would like to ask Dr. Crafts but in order to speed things up I am going to ask you to pencil these questions and at the end of the afternoon we shall give you an opportunity to present any questions you have in mind. Next on the program is a report on "Progress in Weed Control Research" by Mr. R. N. Raynor of the University of California.

Mr. Raynor (California): I shall merely mention briefly some of the projects on which we have recently worked.

"A considerable part of my time during the past year has been spent on the research and demonstration project with Sinox. This, however, will be covered by Mr. Westgate, who follows me on the program, and so I shall confine myself to brief mention of several minor projects now in progress.

"Further work on summer spray applications of sodium chlorate to Bindweed has confirmed the results published by Dr. Crafts; namely, that under conditions conducive to translocation, a higher percentage of kill is attained by spraying the foliage than from cutting off the tops and spraying the soil, the chlorate being leached in by irrigation in both cases.

"The chlorate should be left on the foliage for one or two days before irrigating. If left on longer, decomposition of chlorate lessens the amount reaching the roots when finally leached in. The same loss of effectiveness with increasing time intervals occurs when the spray is applied to bare soil.

"Addition of wetting agents to the acid arsenical spray appears to increase its effectiveness even on bindweed, which is readily wetted by the spray even without added wetting agents. This is in spite of the fact, shown by laboratory experiment, that the volume of spray retained on the plants is less when a wetting agent is added.

"The addition of a wetting agent increases the effectiveness of sulfuric acid sprays on plants such as yellow star thistle, which is not readily wet by aqueous sprays. It is necessary to use as a wetting agent sulfated or sulfonated fatty alcohols or esters of sulfo-dicarboxylic acids in these acid sprays. These spreaders are also satisfactory in chlorate solutions used as a contact spray on mixed annual vegetation, including grasses.

"Plot tests with the acid-arsenical spray on hoary cress and perennial pepper cress indicate that it may be effective on Lepidium repens (Lenspodded hoary cress) but not on Hymenophyllum pubescens (Globe-podded hoary cress) or Lepidium latifolium (Perennial pepper cress). The present tests have not included Lepidium draba (Heart-podded hoary cress). Morgan, in Australia, reports it is effective on this species. Sodium arsenite was more effective than arsenic pentoxide. A higher arsenic concentration than is used on Morning Glory and Russian Knapweed appears to be desirable.

"Plot tests with chemicals for Klamath weed control in Shasta and Yuba Counties have confirmed the results obtained in Humboldt County, already published. As little as one pound of sodium chlorate per square rod has given satisfactory control. A mixture of four pounds borax and one-half pound sodium chlorate per square rod is effective over a wider range of conditions than sodium chlorate alone. The relation of date of application to rainfall distribution is further confirmed by these tests. Maximum kills resulted from application at earlier dates in the spring at Marysville than at Smartsville or in Shasta County.

"White horse nettle (Solanum eleagnifolium) is resistant to sodium chlorate; at least six pounds per square rod are necessary for any appreciable degree of control.

"Plot tests of several soil sterilants on railroad roadbeds show dry white arsenic superior to sodium arsenite, borax, borate ores, and sodium chlorate for that purpose. It is the least expensive, and the most lasting in its effects.

"Injections of sodium ethyl xanthate into the stems of tules (Scirpus acutus) resulted in the death of stems surrounding the treated ones. Spraying a solution on the stems killed them back at the water line only.

"A series of cultivation and cropping plots on hoary cress were established this season in Big Valley, Lassen County, by the Agricultural Commissioner and the Farm Adviser, with the Weed Control Service of the State Department of Agriculture and the Botany Division at Davis cooperating. The studies include frequency of cultivation, date of beginning cultivation, comparison of rotary rod and duckfoot cultivators, winter cropping between two seasons of cultivation, and deep dry plowing."

Mr. Spence (Chairman): Thank you, Mr. Raynor. To continue the report on "Progress in Weed Control Research" I shall call on Mr. W. A. Westgate.

Mr. Westgate (California): I shall give you my report on the Summary of Sinox Investigations and then we shall have a few slides.

"Sinox chemically is sodium dinitro cresol. It is a basic dye stuff made from coal tar. It contains 70 percent water which is necessary in the manufacturing process and serves to make the material noninflammable. It is noncorrosive and relatively nonpoisonous. It is relatively nonpoisonous in comparison with the arsenic compounds and the heavy metals. It is, however, classified as a poison and should not be taken internally in large amounts. The material used as a spray is noninflammable. However, the dried product is highly inflammable and users are cautioned against allowing opened cans to dry out and to wash off equipment when not in use. We have on a number of occasions attempted to ignite clothing which had been previously soaked in concentrated Sinox and allowed to dry. We have noted that combustion was not materially more rapid than had not the Sinox been present, neither is there a sufficient amount of the material deposited on sprayed foliage to cause a fire hazard.

"Sinox was first developed in France in 1933, and it was the French who gave it its name. Since that time it has been extensively used throughout central Europe and England as a selective spray in

cereals and flax. It has been used commercially in this country for the first time this year. Some 10,000 acres of grain and flax in this state have been sprayed during the past season, of which 8,000 were with ground rigs and 2,000 with airplanes. The experimental work was first started in New England at the New Hampshire Experimental Station about three years ago. We soon learned, however, whereas we had plenty of weeds back in New Hampshire our agriculture was somewhat limited. Therefore, the project was transferred to California, where we find plenty of weeds as well as extensive agriculture.

"We have just completed two seasons' investigational work in California. This last season we put on over 700 different plots using a power rig and over an area extending from Kern County near Bakersfield to the Oregon line. These plots were both experimental and demonstrational in nature. In all cases weather records were taken at the time of application and for a few days following. We have not as yet had time to tabulate all the results. We are now taking yield records on a number of these plots. I can, however, in a very general way give the trend in results.

"Since we are dealing with a penetrative phenomenon, any factors which affect the rate of penetration, such as temperature, concentration of chemical, rate of evaporation, and the nature of the plant cuticle will have an effect on the action. Thus we have found wild radish to be more difficult to penetrate than wild mustard, and plants which have been stunted and growing under dry conditions are more difficult to penetrate than tender succulent plants. The results in relation to weather conditions may be divided into two groups. First there is an immediate action which is noted when Sinox is applied at temperatures above 50 degrees and when the humidity is at least 50%. Under these conditions the action will be noted to take place within two hours after application. White translucent areas will first appear on the leaves which gradually grow larger, finally resulting in the complete wilting of the weed in about three days to one week. Under these conditions rain or any washing off which occurs after two or three hours from time of application has no effect on the results. Heavy fogs and dews are not important providing temperature is at least 50 degrees or rises to 50 degrees after the application. There is a second type of action which may be described as a slow toxic action over a period of several days or even weeks. This type has been noted when the spray was applied under cold and dry conditions and when the plants are stunted from drought. We ran into this situation during the last winter in the Sacramento Valley region. It is known that during a period of drought which characterized this region last winter that the plants change their surface character to withstand adverse conditions. Plots which were put on during this period did not show results for several weeks after application. There was, evidently, a slow toxic action with each successive dew that might have occurred which finally produced good results. However, other plots which happened to be washed off within a few days by rain or heavy fog failed to give results when the spray was applied under low temperatures and humidities.

"It was noted that the common wild mustards Brassica arvensis and Brassica campestris were least subject to weather conditions than any of the other important annual weeds of grain and flax. Wild radish and yellow star thistle, Centaurea solstitialis,

demanded slightly more ideal conditions, while *Amsinckia* was most exacting of all.

"Dosage of course will depend on the species of weed and its stage. We have had consistently good results against the common wild mustard, *Brassica arvensis*, using 1 gallon of Sinox to 120 gallons of water and applied at 80 to 100 gallons to the acre. This would represent a minimum material cost of \$1.30 per acre. The most ideal time for spraying wild mustard is while it is in the three to five leaf stage. Its resistance, however, does not appear to increase greatly until the flower buds occur. In our experiments to reduce the volume per acre we have had good results against the common wild mustard using 1 gallon of Sinox to 50 gallons of water and applied at 50 gallons to the acre. Where water is a difficult problem this dosage costing \$2.00 per acre would be most advantageous. With the airplane applications for control of the common mustard 1 gallon of Sinox dissolved to make 12 to 15 gallons of spray has given very satisfactory results.

"We have had good results against wild radish, *Raphanus sativus*, Black mustard, *Brassica nigra*, and yellow star thistle, *Centaurea solstitialis*, at the three to five leaf stage using 1 gallon of Sinox dissolved in 100 gallons of water and applied at 80 to 100 gallons per acre. However, due to the fact that the resistance of these plants greatly increases after they have passed the five leaf stage it is recommended that a 1 to 80 dilution at 100 gallons to the acre be used.

"On yellow star thistle growing in dense grass along the roadsides we have had best results using 250 to 300 gallons per acre.

"As to pressures desired for applying this material, we have not been able to note any differences between 60 and 300 pounds. Pressures below 75 pounds are more subject to wind drift than are higher pressures which produce a greater driving force.

"Crops other than grain and flax which have been successfully sprayed are young onions and corn. Weeds which have been controlled in these crops are the mustards, wild lettuce, *Lactuca* spp., annual sow thistle, *Sonchus* spp., Lamb's quarters, *Chenopodium album*, pigweeds, *Amaranthus*, spp., knotweed, *Polygonum aviculare*, and Shepherd's purse, *Capsella bursa-pastoris*. It is not to be recommended for the control of chickweed.

"Crab grass, *Syntherisma sanguinalis*, in lawns has been successfully controlled using a 4 per cent dilution by volume at the rate of 2 gallons per square rod. It is necessary to spray the crab grass when it has first germinated or when showing two and three leaves. Bluegrass and Bermuda grass lawns are very resistant to Sinox dilutions, and show only a temporary "browning up" following the spray application. It is not safe, however, to spray bent grass lawns."

(Mr. Westgate then showed some slides relative to his subject)

Mr. Spence (Chairman): Thank you, Mr. Westgate, Our next speaker will be Mr. R. M. Hagan, Associate in Experiment Station, Davis, who will give us a talk on "Soil Factors Affecting Movement of Carbon Bisulphide."

"I -- Introduction

This project was undertaken to establish in a quantitative manner the relations various soil factors bear to the movement of CS₂

through the soil. The factors studied include soil porosity, texture, moisture content, degree of compaction and temperature. One might ask why we are interested in studying the movement of CS_2 in such a detailed way. Both the success and failure of CS_2 applications for weed and fungus control depend upon the movement of the CS_2 through soil or out of the soil.

"I shall briefly review the manner in which CS_2 is used in treatment of deep-rooted perennials, such as morning glory, and in control of oak-root fungus *Armillaria*. CS_2 is introduced below the surface of the soil as a liquid which rapidly volatilizes and diffuses through the soil as a vapor. For example, in treatment of morning glory, the area is laid out into squares, a small hole made in the soil at the corners of the squares with a prod, a given dose of CS_2 released at the bottom of the hole, and then the hole is closed by tamping full of soil. Large scale applications are also made with an adapted sub-soiler equipped with CS_2 lines running down the back edges of the standards. Commercial treatments on morning glory have, in general, been very promising, but in some cases satisfactory kills have not been obtained. These failures seem to be caused by the inability of the CS_2 to contact the roots with a toxic concentration of CS_2 for a sufficient time under the conditions presented in the particular soil.

"Limited greenhouse experiments have shown that CS_2 is a "contact killer" and cannot be depended upon to translocate along the root system as do the arsenicals. This means that to secure a satisfactory kill, the soil condition must allow the CS_2 to move readily through the soil so that it may adequately contact the root system. At the same time, excessive loss of vapors from the surface must be prevented. Data to be presented later shows that the extent of upward diffusion and loss from the surface may be great under some conditions.

"It is evident, then, that the critical point of the CS_2 problem involves the ability of the CS_2 to move through the soil. Many field plot tests have been put out, but experience has shown that the interplay of the various uncontrolled factors, a condition necessarily inherent in field work, is so complicated as to render it very difficult to make interpretations from the results observed. The goal of this present work is an understanding of the role each of the soil factors plays on the movement of CS_2 , so that the field plot work can be better interpreted. This work will also provide a basis for more intelligent selection and management of field plots to the end that they may supply data capable of ready interpretation.

"II -- Method of Study

To obtain the necessary control, a program of laboratory work has been under way under a grant from the Wheeler, Reynolds, Stauffer Chemical Company of San Francisco. Each of the soil factors mentioned has been studied in a quantitative manner, holding all the others as constant as possible.

Slide # 1

"The apparatus used is necessarily quite complicated. Briefly it consists of a tube containing the soil to be analyzed, a shallow dish sealed on to the lower end of the soil tube into which the CS_2 is quantitatively measured, and an "air-sweeper" attached to the

upper end of the soil tube. CS₂ is vaporized in the shallow dish, and the vapors, moving upward through the soil and rising from its upper surface, are collected by the air-sweeper and carried into absorber columns, where the amount of CS₂ may be chemically determined.

"This method has proved quite satisfactory. We have been able to determine small, as well as large, differences in CS₂ flow in response to different soil conditions. The CS₂ flows measured are not empirical but represent a measure of the permeability of the soil. Side experiments were carried out to determine the fundamental validity of the work, and it was found that the CS₂ movement measured bore a definite relationship to the "driving forces" involved.

Slide #2

"This is shown in slide #2 where the flow has been plotted against the vapor pressure of the CS₂ which is the "driving force". Our use of comparatively small soil tubes may be questioned, but we found that the flow measured in these small tubes was proportional to those through much longer tubes.

"III -- Brief Review of Soil Concepts Involved

CS₂ flow is shown to be largely a function of the porosity of the soil. By "porosity" we mean the volume of air in a given volume of soil divided by that total volume. That is,
$$\text{Porosity} = \frac{\text{volume air}}{\text{volume soil} + \text{volume moisture soil particles}}$$

Slide # 3

"Porosity, then, is an expression involving all the air contained in a soil. This air may be in the form of connected pores, disconnected pores, or bubbles. Different soils vary in the quantities of these various types of air spaces. It is for this reason that different textures show differences in flows of CS₂ at a given total porosity.

"When moisture is added to the soil, thin water films first form around the soil particles. As more water is added these films become thicker and thicker, and where the particles are close together, the passageway between may be entirely closed by the water films. With further additions of water, more and more pores become blocked.

"The compaction of a soil is an expression of the closeness with which the soil particles have been squeezed together. The more compact the soil, the smaller the pores or passageways between the individual particles. However, in general, the squeezing together of the particles does not completely seal the passageway as does the addition of water.

"IV -- Presentation of Data and Discussion of Results

(1) Porosity

Slide #4

"On the basis of this laboratory work, porosity is the fundamental variable. The other soil factors, soil moisture and compaction, influence flow in the degree to which they affect porosity.

"Experiments on fine sand shown in slide #4 indicate that CS₂ flow is quite a direct function of porosity. The significant point to note is that the CS₂ becomes zero, not at zero porosity, but at a

porosity near 26%. This means that 26% of the total percentage air in the soil is contained in non-continuous pores or air bubbles as shown in the preceding slide.

Slide #5

"Experiments on other textures, fine sandy loam, loam, and clay show that flow is also governed by porosity but that the relationship is not quite linear. The significant thing again is that flow becomes zero at 26-29% porosity.

"(2) Texture

The texture of a soil is a term indicating the coarseness or fineness of the soil; differences in the properties of soils of different textures are not due only to texture but to another factor, structure. Structure expresses the arrangement of the individual grains and aggregates that make up the soil mass.

"In carrying out a laboratory study, one must use soils which have been carried in from the field. This removal from their natural condition does not appreciably affect the coarseness or fineness of the soil; that is, its texture, but does modify its structure. Laboratory samples of soils of various textures still possess structural differences, but these differences have been reduced.

"Referring again to slide #5, we see that comparing the different textures at a given porosity, the differences in flow are comparatively small. It is to be noted that at a given porosity fine sandy loam gives the highest flow, followed in turn by loam and clay. Although not given here, clay loam was found to fall between loam and clay.

"Because textural differences in the field are associated with structural differences, the variations in flow between the textures under field conditions would be greater than indicated here.

"Structure is a factor on which work must be done, but very little is known about soil structure itself. This is one of the problems I am planning to tackle in my future work.

"By way of summary, it must be said that in the absence of characteristic field structures, the textures when compared at a given porosity, show comparatively small differences in flow. But under field conditions, these differences would be greater with the sand showing the highest flow and clay the lowest flow when compared at a given porosity.

"(3) Moisture Content

Slide #6

"Moisture Content is the most important single variable, for the addition of moisture can bring about large reduction in the porosity. Small changes in moisture content result in big changes in CS_2 flow. Referring to the slide for the sand, note that a change in moisture content from 5 to 10% cut the CS_2 flow to one half its previous value.

Slide #7

"The fine sandy loam shows a similar drop in CS_2 flow with increasing moisture. It also brings out another very important point. Note that when the moisture content is near the field capacity, the flow of CS_2 nearly ceases. The other textures on which work has been done also show the same thing. I feel that this is a highly significant point and that consideration of this point will go a long way toward explaining many of the anomalies we run across in

attempting to interpret our field plots.

"If I may digress for a moment from weed control to fungus treatment problems, I should like to point out what seems to be an illustration from field work of this fact of zero flow in soils at the field capacity. Dr. Thomas of the Plant Pathology Division in Berkeley has been carrying out investigational work on the control of oak-root fungus on the roots of peach trees in several sections of the state. Much of his work has been carried out in commercial orchards where irrigation practice calls for quite frequent applications of water. It has been found that in these orchards most of the roots are confined to the first six feet of soil. The trees are able to dry out the first 6 feet of soil, but below the 6 foot mark, the soil remains at field capacity. Now, the significant point is this. Dr. Thomas has not been able to get the CS_2 to penetrate below the 6 foot depth even though he varies the depth of application of the CS_2 . He does not find any difficulty in getting the CS_2 to penetrate the first 6 feet of soil.

"This relationship between CS_2 flow and soil moisture content has two very important applications for weed work. Where we wish to provide for maximum movement of the CS_2 through the soil, it should be quite dry and certainly it must not be near the field capacity. Secondly, to prevent loss from the surface during a treatment, a shallow irrigation should provide an excellent seal. Such a seal would be far more adequate than a dust mulch or compacting operations.

"(4) Compaction

"The data for fine sandy loam (slide 7) and also for loam and clay, which will be given later, show that CS_2 flow is a function of the soil compaction. Compaction reduces flow to the degree in which it changes the porosity, and this depends on texture. Light textured soils, in general, show a small range of compaction, while heavy textured soils may be highly compacted.

"The compactions we were able to obtain in our studies are not so great as sometimes experienced in the field. Field measurements show compactions to vary between rather wide limits, even for a given texture. For the Yolo Series of soils, field determinations on different textures gave a mean value of 1.32 (specific gravity value). The compactions we arrived at in our study can be seen to fall above and below this mean value. This graph then shows how flow varies with compaction over this limited range. These curves must be extended greatly to cover the compaction found in plowsoles. Field plots established at Davis to study CS_2 showed that plowsoles could seriously interfere with CS_2 flow. Unfortunately we do not have any measurements on the compactions of this particular plowsole or on the undisturbed soil, but Bodman and Shaw made such measurements on a Ramona sandy loam. They found that the plowsole had compactions as high as 1.95 while the undisturbed soil had a compaction of 1.20. In order to give an approximation to the effect of such compaction on CS_2 flow, I have used this curve for fine sandy loam and extrapolated to a compaction of 1.95. This gives a flow value of approximately 2.00. Comparison of this value with flows of 8 or 9 obtained at the lower compactions shows more adequately the degree to which compaction can reduce CS_2 flow.

"Plowsoles may be more serious than even this would indicate.

Compaction data is customarily taken by use of a tube which is driven into the soil. The core of soil removed is generally about 2" long. This means that the compaction value arrived at by measurements on this 2" cylinder of soil must represent an average compaction for this 2" depth. It is conceivable that within this two inch depth there may be thin layer of very high compaction. If this be the case, the CS₂ flow would be controlled by the compaction value of this densest layer.

"The next two slides 8 and 9 show moisture and compaction curves for loam and clay. Referring to the moisture curve note that CS₂ flow becomes very nearly zero at the field capacity. It must also be remembered that these compaction curves cover only a part of the range of compactions found in the field.

"(5) Temperature

"Temperature was found to have a marked influence on the CS₂ movement. Soil temperatures may vary over a wide range. Measurements by Smith (*) on Yolo soil at Davis gave the following summary data.

	Temperature (1927)		
	<u>max.</u>	<u>min.</u>	<u>range</u>
Air temperature	105°F	24°F	81°F
Soil temperature			
3" depth	96	37	59
6" depth	91	41	50
12" depth	84	42	42
24" depth	79	48	29
36" depth	76	52	24

While these measurements were made on one particular soil for one season, the data serves to indicate how great the variation in temperature may be in the top 12" of soil, the region of the soil into which we introduce our CS₂ and the region where the liquid CS₂ is volatilizing.

"Slide #10 shows the variations in CS₂ flow with temperature for fine sandy loam and clay. We also obtained similar data for loam.

10°C	=	40°F
20	=	68
30	=	86
40	=	104
50	=	122

"Note that the flows at 40°C or 104°F are more than three times as great as those at 10°C or 40°F. Such great changes in flow with temperature indicate the necessity of a knowledge of the soil temperature condition at different depths especially when considering the application of CS₂ to field plots where other variables such as soil moisture dosage and spacing requirements, etc. are being studied."

Mr. Spence (Chairman): Thank you, Mr. Hagan. Mr. R. S. Rosenfels from the Bureau of Plant Industry, U. S. D. A. was supposed to be next on the program. Mr. Rosenfels is not here, and I understand that Dr. Robbins is pinch-hitting. Dr. Robbins.

(*)Hilgardia, Vol. 4, No. 3, May 1929, pp. 77-112 inclusive, by Alfred Smith.

Dr. Robbins (California):

"In August 1938 the Bureau of Plant Industry of the United States Department of Agriculture started an investigation of methods of Whitetop control near Fallon, Nevada, with the cooperation of the Agricultural Experiment Stations of California and Nevada. This work is along three main lines.

"First is the study of cultivation methods. Plots have recently been established which will be cultivated at the time of emergence of the plants above ground, and at 4, 8, 12, 16, and 20 days after emergence. These plots are 4 square rods in area and will be cultivated with a set of V-shaped knives drawn by a garden tractor at a depth of 3" or 4". Accompanying the cultivation experiments are studies on the root reserves of Whitetop. By root reserves is meant the available food materials, principally sugars and starch, stored in the roots. These are determined by chemical analysis on samples of roots dug at suitable intervals during the growing season and screened from the soil, washed, weighed, and preserved. The object of this work is to find the point during the season at which the reserves naturally reach their lowest level, and also to follow the trend of the reserves after a cultivation. The low point of reserves is sought as the best time to start cultivation. The trend of the reserves after a cultivation is desired to indicate the most effective interval between cultivations, the object again being to cultivate when the reserves have reached their lowest point. This work, started in the fall of 1938, has not progressed far enough to reach the above-mentioned objectives.

"Second is the trial of various herbicides. Lepidium repens has been killed by the application of 8 lbs. of sodium chlorate per square rod to the bare soil in the fall followed by 5" of irrigation. Carbon bisulfide is now being tried as is ditch-bank sterilization with arsenic compounds. This work is being done to determine the feasibility of using chemicals on the small patches of Whitetop which often occur in alfalfa fields, and on the extensive infestations on ditch banks and along fences.

"The third line of work is concerned with crop plants, especially grasses, as competitors against Whitetop. Selected areas have been plowed, and are to be cultivated at intervals during the present season. In the fall they will be seeded to Reed canary grass, crested wheat grass, brome grass, strawberry clover, alfalfa, and possibly others.

Mr. Spence (Chairman): Thank you, Dr. Robbins. I want to take this opportunity to express appreciation for the work which your department has contributed this afternoon. That completes the papers and I think we should spend a few minutes in discussions. The meeting is now open for discussion,

Mr. Stallings (Utah): Mr. Chairman, reference has been made to three different varieties of Whitetop. May we have some discussion on that? Are there actually three varieties?

Dr. Crafts (California): I am certain that we have three distinct species involved. We have Lepidium draba, Lepidium repens, and Hymenophyssa pubescens.

Mr. Spence (Chairman): I think we have done a pretty good job today and now are catching up. The program in the morning is one which I think we shall all be interested in. It is going to deal primarily with educational activities and the main discussion will have to deal with federal lands. I think one of the major problems is the lands controlled by these various federal agencies.

(Meeting adjourned at 4:40 p.m.)

SECOND ANNUAL WESTERN WEED CONTROL CONFERENCE

Saturday Morning -- June 10, 1939

Meeting Called to Order 9:45 A. M.

Mr. Spence (Chairman): The first thing on the program this morning is to settle the place of our next year's meeting so the Nominating Committee can complete their work and have the report ready by 11:00 o'clock. The past two years we have met in conjunction with the Western Plant Quarantine Board. I understand that they have tentatively set Helena for their 1940 meeting with the possibility that it might go to Seattle. It has been suggested we meet with the Northwest Advisory Board in Seattle. The Oregon delegation have invited us to hold our meeting in Oregon. I think the question is whether we want to stay with the Western Plant Quarantine Board or go to Seattle.

Dr. Crafts (California): Do you have the dates of the meetings of the Northwest Advisory Board in Seattle?

Mr. Spence (Chairman): The middle of June. The Western Plant Quarantine Board will also be in June.

Mr. Griner (Washington): Mr. Chairman, I think that there are a number of the people who are interested in your weed work that are also representing the states in their quarantine regulations and for that reason they should be held together.

Mr. Ball (California): Do you think, Mr. Griner, that the fact that we do desire to meet with the Board would affect the Executive Committee of the Quarantine Board in changing the meeting to Seattle?

Mr. Griner (Washington): I think it would. They could set the meeting so we could make both meetings on the same trip.

Mr. Spence (Chairman): Would it not be best then to leave the matter in the hands of the Secretary to settle it definitely. The Secretary will notify these other two organizations and work out a schedule of dates.

Mr. Ball (California): Do I understand that we are definitely going to Seattle regardless of what the others are going to do?

Mr. Spence (Chairman): I think we will leave it up to the Executive Committee as to whether we shall go to Seattle or Helena. In order to expedite things we are going to pass up the educational program for the time being as Dr. C. L. Corkins was unable to be here. I think insofar as we have a number of representatives from the various

federal agencies that that part of the discussion is more important this morning. In dealing with the weed problem in the various states there is a lack of correlation between the various federal bureaus in weed work. In Idaho in conjunction with our program we have had excellent cooperation from the Bureau of Reclamation. On the other hand, we have quite a large area of land that is controlled by the Indian Service and Forest Service and we haven't been able to work out cooperative programs. We have gotten together representatives from these various agencies so we can discuss the problems and bring about a better understanding. There are certain weed practices in conjunction with the AAA program with which we should have a better understanding. Will the representatives please answer as I call the names of the various federal agencies? Reclamation Service, (none); Indian Service, Mr. Fortier; Forest Service, Mr. Talbot; CCC, Mr. Sumner; Taylor Grazing, Mr. Brooks; Soil Conservation (none); Agricultural Adjustment Administration, Mr. Farrington.

Mr. Ball (California): To start the discussion, I can say that with some agencies we have had very good cooperation, with others we have not. Our Klamath Weed problem extends, of course, into different areas involving federal agencies, primarily national parks and forest lands, while state parks and state owned land may be included. Our greatest difficulty is getting cooperation from the various agencies due to the fact that their rules and regulations and budgets do not include weed control work. If they could realize the importance of this work and allow funds for it, much of the difficulty would be solved. New infestations of weeds may be found on public lands and there should be ways to handle these. The federal representatives are willing to help, but have no authority to do so. The private individuals say: "Until the federal government does something, we're not going to." So it is a matter of cooperation, and in some areas there is very definitely a serious problem. We are unable to touch some of the Indian Reservations in any way as these depend entirely upon the agent. If he isn't in accord with the program, we get nothing done. We were unable to assign topics for this meeting, but I thought we could discuss our state problems and possibly have them answered by some representative here this morning.

Mr. Spence (Chairman): I think the one limiting factor was funds, but there has been a wide variation in the different states. In Idaho we have three reservations. One had money and the other two have been unable to do anything. In the Taylor Grazing and Forest Services evidently there have been limitations. We should like to work out a definite understanding that would be uniform so we could make our program one of cooperation between various agencies. Mr. Brooks, I wonder if you could give us a word in regard to the grazing lands and the CCC boys.

Mr. Brooks (Nevada): Mr. Chairman and members of the Western Weed Control Conference. Some ten days ago I received a letter from the Director of Grazing in Washington, addressed to Mr. Ball, in which the Director promised I should attend the conference. I got in touch with Mr. Ball to find out if there was any set program and what I was expected to do. Mr. Ball gave me some idea as to what the meeting was to accomplish. It was my understanding that from the standpoint

of public lands, under the Administration of Grazing, I was to explain in as much detail as is necessary what noxious weed control work can be done by the Division of Grazing under Public Lands.

Some five years ago, June 28, 1934, the Taylor Grazing Act was passed. The preamble of that Act gives you in brief the sum and substance of the Act. The preamble is as follows: (reads preamble). Now, as a result of that Act, which gave the Secretary of the Interior the authority to administer grazing on the public lands, which up to that time had had no administration whatsoever, the Division of Grazing was set up. Of course, it was very small the first two or three years, and it is still small, although a little larger than before. I'll give you a brief outline of the organization. We have our main office in Washington with Mr. R. H. Rutledge, our Director, who has a small staff in Washington. We have regional offices to include 10 of the 11 western states. Each regional office, with the exception of one, has jurisdiction within the state and that one region is the region which I represent--Nevada and California. Each region has regional headquarters. In addition there are district headquarters for the different grazing districts. Out of the 9 regional headquarters in 10 states we have 50 grazing districts to administer. In those 50 districts there are some 120,000,000 acres of the public lands that are now under the administration. In order to further assist in administering, there have been assigned to the Division of Grazing 90 CCC camps which, I think, is the largest number of camps assigned to one agency. That gives you a brief picture of our whole western set-up. The only western state in which we have no grazing district is Washington. Nevada and California comprise what we call Region 3, which includes two states with headquarters in Reno, Nevada. We have 17 CCC camps in Nevada. In California we have 2 grazing districts. During the summer our 2 CCC camps are located in Modoc and Lassen Counties. In the winter time, however, one of those camps is moved south to our Mohave grazing district. There are somewhere between 3,000,000 and 5,000,000 acres of public grazing lands in those two California districts. There are several methods which we can use to obtain money for range improvements on the public domain lands. The Taylor Grazing Act, under Sections 4, 9, 10 and 11, mentions range improvements, and under Section 4 range improvements are those improvements which are placed on the public lands by private individuals. Under Sections 10 and 11 the range improvements pertain to the way in which the fees can be spent. Under the Taylor Grazing Act, 25% of the fees collected come back directly to the Department for expenditure for range improvements, and 50% of the fees go to the states. Each state legislature has, I believe, passed a law providing for the expenditure of that 50% fund. In almost all of the states that 50% is to be used for range improvements. In addition to that we have our CCC appropriation, which is a separate appropriation and is allotted to each region in accordance with the number of camps that we have in that region. Having 19 camps in our Nevada-California region, we probably have the largest CCC allotment of any Division. There is broad authority for conservation work on the federal range in the Taylor Grazing Act and also in the CCC Act. In the CCC Act there is a complete classification of the projects which can be performed by the Division of Grazing with CCC money. These projects include such work as fixing of springs, drilling of wells, and various other things. Any improve-

ments that are made on the public lands are supposed to be made for the benefit of conservation of the natural resources which the public ranges have or for the benefit of ranges so far as the distribution of livestock is concerned. For that reason, we feel that the range improvement angle, in connection with our 25% fees and 50% fees and CCC money, is one of the most important phases under the Taylor Grazing Act, especially at this time when we have so many CCC camps.

To give you an example of how we perform--if we have cash available we try to buy materials with that money and permit the labor to be done through the CCC. The commodity that we have for sale is labor--the boys' labor. It is true that not as much labor is turned out per man as is done in commercial activities, but the principal value is for the boys. The morale and uplift and educational training that they would receive, including vocational training, is the principal thing and the work projects which they are placed on through our camp personnel is secondary.

Coming to the subject at hand, you are wondering, no doubt, whether or not we can eradicate weeds from other lands than public lands. Generally, no, but we can in some instances. Take for example, a little isolated ranch surrounded by public domain land and there are noxious weeds on that ranch. If these weeds are permitted they will spread from the ranch to the public domain lands and if there were danger of infestation of the public domain lands, we would, of course, treat the weeds. We have done many emergency types of work in connection with our funds. Had it not been for emergency work I probably could have been over to your meeting yesterday. It so happened that the day before yesterday I was to a meeting with a delegation in Winnemucca, Nevada, for the purpose of seeing what we could do in fighting Mormon crickets. We have done some weed control work and we intend to continue to do that type of work, but we do it primarily on public domain lands. As far as public lands are concerned, we have ample authority to do weed control work when they are in grazing districts. Most of the lands can be reached by our CCC camps. Whenever possible we try to use CCC labor because it doesn't cost us anything. In general, I think, that gives you the information that I had in mind, and if there are any questions which you would like to ask me, I shall be glad to answer them.

Mr. Ball(California): Is the elasticity of the allocation of funds such that you can use the money as you see fit when an emergency arises, or are they for definite measures?

Mr. Brooks(Nevada): The funds are made definite. However, in emergencies we have ample authority to proceed with our CCC help. Where they are not strictly emergencies, we must stay away from them. Now-a-days almost anything seems to be an emergency, and it seems to be hard to differentiate between an actual emergency and one which people just think is an emergency.

Mr. Stroup(California): Is there in your Act any stipulation as to the responsibility of surveying areas for new infestations of weeds?

Mr. Brooks(Nevada): No, we have no agency of that type. However, I doubt if there is any need for such an agency, because stockmen and

local people usually know of those things and they^{tell}/us of them. We have advisory boards of stockmen who make recommendations so far as our Taylor Grazing Act improvements are concerned. These stockmen represent all portions of our various grazing districts and they are in direct contact with the people who are living in the area under our jurisdiction.

Mr. Ball(California): Are the recommendations of those committees usually given a great deal, or just what degree, of consideration?

Mr. Brooks(Nevada): The Advisory Board is as the name states. We give due consideration to those recommendations and in 99 cases out of 100 if we feel that the Advisory Board is wrong, we are able to convince them that they are wrong. In most instances there is a meeting of minds on the question.

Mr. Farrington(Washington): Are the lessees required to do anything themselves about a noxious weed, or does their responsibility end when they notify you of the infestation?

Mr. Brooks(Nevada): We don't operate by the lease so far as public lands are concerned. We have permittees or licensees. The federal government assumes full responsibility and the licensees have no control over the public lands.

Dr. Crafts(California): Do you have any work under way on the White-top?

Mr. Brooks(Nevada): I think that there will be some work done in southern and eastern Nevada--mostly on public lands.

Mr. Stodieck(Nevada): Can your CCC boys use poison on your lands?

Mr. Brooks(Nevada): The CCC regulations won't permit the boys to do any type of work which is hazardous to life or health. In fact, we were not permitted to do very much work at all in connection with the CCC boys where poison would be spread. However, our boys are now spreading poison mash for cricket control, but that must be under immediate supervision of some technically trained person. There are certain types of poison which can't be spread by CCC boys. The details I can't give you now.

Mr. Ball(California): May I ask who makes the determination as to the possibility of a weed pest spreading from lands adjacent to the Taylor Grazing lands onto the Taylor Grazing lands and who makes the decision of using the CCC on control work there?

Mr. Brooks(Nevada): It would be up to the Regional Director. At the present time the Taylor Grazing Act areas comprise arid lands and mountain plain lands. For the most part, the Taylor Grazing lands are desert and for that reason there is not the extent of noxious weeds or pests of that type that do inhabit the irrigated or better areas. In the States of Nevada and California, I am positive that 90% or more of the noxious weeds would be on private lands. There are certain areas, however, of public domain lands which do

have these noxious weeds and those are the areas in which we intend to work.

Mr. Spence(Chairman): Another one of the federal agencies which we all deal with on weed problems is that of the Indian Service. Mr. E. C. Fortier, would you give us a word concerning this problem?

Mr. Fortier(California): Mr. Chairman, I don't know that I am in a position to state the policy of the Indian Office in regard to noxious weeds as that happens to be out of my line. My function here I think will be largely to absorb information rather than dispense it. You may be interested though in our Indian Service set-up. I think that perhaps every function of the federal government is represented in the Indian Service. In fact, the administration of Indian Affairs is, in a small way, an exact duplicate of the federal administration of the United States. We have health problems, educational problems, extension, irrigation, roads, CCC, and others I can't recall at the present time. Each one of the functions of the office of Indian Affairs is represented by a Division head in Washington, and the field work is somewhat varied with the different divisions, but most of the divisions are represented by regional officers scattered throughout the West or where the Indians are located. I happen to represent the Irrigation Division as Supervising Engineer of this district, which represents California, Nevada, part of Utah, and part of Idaho.

We have in our irrigation work a very serious weed problem, not only along the ditchbanks and rights-of-way, but also in our irrigated land. Most of the land is leased and the lessees are not so much interested in the welfare of the land, so they usually farm the best portions and, if the weeds have taken over a part of it, they let that go. Cleaning weeds on our ditchbanks is a very serious problem. The annual budget to take care of weeds in the San Carlos project in Arizona was \$50,000.00. We also have the problem of poison weeds on our grazing land.

I can't speak for the Indian Office as to its policy in weed control matters, but I am sure that they are very much concerned with the weed problem. We have, of course, something like a million acres of veritable land for Indians. We have about 700,000 acres now under construction work. Our irrigation activities are very similar to those of the Bureau of Reclamation, only a greater variety of projects. Then, too, we have mixed projects of white and Indian lands. The funds for carrying on the work for the Indian Office are budgeted each year in a manner similar to other government agencies. The work to be done is outlined before the Bureau of Budgets and the funds are made available. For weed control, I presume the only money that would be available are the allotments from the CCC appropriation. The regulations for the expenditure of that money are, of course, the same as they are for the funds as a whole, although the money is usually turned over to the superintendents and expended through the agencies' offices. Up to the present time we have had so much work to do to catch up with our development of springs and wells, and buildings small dams for storing water for cattle, there will probably not be very much money left for weed control work, although it is my understanding that some of that work

has been done. The programs for the expenditure of the CCC money have originated largely with the superintendents working in conjunction with the Indian councils. Those programs are submitted to the Washington office for approval, of course, before any money is expended.

In the matter of cooperation, I believe that probably the best contact would be through the local superintendents in working out a cooperative weed control program. So far as I know there are no other funds allotted to the Indian Service that would be available for that purpose.

Dr. Robbins(California): You mentioned an Arizona project which spent something like \$50,000.00 a year for the control of weeds on certain ditches. What are those weeds and what methods have you used?

Mr. Fortier(California): We have Johnson grass and willows. There are no very scientific methods to get rid of them. We usually just chop them out and in the last four and five years have burned them. Willows are very bad and unless they are pulled out they become a real problem.

Mr. Ball(California): Are instructions given to the superintendents out of your main office relative to uniform procedure of cooperation? I ask that question following the actual procedure here. In our Modoc areas the superintendent is quite weed minded, while in Lake County, where we have a problem, it seems almost impossible to get anything done. I was wondering if there were a personal factor there.

Mr. Fortier(California): That is strange, as Lake and Modoc Counties are under the same supervision.

Speaker: I understand the agricultural land is leased or rented to the Indians.

land
Mr. Fortier(California): No, if it is Indian/it is not leased to the Indians.

Speaker: What jurisdiction has the superintendent over individuals allotted land?

Mr. Fortier(California): The land ownership status varies quite a bit in California. Some land is allotted where the Indian has control of the land. Then there is land held in trust for the tribe as a whole. I think, perhaps, those two classes take in most of the land.

Mr. Ball(California): The problem then is working with the individual Indian, so to speak, as you would a private citizen.

Mr. Spence(Chairman): The important thing that we should like to bring about is a uniform procedure that would operate under all reservations. Some reservations have had money, while others have had no money. In most cases we have had to depend entirely upon the local superintendent or local man.

Mr. Fortier(California): The money available for CCC would be available for individual allotments on agricultural land. I think that the matter of uniform leases is something which should be taken up with our Extension Division in Washington. Mr. Cooley is the Director of the Extension.

Mr. Stroup(California): Does the Indian Service have any jurisdiction over the manner in which Indians or whites operate land that belongs to or is under the control of the Division?

Mr. Fortier(California): Yes, we have that control.

Mr. Griner(Washington): Are allotted lands under the jurisdiction of the Indian Service?

Mr. Fortier(California): Yes.

Mr. Spence(Chairman): Any other questions? If not, thank you, Mr. Fortier. I think we have all followed very closely the activities of the AAA in regard to weed work. While I realize that the 1940 program has not been worked out, Mr. Farrington, we should like to have a few words as to the plans.

Mr. Farrington(Washington): The AAA has no jurisdiction at all over public lands. The only authority the Secretary has under the AAA Act of 1938 is to make payments to agricultural producers on private lands. We make no payments whatsoever in respect to public lands. As you know, the AAA programs have provided some assistance to agricultural producers in carrying out weed control measures on private lands. There is a small payment of \$7.50 per acre for the control and eradication of noxious weeds in infested areas. We have the limitation there that the weed control work must be carried out in an organized weed control district. That is a rather flexible term and does doesn't necessarily mean a district established for state law. In some cases where there is a group of interested producers who agree to carry out the work systematically and uniformly over an area, we permit payments to be made. The AAA, through its activities in the way of providing more land for soil conserving crops does, I think, assist producers in weed control work over and above the \$7.50 payment for this practice. Very often the land that isn't cropped is the land that is left out of production, so in a way the entire farm payment program assists the producers in doing weed control work. It is a small payment in relation to the cost of carrying out this practice. The Secretary has rather a broad field of activities in which he can make payments. Recently, by an amendment, the authority has been extended to cover water conservation under certain conditions. We have not made weed control a major feature of the AAA program. We have felt that Congress intended that the AAA funds be tendered more directly along these other lines. Weed control work is one which has been debated several times in Washington and the question was whether it was a true reclamation or conservation practice. We have at last decided it was enough of a conservation practice so the Secretary was not prevented from making a small payment to aid producers. We have not felt that the weed control problem was one that could be handled primarily by federal benefits.

We firmly believe that there must be the use of the police powers of the states and private incentive if this problem is to be met. The most that we can do under the AAA program is to provide some financial assistance where these other activities are not in operation.

Mr. Stallings(Utah): I should like to ask if there are some limiting factors there.

Mr. Farrington(Washington): The \$7.50 payment is limited.

Mr. Spence(Chairman): We appreciate the help which AAA has given us on weed control.

Mr. Stroup(California): Going back to this matter of districts. You speak of them as legally constituted districts and also a district set up by mutual consent. Now, who determines what constitutes a district in that latter classification?

Mr. Farrington(Washington): It is solely in the jurisdiction of our state and county committee.

Mr. Spence(Chairman): Next we should like to have a word from Mr. Sumner, representing the National Park Service.

Mr. Sumner(California): It is true that some area under the National Park Service is present in almost every one of the western states, and I know we have not been very conscious of the weed problem, but now we do go extensively into the business. We have whole CCC camps working on the eradication of Ribes in connection with the White Pine Blister Rust. Aside from that, I may say that the policy of the National Park Service is to keep out all non native plants. As you know, most of our weeds are European weeds; therefore, we are anxious to keep them out of our areas. The way we do that mostly is not by positive eradication measures, but by preventive measures. We have done some work with eucalyptus eradication in the Bay region, because large areas were killed and the fire hazard was considerable. In our cooperation with the municipal districts who own the land in the Bay region, we have done that work using Sodium chloride and Diesel oil. In certain local areas, such as horse pastures and around administration buildings and areas receiving heavy use, we have a few invasions of weeds common to waste lands and here we have used various methods. Possibly some of them have not been up to your standards. I know in some cases hoeing was used and we found that was not very desirable because it turned under the soil. Pulling has been used by CCC boys in other areas. Because we are against the spread of infestations in our areas of weeds which are not native to the areas, we should certainly welcome cooperation from your group on the control of such and should like to know the best methods. The only time that we might raise a question of weed control would be where the weed was definitely a native species to the park area; but I have never heard of any native species in our mountain parks constituting a national pest.

Mr. Spence (Chairman): Any questions? If not, thank you very much, Mr. Sumner. Has a representative from the Soil Conservation Service or Forest Service come in?

Mr. Talbot(California): I am representing part of the Forest Service. Mr. Chairman, in range research we are dealing with, I think, at the present time not a single one of the species that are in your list of noxious weeds of the state. We use the word "weed" in a slightly different sense--that of the stockman's understanding. A weed to him is a plant he does not want. From that angle we are devoting most of our efforts in our two experiment ranges--one in the Madera County foothills and the other in the middle of the pine plateau in the mountains west of Susanville. I think that is probably not in the direct groove of your chief interest of this meeting.

The second point touched upon by Mr. Sumner may be a little closer to the interest, although again I am afraid that it is a bit afield from your main target. However, our work with chemicals in the firelines of the State have resulted in the conclusions as follows: (refer to book "J. of Forestry," 36 (No.5) 507-515, May 1938). The weed work from the standpoint of our chief interest within the limitations of our appropriations boils down pretty much to the poison plants for livestock. Broadly speaking, most of those plants do not cause extensive damage in California, but over the area as a whole the poison plant problem of our mountain ranges is more ~~localized~~ and less acute than in the local mountains and southwest. I do know that we have done a good deal of work in past years on larkspur, particularly in the mountains east of Sonora, one of the areas in the State where larkspur poison has been given some attention. We have not gotten so far in getting rid of Milkweed. The Klamath Weed problem was reviewed at length after we found it creeping into two of our forests, possibly three. It is in the Trinity and at the end of the Mendocino Forests in the northwest part of the State. Some of the observations of our field men indicate that it is showing a tendency of not invading above 4,000 feet, but we have considerable forest areas in that part of the State below that elevation and Klamath Weed does affect forest lands.

As to the use of funds, I think, with pretty fair certainty, that the CCC program of the Forest Service has the authority to deal with noxious weeds on forest lands, particularly with forest grazing lands, provided the control can be defended as a range improvement measure. There is a point there your committees may want to confer--whether that authority might extend to deal with infestations of a bad agricultural weed, which may not be a serious range weed. The CCC program, I am sure, has the authority further within national forest boundaries to do weed eradication or weed control work on the adjoining private lands only if the work is necessary to improve or help the management on grazing capacity of adjoining forest lands. Both bureaus are working under that identical situation. The matter of how much of the CCC money allotted to each camp could be used for weed control is one thing, and then, in addition to that, there would have to be a balance struck with the other uses for which that money is appropriated. The extent to which the CCC of the Forest Service could be used on this particular project would have to be

worked out with the local programs which already have commitments in other lines.

Mr. Ball(California): Our main problem is Klamath Weed. I am thinking particularly of Trinity County. We have such a large infestation there that there is nothing to be done at the present time, but a similar condition may arise elsewhere and it is under these conditions that we are anxious to know what the Forest Service would do.

Mr. Talbot(California): I would make the suggestion, in handling a case of that type, that you meet with the National Forester, Mr. Shaw. For the reservation phases, Mr. Connullen.

Speaker: Have you had any loss of wild life due to the use of sodium arsenite?

Mr. Talbot(California): We lost a few animals at first, but now the danger is very low. It does exist though in a small degree.

Mr. Spence(Chairman): May I express the appreciation of the Western Weed Control Conference for the attendance and trouble you have gone to and the information brought us. I extend an invitation to the federal agencies to our next meeting. We should appreciate your attendance. We are now ready for the reports of the committees. Mr. Stallings, have you the report for the resolutions committee?

Mr. Stallings(Utah): Mr. Chairman, your committee appointed yesterday accepted responsibility and met yesterday evening after the meeting. Mr. Kohout was elected Secretary. Mr. Kohout, are you ready with your resolutions?

Mr. Kohout(Idaho): The committee decided to draft only a few resolutions at this meeting. We have one resolution on the enactment of the proposed weed bill which was discussed in Professor Hyslop's paper yesterday.

Resolution 1. (See resolutions at end of report.)

Mr. Spence(Chairman): Would you like to have the entire report read before the discussion or would you rather have discussion individually?

Mr. Ball(California): I suggest, Mr. Chairman, to save a little time, we act upon each as we go along.

Mr. Spence(Chairman): I think there were three things we brought up yesterday. One was that farm to farm sales were excluded from this bill. The second bill calls for a tolerance of 2% weed seed and the recommendation was for 1%.

Mr. Harris(Oregon): The other item there is exempting common carriers from being licensed.

Mr. Stallings(Utah): Regarding the farm to farm practice--the com-

mittee thought possibly it may be unconstitutional and it would be hard to enforce.

Mr. Spence(Chairman): Does anyone have another point on that particular item? It is not in the present bill as it now stands.

Speaker: Personally, I should like to see that provision put back in the bill.

Mr. Spence(Chairman): Would someone care to make a motion that that be included in the resolution?

Mr. Alex. Johnson(California): I do not know that I am a member of this conference. If so, I should like to call the motion.

Mr. Ball(California): I second it.

Mr. Spence(Chairman): You have heard the motion that we recommend the inclusion of a provision to cover farm to farm sales.

Mr. Stodieck(Nevada): Would that apply only then to interstate trade between farmers or farmers within the State?

Mr. Spence(Chairman): Interstate. Are you ready for the question?

Mr. Ball(California): Question.

Mr. Spence(Chairman): All those in favor of the motion make known to say "aye". Opposed? Motion carried.

Mr. Kohout(Idaho): The next resolution is on uniform seed laws within the states. This resolution was adopted at the meeting at Denver last year. (Resolution 2.) Mr. Chairman, I move the adoption of this resolution.

Mr. Spence(Chairman): Is there any discussion:

Mr. Stodieck(Nevada): In a resolution of that kind should we not include a list of noxious weeds, so the list would be as uniform between states as possible?

Mr. Spence(Chairman): I do not know what the feeling is but, due to the wide variation of climatic conditions in different states, I doubt if it would be possible to formulate a uniform list.

Mr. Stodieck(Nevada): My purpose in asking that question is this: Some states do not call some weeds noxious which other states do, and this allows passage of seeds across states. I think Whitetop should be noxious in all eleven western states.

Mr. Stallings(Utah): It seems to me that state departments have a practice of not calling weeds noxious until they are noxious within their state.

Mr. Ball(California): The reaction that you get from that is that noxious weeds are very often placed in one category. That is, a weed is noxious regardless of where it grows, which is not always a true statement. A weed may be very serious under some conditions and not troublesome under others.

Mr. Spence(Chairman): Would not this be covered, Mr. Stodieck, in regulating a uniform seed law within the state?

Mr. Stodieck(Nevada): I think that would be well.

Mr. Ball(California): I think it would be well to define noxious weeds. I think that condition can be made broad enough to cover the eleven western states, which would include most of the most serious weeds.

Mr. Spence(Chairman): Is there a second to the motion that the resolution be adopted?

Mr. Stallings(Utah): I second the motion. (Motion carried)

Mr. Kohout(Idaho): (Resolution 3) Mr. Chairman, I move the adoption of this resolution. (Resolution adopted)

Mr. Kohout(Idaho): (Resolution 4) Mr. Chairman, I move the adoption of this resolution.

Mr. Ball(California): The Austrian Field Cress is a weed of aquatic nature and grows in moist or wet areas. This resolution is of particular interest to us here in California. It will also be of help to Idaho where the infestation is at the head of the Snake River. Our thought was to get what assistance we can through the federal agencies.

Mr. Spence(Chairman): Any further discussion?

Mr. Stroup(California): I speak as one from the Sacramento Valley. I have observed the dangerous possibilities of this weed and the danger of its spreading by water. I feel that it is a most serious matter and one of interest to the western group, because once it is widely spread it certainly becomes a most serious added burden.

Mr. Brooks(California): I should like to have some explanation as to remedial measures that can be taken. I know the area very well. I do not know how a CCC camp can correct the situation.

Mr. Ball(California): This plant spreads by means of seeds and rootstocks. The recent flood did wash some of the roots which we had plowed up down the river. Surveys have not been completed, so we cannot say as yet how extensive the spread has been. We used S.E.R.A. and carried on some test work by digging and using chemicals and some of this work was satisfactory, giving us the information desired. Heavy applications of common salt looked quite good and are being used. We attempted to cut all plants with scythes and mowers to prevent seeding. With spotting work, prevention of seed,

and surveys, there definitely is a place for well-organized work under the CCC program and under good supervision. Our department will be very glad to carry on and cooperate, as will the county. I am quite certain that a lot of good can be done.

Mr. Brooks(California): It is my belief that the small amount of work that we could do on this eradication program with one CCC camp in the area would be so small and so insignificant that it would be useless for us to go in there.

Mr. Ball(California): I should like to meet you or one of your agents in the field and go into the matter more thoroughly.

Mr. Brooks(Nevada): All right, I shall be glad to do that.

Dr. Robbins(California): For the last year or so I have been giving a good deal of attention to the history of California weeds. Now, the A, B, C, of weed control is to get incipient infestations. If you do not take a weed like the Austrian Field Cress out right away, you will find it all over the country. The first thing you have to do is to find these first infestations and get them out. Austrian Field Cress should be stamped out now. A very few years ago the Puncture Vine entered this State; now you cannot do anything with it. Now we are going to let this repeat itself. We are letting these weeds come in. The first infestations should be stamped out at the beginning, no matter how much it costs.

Mr. Spence(Chairman): Is there any more discussion? Resolution adopted.

Mr. Kohout(Idaho): The committee had under discussion a resolution pertaining to the enactment of the weed bill discussed yesterday afternoon. So, with your permission, we should like to write a resolution urging the enactment of the bill as written. (Resolution 5). (Carried)

Mr. Kohout(Idaho): We have under consideration a resolution urging some educational work on the quarantine of livestock--the movement of livestock between areas that are known to contain noxious weeds.

Mr. Stallings(Utah): I think we all have quarantine laws that could possibly take care of that within the State. Cattle that are going out of the state we let go. The cars are going to be cleaned some place and no doubt seed will spread.

Mr. Spence(Chairman): Most of your state laws cover quarantine. It seems to me that this is worthy of further discussion but one that falls under the Quarantine Division. It is closely allied to this Association.

Mr. Spence(Chairman): I think that is something that should be left open for further discussion. Let us think about it for next year.

Mr. Stodieck(Nevada): I believe that in the State of Nevada 75% of the spread of Whitetop has been caused by cattle eating weeds and then being moved.

Mr. Spence(Chairman): Is it the desire of the conference to have the Secretary prepare such a resolution? There has been no resolution prepared, but we could ask the Secretary to prepare it and have a report on it at our next meeting.

Mr. Stallings(Utah): I believe it is something we are not ready to do yet. Some educational and research work should be done about it.

Mr. Spence(Chairman): Then we shall discuss this at our next meeting. There is one more committee to report. Is the Nominating Committee ready?

Dr. Crafts(California): We have selected the following officers for next year: G. R. Hyslop (Oregon), Chairman; J. I. Griner (Washington), Vice-chairman; and Walter Ball (California), Secretary-Treasurer. (Officers elected).

Dr. Crafts(California): It is further recommended that the Secretary correspond with the Chairman of the Western Plant Quarantine group and the Standardization Board regarding the time and place of the next meeting. It was previously suggested that it be held in connection with the Agronomists' meetings on June 17-22, 1940, at Seattle, Washington. This is a national meeting which will bring in all groups interested in pest control work.

Mr. Spence(Chairman): Will the Secretary please do this? I think that the discussions have been very worthwhile. I should like to extend my personal appreciation for the cooperation that has been given to the conference this year by the College of Agriculture, the Experiment Station of Davis, the State Department of Agriculture, and for Walter Ball's good services in carrying the bulk of the weight in the program. I hope at our meeting next year in the Pacific Northwest you will all be in attendance again.

Mr. Ball(California): I should like to again thank all of you who have helped with this program. We shall look forward to another well-attended meeting next year.

Mr. Spence(Chairman): The meeting is now adjourned. (Meeting adjourned at 1:30 p.m.)

RESOLUTION NO. 1

Coffee Bill - H.R.5625

WHEREAS, there is now before the Congress of the United States for consideration a bill to regulate the importation and commerce of agricultural seeds, particularly known as H.R.5625; and

WHEREAS, the Western Weed Control Conference has, by resolution adopted at its annual meeting in Denver in June of 1938, approved the principles embodied in the aforesaid bill; and

WHEREAS, by previous resolution the Western Weed Control Conference has urged that the total tolerance on weed seeds be reduced to a maximum of $1\frac{1}{2}\%$; and

WHEREAS, the movement of seed from farm to farm presents a major hazard and is often the cause of introducing a serious weed pest with which the farmer is unfamiliar; therefore

BE IT RESOLVED, that the Western Weed Control Conference, assembled at Berkeley June 9 and 10, 1939, urge the enactment of the aforesaid bill; and

BE IT FURTHER RESOLVED, that the Western Weed Control Conference urge the amendment of the said bill to reduce the total tolerance on weed seeds to a lower maximum; and

BE IT FURTHER RESOLVED that the Western Weed Control Conference urge that the farm to farm movement of seed be included in the bill for the protection of the farmers who, unknowingly, plant weed seed with crop seed.

RESOLUTION NO. 2
Uniform Seed Laws.

WHEREAS, there is now a lack of uniformity in seed laws as they exist in the various states; and

WHEREAS, the seed laws of some states are unworkable or not enforced; and

WHEREAS, the Western Weed Control Conference recognizes the seriousness that exists from interstate sale or movement of agricultural seeds or screenings that contain noxious weed seeds; and

WHEREAS, the movement or sale of all agricultural seeds containing weed seeds should be reduced to a minimum; therefore

BE IT RESOLVED that the Western Weed Control Conference, assembled at Berkeley June 9 and 10, 1939, urge the enactment of a uniform seed law within the states; and

BE IT FURTHER RESOLVED that the Western Weed Control Conference urge the departments of agriculture in the several states to sponsor the necessary legislation for the enactment of such laws.

RESOLUTION NO. 5

Clark Bill S. 771.

WHEREAS, there is now a bill drawn up by the United States Department of Agriculture for the enactment of legislation by the Congress of the United States for the control and eradication of noxious weeds; and

WHEREAS, the noxious weed problem is national in scope and concerns public and private lands; and

WHEREAS, the cost of control of noxious weeds in many instances exceeds the resources of private and local agencies; and

WHEREAS, the enactment of national legislation for the control or eradication of noxious weeds is for the benefit and welfare of all agriculture; therefore

BE IT RESOLVED, that the Western Weed Control Conference, assembled in Berkeley June 9 and 10, 1939, urge the enactment of said bill as written; and

BE IT FURTHER RESOLVED that copies of the bill be distributed to all interested persons and agencies.