PROCEEDINGS

of the Twelfth Annual

WESTERN FOREST INSECT WORK CONFERENCE

Berkeley, California

March 1-3, 1961

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INTRODUCTION

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EXECUTIVE COMMITTEE (Twelfth Conference)

B. H. Wilford, Fort Collins	-	Chairman
R. W. Stark, Berkeley	-	Immediate Past Chairman
A. E. Landgraf, Denver	-	Secretary-Treasurer
G. T. Silver, Victoria	-	Councilor (1959)
G. R. Struble, Berkeley	-	Councilor (1960)
D. O. Scott, Missoula	-	Councilor (1958)

R. C. Hall, Berkeley	-	Program Chairman
R. W. Stark, Berkeley	-	Program Co-chairman

EXECUTIVE COMMITTEE ELECT

B. H. Wilford, Fort Collins	-	Chairman
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N. E. Johnson, Centralia	-	Councilor (1961)

C. L. Massey, Albuquerque	-	Program Chairman

Prepared by the Secretary-Treasurer, Amel E. Landgraf, Jr., from summaries submitted by the discussion leaders, named under each section. Stenographic assistance was provided through the services of Mrs. A. E. Landgraf, Jr. and by the Division of Timber Management, U. S. Forest Service, Region 2, through the services of Miss Susan Heifner. Duplicating services were provided by U. S. Forest Service, Division of Operations.

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MINUTES OF INITIAL BUSINESS MEETING

March 1, 1961

The Chairman called the meeting to order at 9:00 a.m. in the Alumni House, University of California, Berkeley, California.

Welcoming addresses were given by the following:

Dr. Henry Vaux, Dean, School of Forestry, University of California

Dr. Roy F. Smith, Chairman, Department of Entomology & Parasitology, University of California

Dr. R. K. Arnold, Director, Pacific Southwest Forest & Range Experiment Station

The following people, attending the conference for the first time, were introduced:

Dr. Milton Stelzer
Dr. William Ferguson
Gerry Pittman
Dr. John A. Schenk
Bill R. Rose
John Masson
Paul Buffam
Dr. Carl Huffacker
Eric Jessen
Ned Simmons
Dr. Sam Graham
Robert Shot
John Mahoney
Dr. P. S. Messenger
Mr. Ken Swain
Mr. R. H. Hunt
John Pierce
Charles Schaefer
Dr. D. W. Muelder

Ralph Hall, Program Chairman, outlined the program and other arrangements for the meeting. The banquet and children's hour were scheduled at A. Sabella's, Fisherman's Warf, Thursday evening, March 3.

Program Chairman, Ralph Hall, acknowledged the help of Dr. Ron Stark, Dr. Tom Silver, Dr. Ken Graham, Dick Smith, Bill Bedard, and Bob Stevens.

Norman Johnson advised panel members who are on Friday's program to set up their material prior to the meeting.

George Hopping moved that the Treasurer's report be approved as read. Seconded by Ken Wright. Carried.

Ralph Hall moved that the minutes of the final business meeting be approved as read. Seconded by George Downing. Carried.

The Secretary outlined the recommendations agreed upon by the Executive Committee meeting, held the evening of February 28. Council recommendations arising out of the Executive Committee were as follows:

an infestation on the underside causes twigs to bend upwards. The more vigorous the twig, the greater the distortion and the more difficult it is to prevent bud flush. As the host is weakened, by previous aphid infestations or other factors of environment, bud inhibition becomes less difficult.

Trend Plot Studies - Balsam woolly aphid infestations stratify themselves in the stand with the dominant trees being the most susceptible and the suppressed trees the least.

Trees characterized solely by crown infestations suffer considerable crown deterioration and loss in height growth but seldom die; recovery is often apparent after 3 to 5 years of infestation. Pacific silver fir and subalpine fir usually die after 2 to 4 years of heavy stem infestation; radial growth at breast height does not appear significantly reduced and crown deterioration is usually nil. Grand fir often survive heavy stem infestations but height and radial growth decline.

Mortality in Pacific silver fir is correlated with the number of stem infestations present; the more stem attacks there are, the greater the mortality, and, the better the growing site and greater the number of stem attacks. Correlation between site and mortality is also apparent in subalphine fir.

Bark beetles were not found associated with Chermes-weakened trees.

V. M. Carolin - Effect of spruce budworm defoliation on tree growth and survival.

This work was designed to study the relationship between populations and damage to Douglas fir and white fir, both on an individual tree and on a stand basis. Results to date show that per cent defoliation of new growth and bud-killing are not consistently related. The degree of defoliation between trees is more accurately shown by the use of field glasses than by shoot tallies, with time limitation involved. Also, ocular estimates of defoliation showed correlation between larval counts two out of three times. Damage on white fir trees was much greater than on Douglas-fir trees, with similar budworm populations. Tree damage classes shown related to degree of reduction in radial increment. Damage surveys are conducted on this basis.

B. E. Wickman - Mortality and Growth Decline in White Fir Defoliated by Douglas Fir Tussock Moth.

Studies were conducted at two localities. The outbreaks on the Stanislaus National Forest occurred from 1954 to 1956, and was controlled in 1956 with 1 lb. of DDT to 1 gallon of diesel oil in July, 1956. An outbreak at Mammoth Mt. occurred from 1933-37. The effects of defoliation were studied from 1938-42, but the results were never published.

Twenty-three 1/2 acre plots were established throughout the infested area on the Stanislaus National Forest. Defoliation was estimated on all plot trees, and tree mortality recorded annually. Radial increment was measured on three discs cut from 40 trees covering all degrees of defoliation.

The main results were:

Mortality due to defoliation alone was mainly in the smaller diameter classes. Almost 25 per cent of the white fir in the 2-inch to 6-inch diameter classes were killed. The largest tree killed by defoliation alone was 22 inches d.b.h.

Mortality caused by defoliation and bark beetles occurred mostly in larger trees from 16 to 50 inches d.b.h. Sixty-five per cent of the trees 90 per cent defoliated died and contained Scolytus bark beetles and Tetropium sp. This seems to demonstrate the preference of bark beetles for the severely defoliated trees.

Twenty per cent of the green stand volume on the Stanislaus National Forest (11,071 bd. ft. per acre) was killed in the four year period from 1956 to 1959. Twenty-nine per cent of the green stand volume on Mammoth Mt. (10,597 bd. ft. per acre) was killed in the four year period from 1938-1941. It is possible that the nine per cent greater mortality at the Mammoth plot was because the infestation was uncontrolled and last five years vs. three years for the other outbreak.

Top-kill was heavy in both infestations. In the Stanislaus N.F. outbreak 12 per cent of the heavily defoliated white fir had permanent top kill, and many more had deformed tops from temporary kill.

The loss of radial growth was severe where defoliation exceeded 50 per cent. Growth loss was most pronounced in tops, but was noticeable at d.b.h. Radial increment started to recover the year following the last heavy defoliation, and was almost back to normal in three years.

Summary - The Douglas-fir tussock moth can wreak terrible havoc in white fir. The tolerance level for this insect is zero years of heavy feeding. This study suggested that a one-year hesitation before applying control cost at least 5,000 bd. ft. per acre of prime, commercial white fir.

W. E. Cole - Loss of increment due to defoliation by the pine butterfly.

The pine butterfly began increasing in 1950 on the Boise National Forest in southern Idaho and by 1953 severe defoliation was evident on approximately 250,000 acres. The infestation was controlled in 1954. Studies were conducted to determine the effect of defoliation on increment and mortality of ponderosa pine due to defoliation.

There was a significant difference in radial growth between the pre-, during, the post-defoliation periods. Defoliation caused a 39 per cent loss, or failure to gain in increment. Based on 183 bd. ft. of annual increase of volume per acre, this percentage amounted to 72 bd. ft. annual loss per acre, cent of the crown green. The average tree infested had only 3 percent of the crown green. The Browns Flat burn, though small, serves to illustrate the explosive population potential of the western pine beetle in ponderosa pine following a fire.

Degrade Due to Borers

F. E. Dickinson

In discussing wood deterioration as related to products produced from fire and/or bug-killed trees, my remarks for the most part will be concerned with the conversion of the material into lumber. Deterioration of wood products from trees killed either by fire or bugs may result from any one or a combination of the following: stain caused by fungi, holes caused by insects, and decay caused by fungi.

The most important stain caused by fungi is blue stain, sometimes called sapstain as it is confined to the sapwood. Blue stain and/or other fungus stains have little or no effect on strength properties of wood; the primary effect is that of appearance. Effect on appearance is also of importance in considering deterioration from holes caused by insects. Holes can, of course, make the board unsuitable for certain uses and if holes become plentiful, there will be some effect on strength.

Decay is the most serious of the three types of deterioration. Even with incipient decay we have considerable strength loss as well as loss in appearance of the material. As decay advances, the strength loss is such that the material becomes completely unusable.

Most of the timber being manufactured in sawmills in California goes into boards either of finish, factory or common grades, or into small dimensions, that is 2 x 4's, 2 x 6 s, etc. I have heard from various sawmill men from time to time that in milling pine lumber and associated species, the break even point is about at the #3 board, meaning that material recovered which rates above #3 is a profitable item whereas below #3 is a losing item Thus, the finish grades, #1 and #2 common and the shop grades have to carry not only the costs of milling themselves, but must make up for the loss incurred with the lower grades. It is common knowledge with all of you that our top grades, whether they are finish or shop, come from the outer portions of the log. Deterioration in the tree by any one or all of the three of the causal factors given above starts at the outer part of the sapwood and works progressively inward. Thus, the highest quality material from the standpoint of appearance is degraded first and the lower quality later on.

Let's just take a quick look at what these three deterioration factors do with reference to degrading lumber. Remember that we are primarily concerned with what is happening to the grade of the outer portion of the bole; that is, that portion from which you would normally get your D and better finish grades as well as your top shop grades.

Just a word about stained and decayed wood for pulp. Stained wood is undesirable for pulp inasmuch as the resultant pulp presents a bleaching problem somewhat more severe than normal wood. Decayed wood produces a low yield and a low strength pulp.

In timber salvage, blue stain is the most important deterioration factor during the first year; in following years insect holes and decay become extremely important. Stain organisms are introduced into the tree bole either by being carried in by insects such as bark beetles, or by the spores entering through openings provided by the insects. Optimum conditions for development of stain are from 75-85°F. Other necessary conditions include presence of moisture and air. Moisture is an important controlling factor as stain will not develop if the wood is at a moisture content of 20 percent or less or is saturated. The moisture content of wood in a freshly killed pine or fir tree is somewhere between these extremes.

Decay fungi are probably also introduced by insects, either primary or secondary attackers, as well as getting to the wood through bark cracks or other openings. It would appear then that the rate of deterioration of standing timber depends on the activity of insects at the time of and following a burn. Presumably timber which has been fire-killed during the summer or early fall prior to the cessation of flights by insects can very well be subject to damage starting during the fall period.

In discussing the deterioration which may occur, the influence of species should be considered. With reference to stain, studies have shown that white fir sapwood does not stain severely, whereas sugar pine sapwood stains severely and quite rapidly. Ponderosa and jeffrey pine sapwood is much like white fir and does not blue stain severely. Thus, blue stain is of primary importance in the pines, and can have a severe degrading effect on the sapwood. The total effect is greater in ponderosa and jeffrey pines than in sugar pine because the sapwood is thicker in the former.

Sapwood of all of these species has little or no resistance to decay and, in general, sapwood is not salvagable much beyond the second year in sugar pine and white fir. Some Douglas-fir and ponderosa pine sapwood may be salvagable during the third year but would be of extremely low quality. Heartwood of all of these species does have some resistance to decay. White fir is lowest on this list. Reports indicate that little may be salvaged of white fir heartwood after the third or fourth year. In ponderosa and jeffrey pines, decay is somewhat more retarded. In sugar pine, heartwood has been salvaged from large logs as long as ten years or more after a fire. Decay in Douglas-fir heartwood proceeds rather slowly and some salvage of large diameter trees has been possible fifteen to twenty years after death from fire. With all of these species, smaller trees have much shorter salvage periods.

Gardiner (1957) reported on the deterioration of fire-killed pine in Ontario and the causal wood-boring beetles. His data were based on 1-foot-long sections taken at 16-foot intervals along the sample tree holes.

He found no consistent relationship between the extent of charring and borer attack in trees that died at the same time; however, it was found that the time of tree death, which is influenced by severeity of fire injury, affect the time and nature of the insect infestation. Trees that suffered severe fire injury died and became infested shortly after the fire. Moderately injured trees died, for the most part during the first winter and became infested the following spring, whereas lightly injured trees usually escaped infestation for at least a year after the fire.

In white and red pine, the proportion of holes made by *Monochamus* was greater in trees killed outright than in those that died later. Gardiner demonstrated that *Monochamus* spp. showed a market preference for white pine over red pine. They penetrated deepest in white pine and shallowest in red pine, jack pine being intermediate.

Near Vernon samples were taken by Ross from fire-killed ponderosa pine in two burns that occurred July 7-8, 1958. The average number of *Monochamus maculosus* entrance holes per square foot per tree by the fall of 1960 was 1.7 on the larger burn and 2.6 on the smaller burn.

The distribution of entrance holes up the trunk on ponderosa pine was somewhat similar to that of *M. oregonensis* in spruce; however, there was a greater proportion of holes in the upper samples in ponderosa pine than in spruce. The number of entrance holes in spruce, in the upper half, was roughly 1.5 times that of the lower half. In ponderosa pine the factor was 2.5 to 3 times that in the lower samples.

In attempting evaluations of damage to fire-killed trees by *Monochamus* the following tentative conclusions should be considered.

1. The number of *Monochamus* attacks is dependent on the time of the fire, and on the time of death of the tree which may not be at the time of the fire.

2. In the case of spruce, very hot fires may render trees unsuitable for attack by *Monochamus*. Apparently this does not hold with the pines.

3. The average depth of maximum penetration does not vary with burn types.

4. Depth of penetration by *Monochamus* varies between host species and possibly between spp. of *Monochamus*.

5. The rate of larval development and time of tunnel construction appears to differ between sawyer beetle species.

6. The greater damage occurs in the upper half of the tree in most instances.

Ambrosia Beetles

J. M. Kinghorn (Presented by R. R. LeJeune)

Relatively few woodboring insect species damage the coastal softwoods of British Columbia. With the huge volumes of waste wood still left on the ground after typical coastal logging, it is always a source of wonder why insects like Monochamus do not breed in huge numbers. It is true that many species of cerambycids, buprestids and siricids are native to the region, but cases of extensive damage are rare. Occasionally these groups heavily infest and damage fire-killed timber, but the losses in the course of normal logging are insignificant. Even after the hemlock looper catastrophe in the forties, woodborer damage was slight - actually horntails were the most common, and even their damage was restricted to the outer sapwood. Volume losses caused by sap- and heart-rots far outweighed the combined damage of all wood infesting insects.

In contrast with the other groups of woodborers, ambrosia beetles present a very real and costly problem to the coastal industry. To be more specific, it is the striped ambrosia beetle, Trypodendron lineatum, that breeds so prolifically in our felled timber. Other ambrosia beetles are of relatively little consequence, although Gnathotrichus sulcatus and G. retusus attacks usually occur with those of Trypodendron. Gnathotrichus has been more frequently the culprit in cases of beetles attacking freshly sawn lumber. Damage by Playtpus wilsoni and Xyleborus tsugae is so rare that it does not warrant special consideration.

British Columbia lumber producers are so dependent on export markets that factors lowering lumber quality are of prime concern. Some segments of the industry have endeavoured to reduce ambrosia beetle damage, and concomitant with these efforts there have been demands for information on dollar losses caused by ambrosia beetles. Obviously, the cost of preventive measures must be less than the value of degrade losses prevented. Individual companies have conducted their own mill studies, and the Forest Biology and Forest Products Laboratories have cooperated on two occasions to ascertain ambrosia degrade to sawlogs. Lumber degrade is the principal source of value loss. Indirect losses through heavier slabbing and increased milling time do occur, but are extremely difficult to evaluate. Beetle damage in plywood peeler logs cannot be considered a real problem at the present time because of a surfeit of face veneer stock. An interesting sidelight is that Japanese mahogany face veneers have significantly invaded the Douglas fir veneer market. No one worries about ambrosia beetles in pulpwood; this type of damage does not affect the quality of pulp produced.

The following comments are gleaned from the 1957 mill study of sawlogs that had been infested in the forest. Seventy-three Douglas fir logs and 47 western hemlock logs were examined. Ninety-nine percent of the attacks were by Trypodendron. Attack densities averaged 26.6 holes per square foot in the fir logs, and 16.0 per square foot in the hemlock. Although most holes were no deeper than 1.5 inches, 50 to 74 percent of

K. Graham mentioned the problem of conducting mill studies without disrupting mill procedures. A mill man named Gordon Brand has devised a hypothetical sawing pattern for different diameter logs by which an 18 percent dollar loss was determined for infested 20" number 2 fir logs. The time loss due to infested logs versus clean logs was investigated during a 1950 study.

R. Lejeune said that J. Kinghorn used a pony mill and there was no problem of the order of logs sawed. The mill was used solely for the study. However, the work was rough and the men were bruised.

R. Stevens mentioned a possible problem of Gnathotrichus in second growth redwood sapwood.

W. Wagener gave the viewpoint of a pathologist. In the woods, insects and disease work together. Studies should include both agents. Deterioration is the most neglected field in forest entomology, especially during the first year. Many factors enter into what happens on an individual burn, including elevation, time of fire, and age of trees. Stain associated with borers is another problem. We aren't even sure how it enters the tree. Also, recovery from fire is tied in with bark beetles and borers. We need studies of the whole picture, i.e., the vertical picture, not just what can be gleaned by chopping in at the base.

R. Hall indicated that flatheaded borers have not been mentioned as a problem by the panel but they begin coming in while the smoke is in the air. More information is needed concerning them.

D. Ross said that flatheaded borers were numerous but penetrated to only 3/4". Also, many species were present and difficult to identify as larvae.

R. Hall pointed out a geographic difference in California in that the flatheaded borers penetrated much deeper, as great as 3 to 4 inches.

M. Furniss concluded with a statement that such geographic differences can be very important and may be tied in with climate. According to J. J. Mielke, 84 percent of beetle-killed Engelmann spruce at 10,000 feet in southern Utah remained standing for 25 years. Yet, pine killed by bark beetles in Mexico was reported by J. M. Miller to have fallen and decomposed in a year's time.

IV. ECOLOGICAL EFFECTS OF INSECT ATTACKS IN FOREST STANDS. EFFECTS ON AGE DISTRIBUTION, SPECIES COMPOSITION, FOREST SUCCESSION, MANAGEMENT PLANS, SILVICULTURAL METHODS, ETC.

March 2, 1:00 - 4:30 p.m.

Moderator: D. W. Muelder
Panalists: C. B. Eaton
G. R. Hopping
W. F. McCambridge
J. P. Vite
K. Graham

To streamline the procedure somewhat the panelists had been asked to discuss, if this fitted their own intention, for a forest type of their choice, the following questions:

1. For the type in general or certain subtypes what role do insects play either in maintaining this type or causing type changes? This applies to virgin forests and the insect condition found therein.

2. What insect conditions and problems were created by early logging?

3. How would the entomologist cut old growth if he had complete managerial control? How would he modify the virgin structure and species composition? (Sanitation salvage, rotation, silvicultural system, heaviness of cut, setting of blocks in clear cut systems, etc.)

4. How do insect conditions prevalent or to be expected in second-growth stands compare with virgin forest? (of the particular type under discussion).

5. How does age structure and species mixture affect hazard and outlook for control? (If points not sufficiently covered in 1 through 4).

These were the panelists and the topics they had chosen:

C.B. Eaton, Chief, Div. of Forest Insect Res. of the Pac. Southw. For. & R. Exp. Sta.: Outbreaks of the lodgepole pine needle miner (Evagora, or Recurvaria milleri) in Yosemite National Park.

G.R. Hopping, Research Entomologist, Forest Biology Div. Calgary, Dept. of For., Alberta, Canada: Ecological considerations and insects outbreaks.

W.F. McCambridge, Entomologist, Forest Insect and Disease Lab., Fort Collins, Colorado, Rocky Mt. For. & R. Exp. Sta.; The Engelmann spruce beetle in Colorado.

G.P. Vite, Boyce Thompson Institute for Plant Research Inc., BTI Forest Res. Lab. at Grass Valley, California: Host-insect relationship between ponderosa pine second-growth and the bark beetle population.

K. Graham, Prof. of Forest Entom., University of British Columbia, Vancouver, Canada: Ecological effects of Sitka spruce weevil.

The moderator expressed satisfaction that a silviculturist had been invited for this panel. Forest entolomogy is of such importance to many disciplines of forestry science that it has to be given its appropriate place in the educational program of forestry schools. To the discipline Silviculture, which is concerned with the biological and technical aspects of any conceivable means of tending forest stands to meet human objectives, it is of particular importance. Wherever insects have the potential to interfere with the accomplishment of said objectives, pertinent entomological knowledge is basic to Silviculture.

When we compare forestry to agriculture, 5 differences which are of major importance to forest entomology, too, become apparent:

a.) Forestry works with a tremendous accumulation of vulnerable plant substance.

b.) Direct control of many of the major forest insects encounters, for biological reasons, particular difficulties. The extent of the areas to be treated and their limited accessibility makes the problem even more serious.

c.) Economic limitations hamper measures of forest insect control much more severely.

d.) The fact that there is mostly little relationship between the investment and the profit of the now operating generation is a continuous temptation to deviate from the principles of sustained yield forestry.

To these four grave circumstances a very fortunate one can be added, namely:

e.) The way forest stands grow naturally is incomparably closer to how we tend them in forestry than is the case in agriculture, which just has to be extremely artificial.

The silviculturist thus must (see a-d) and can (see e) strive for a much higher degree of integrated, or "biological" in its broadest meaning, insect control than one can possibly accomplish in agriculture. It is in this endeavor that he considers the entomologist who understands forestry his closest ally. Joining forces we will succeed in overcoming misleading formulations such as "forestry is 50 years behind agriculture". The silvicultruists, in turn, who understands entomology is fully aware of the fact that "build-in safety" is just one of several means. It is never perfect, often of no use at all. For some of the most destructive enemies direct control by spraying is indispensable.

C. B. Eaton could base his discussion on extensive research by his division, particularly by G. R. Struble. He chose the outbreaks of the needle miner (Evagora milleri) on Pinus contortus in Yosemite National Park, Tuolumne County, because the conditions are in no way disturbed by attempts to manage this type which covers the high elevations between 8,000 and 10,000 feet. Mixed species are Abies magnifica and Pinus monticola. The insect has long been an integral part of this type.

Since 1960 four epidemics have occurred, each of them followed by a mass attack of the mountain pine beetle, Dendroctonus monticola. More than 60,000 acres, highly prized for their recreation value, have been destroyed by the present outbreak, which started in 1954 and was for several years called the most extensive single insect outbreak in the State. All age classes beyond the sapling stage are susceptible. In young stands heavy reduction of terminal growth is most conspicuous and a scattered individual kill, which can well be beneficial to the mostly over-dense stands. In the mature and over-mature age classes more top kill and heavy growth reduction occurs followed by a die-off of trees and groups. The picture is complicated by the rapidly developing infestation of the mountain pine beetle in weakened trees. It is mainly the combination of the two insects (which occur separated in other areas), which eventually results in the killing of large stands.

Rather than a "destruction", the speaker labeled the impact of the insects on the type of "harvesting" proposition. The presence of young and old stands of lodgepole pine in the absence of any observable dynamics towards a species change is a general proof. As a special proof the reproduction underneath the snags of the 1910 epidemic was mentioned. We thus deal with a "needle miner subclimax type" whose dynamics fit part needs fairly well.

Now that DDT has been replaced by Malathion, aerial spraying looks very promising. So far it has been aimed at the adult and larval stage; however, the egg stage may be vulnerable also. The implications of insect control work in parks are too well known to the group to need explanation. Park Forester, R. H. Sharp explained the compromise which the Park administration has chosen, namely to allow the epidemic to take in general its course, but to save the most valuable camp sites by aerial spraying. This was done in close cooperation with the U.S. Forest Service on about 6 percent of the infested park area.

As potentially dangerous enemies for second growth management the lodgepole terminal weevil (Pissodes terminalis) and saw flies (Neodiprion sp.) were mentioned.

G. R. Hopping followed the line of thought for which he, with his specialty, Bio-systematics, is pioneering. Regarding the old controversy on whether insect hazards have increased, the speaker takes as a proof of this that the white man encountered "vast stretches of virgin forests practically untouched by any destructive agent". "Prior to 1900 there were considerable areas with beautiful stands of ponderosa pine 300 to 400 years old. Then in the space of 30 years these stands were destroyed by the western pine beetle and the mountain pine beetle. Following on the heels of this was a tremendous upsurge in the mountain pine beetle outbreak in the lodgepole pine stands in the interior plateau country."

Discussing the ecological reasons for the lower hazard under natural conditions, assumed by the speaker, D. Pimentel was quoted: "Diversity of species and complexity of association are considered vital to the stability and balance of systems." Insects such as Pissodes strobi, Choristoneura fumiferana, and Ips sp. were used as examples and comparisons drawn between virgin and managed conditions in different areas of the world.

What are the principles involved? Though doubtless in favor of Pimentel's philosophy, the speaker conceded that "most of the foregoing is observational" and that more has to be done to get experimental evidence. The speaker's way to deal with the short-sighted objection that this or that is not "economically feasible" deserves to be quoted: "...... There is no way of knowing what may be economically feasible until we know what will work towards that alleviation of insect outbreaks. Very few prototypes of pilot plants were ever completed which made a profit by themselves, but the principles learned in the process may be extremely valuable in the modification of silvicultural practice in commercial operations which may materially lessen the chances of insect outbreaks.

To the particular topic of the panel the speaker contributed the following example: In Alberta the so-called climax spruce-alpine fire stands sometimes develop according to the following pattern: After fires nearly pure stands of lodgepole pine develop. Later spruce and, at higher elevations, alpine fir from nearby seed sources form an understory. After 100 years later the spruce begins to overtop the pine, and again 100 years later the pine starts dropping out. Alpine fir regeneration increases greatly and after again 100 years the stand is composed of a mixed overstory of spruce (predominating) and alpine fir and an understory of alpine fir (predominating) and spruce. This dynamic may be speeded up by the mountain pine beetle as was the case in its outbreak in 1930 - 1942 in the Kootenay Park. Here the lodgepole pine overstory was killed at an early stage of the spruce-fire invasion, shortening by about 100 years the cycle outlined before.

W. F. McCambridge covered the proposed guidelines thoroughly. Engelmann spruce, mostly associated with subalpine fir or lodgepole pine, (in creek bottoms at about 8,000 feet with Douglas fir and Colorado blue spruce), occupies 3.2 million acres of commercial forest in the high country of Colorado. The mixture, spruce - alpine fir, is considered near-climax; however, many stands do not conform to this in their age structure. The speaker thinks that this is due to outbreaks of the Engelmann spruce beetle rather than to fires as believed by others. (His opinion fits F.P. Keen's statement, 1952: "During epidemics trees of all ages and diameters, except reproduction, are attacked" by Dendroctonus Engelmanni). Thus the moding effect of endemic infestations which tends to make an uneven-aged forest is superseded by beetle outbreaks which produce extensive even-aged stands of spruce-fir. When the spruce deteriorates the associated subalpine fir is subjected to windthrow, snow breakage and increased decay.

The 1941-1954 outbreak practically killed every spruce and lodgepole pine over an area of several hundred thousand acres. The pattern observed at Tappers Lake is typical:

1941 - 1945	8% of the spruce killed, average d.b.h. 20"
1946	8% of the spruce killed, average d.b.h. 19"
1947	80% of the spruce killed, average d.b.h. 10"
1941 - 1947	69% of the lodgepole pine over 5" killed

Only 4% of the spruce larger than 3" and 31% of the pine over 5" remained. With findings by E. M. Hornibrook in the White River National Forest the speaker exemplified that the destruction does not result in any type change. Stand conditions after the outbreak were as follows: The overstory consisted of 47 subalpine fir 8" d.b.h. and larger and 13 spruce from 8" to 12" d.b.h. The understory (seedlings and small trees) consisted of 481 spruce and 619 subalpine fir. The further development of such stands seems to be fairly well predictable on the basis that spruce may have about 150-200 trouble-free years ahead of it. Different age classes of subalpine fir will be killed singly or in small groups by the balsam bark beetle (Dryocoetes confusus). From time to time the spruce budworm will take its toll from the subalpine fir and, much less severely, from the spruce. The adverse effect of the two insects is partly offset by the release which works in favor of the more desired spruce.

Against this background of natural development, cutting operations were discussed. The most serious problem is the build-up of the spruce beetle in blowdown material; control of the latter therefore is essential. Several cutting methods were discussed, called (a) "alternate clear-strips", (b) "group selection", and (c) "single tree selection", each of them calling for the removal of about 50 to 60% of the original stand. (a) caused the highest, and (b) the lowest windfall. In (c) the spruce beetle attacked the leave strips heavily. The speaker recommends application of (b) and a size of about 20 to 40 acres for the clearcut patches. Further recommendations concerned details of logging, also aimed at keeping potential breeding material at a minimum.

J. P. Vite stressed the following three points:

(1.) Population dynamics of bark beetles depend on the availability of suitable breeding material. A stand of second-growth ponderosa pine at Lake Tahoe, Nevada, having epidemic conditions, and a similar stand at Grass Valley, having endemic conditions, compare as follows: 30-60% susceptible trees at Lake Tahoe, versus 10% at Grass Valley. "Susceptibility" follows turgidity which is measured in oleo-resin pressure. Under extreme drought conditions, as in 1960, the percentage at Grass Valley reached 70 also; however, the small beetle population could not build up fast enough to reach epidemic dimensions.

(2.) Bark beetle infestations influence both, stand density and species composition, and the "constitution" of the stand in turn influences the bark beetle population. Bark beetle infestions in ponderosa pine often occur in a group pattern. The trend for concentration necessary for beetle survival in pine stands having but few susceptible trees (because bark beetles cannot survive on single trees, even of low turgidity) is reversed after an outbreak. Concentration causes overcrowding in limited localities and leads to attack of unsuitable material although low turgid trees may be available in the vicinity.

(3.) The crowns of the trees which are neighboring beetle killed members of the stand may come, by the sudden exposure, under heavier stress, thus declining in turgidity. This together with the impact of mass attack over short distances turns previously "resistant" trees into susceptible ones.

K. Graham reported on interesting studies on the Sitka spruce weevil (Pissodes sitchensis), called by F. P. Keen "the insect most injurious to Sitka spruce reproduction in the Pacific Northwest." Those familiar with the eastern white pine weevil can draw many parallels. There as here the ecological consequences derive from the insects manner of attack, the growth response of the tree, the persistance of the infestations, and the competition from other tree species. The extent of the effects differs with locality, perhaps influenced by rainfall, temperature, and soil.

When a Sitka spruce is attacked, it loses the axial growth of the previous season, and the potential axial growth of the current season. If the injury occurs before new shoot development for the season, the new shoots from the top whorl of branches grow vertically and form multiple leaders; the tree thus, in the same season, regains some of the height lost by death of the terminal bud. If the injury occurs after new shoot development, the lateral shoots have already continued horizontally, and the tree has lost two years' axial increment in one season; it has also established a greater displacement and deformity in the future axis. If no further attacks take place, about 65-75% of trees recover single leadership in 2-3 years. But infestations persist, and trees are repeatedly attacked. If the downward feeding of larvae in the phloem extends into the node from which the upper whorl of branches arises, the branches may be too weak to develop leaders, but retain their suppressive effect over leader development in the next whorl down. The tree is then in danger of suppression.

The long term effect is drastic suppression of height development, and spreading form. Spruce becomes overtopped by competing species, and loses its dominance. A spruce canopy fails to form, and brush species remain as a major feature of the stand structure. The proportion of spruce in the association is reduced by early deaths from suppression. In some situations the surviving trees develop as great spreading shrubs that resist encroachement. They are then no better than forest weeds occupying forest land for decades, and delaying normal forest establishment.

The broader consequence of the weevil is that it frustrates the development of Sitka spruce plantations and restricts the ability of natural regeneration to compete with alder in clear cut areas of river deltas. One might suspect that mature Sitka spruce would have been a more abundant stand constituent in certain areas had it not been for this weevil during past centuries. With some evidence at hand, that certain individual trees may be immune to the weevil, it is remarkable that natural selection has not resulted in a higher percentage of resistant trees. Planting stock from seed obtained from highly productive Sitka spruce areas shows no special immunity when planted in "weevil areas". The ecological outcome must therefore be regulated by local influences.

Moderator's comments:

Unfortunately there was neither enough time to take down the wording of the questions and answers (indeed to do justice to both, the speakers and the questioners) nor to carry the discussion far enough so that agreements and disagreements could crystalize. Many questions, very much to the point, made in the presentations, were asked amount others by G. R. Struble, J. Bongberg and R. Smith. To save the discussion for the record, the moderator will try to deal as a silviculturist with some of those points which seem to be of major importance from the viewpoint of both, the general topic and the questions asked.

As far as the outbreaks of the lodgepole pine needle miner are concerned, no experience is available on whether and how some silvicultural control could be integrated. Many stands are over-dense and/or over-mature. Because all age classes are attacked by the insect, only slight improvements, if any, can be expected from either changing the uniformity in favor of much smaller, though still even-aged, stands or by converting the even-aged to an uneven-aged structure. Thinnings, too, if they were economically feasible might not change the food condition for the needle miner. However, there is a reasonable chance that silvicultural means of the types mentioned here might change substantially the food condition for the mountain pine beetle. This for itself could be a good step ahead. If, in addition, the needle miner is checked by spraying and the weakening of the tree thus reduced, one might succeed in breaking the pernicious combination of the two insects.

To deal more effectively with the extremely complex problem of what purpose diversification can serve, a breakdown of the following type may be helpful:

1. There can be no doubt that epidemic outbreaks of forest-destroying insects are a most natural thing. The point, however, can be made that this is particularly the case where diversification is lacking in nature. The homogeneity which results from outbreaks may deserve our interest also as a possible cause of their recurrence.

2. As far as the outbreaks are closely related to overstocking and overmaturity, silviculture of some reasonable intensity takes care of the main problems almost automatically.

3. Certain insects are so little dependent on a host condition of a type which one can possibly influence, that an effective silvicultural control can hardly be imagined. Here belong many needle feeders which just call for control by spraying.

4. Where mixtures are easy to accomplish and otherwise desirable or at least tolerable, they can have the advantage that the stands are not entirely destroyed by outbreaks of the insects

discussed under No. 3. This can serve important silvicultural and managerial purposes. Where the insects under discussion prefer certain age classes, uneven-aged structures are one more means to soften the impact. If such silvicultural means are available, it is very questionable whether one should, even where it has proven to be successful, entirely rely on spraying. One does not have to be a "naturalist" to advocate caution in spraying. Furthermore, there may very well be times of public emergency ahead where intensive care just cannot be applied so that any type of built-in safety may pay off.

5. Uneven-aged climax structures demonstrate that for centuries no insects have been able to destroy larger parts of these forests. We otherwise could not have the age distribution as we find it for instance in the mixed conifer type of the Sierra Nevada, in the red fir belt, and in the east side or interior pine type. We like to say that the uneven-aged structure of climax types is mainly due to the molding work of insects, which take individual trees and groups, however, it seems to be necessary to stress that the stability of these types is not due to the fact that dangerous insects are lacking, as one could state for instance for coastal redwood. These types have their climax structure <u>in spite</u> of the presence of most dangerous insects, particularly bark beetles. More recent evidence in second-growth justifies concern. These insects, which were not able to destroy stands having climax structures, may very well be able to destroy even-aged stands on a larger scale. A close study of how insects attack even-aged and uneven-aged stands of these types will give us more dependable answers in about 10 to 20 years.

6. Discussing the issue of mixed stands versus pure stands we must not overlook the possibility that naturally pure stands may result from the fact that the site conditions involved are working against outbreaks, thus allowing one species to dominate the site, whereas mixed stands may reflect the fact that pure stands cannot maintain themselves on the site. A certain number of the mixed type may seem to be just as much or even more susceptible than it is in naturally pure stands on other sites. The key issue, then, is how the species will perform in pure stands on a site which naturally tends towards mixed stands.

7. The strictly entomological part of the question of why a diversified community may be less vulnerable must be left to the entomologists. As far as host condition is important, mixed stands often constitute a mixture of suitable and unsuitable food, leaving the stand at least partly intact (see No. 4). Where the killing of trees adversely influences the physiological condition of their neighbors, making them more susceptible (a pattern which may very well be of considerable importance in California), mixtures will reduce the number of such cases in a

given stand. In uneven-aged stands there are, over short distances profound differences in host conditions which undeniable are of greatest importance to the pattern of bark beetle attack. In regulated uneven-aged stands this will be much more the case than in natural types with their often deplored preponderance of older trees.

It is most unfortunate that discussions of what purpose disversification can serve are so often carried out as if the issue were "natural" versus "artificial" or even "unnatural" silviculture. If diversification is a reasonable tool, we have many more means than nature has to accomplish it. Though the silviculturist is inclined to look and to work for as much integrated control as possible and to try to learn about this from nature, his thinking is not paralyzed by what is "natural". In many cases where the natural forces don't work towards diversification silvicultural treatments can do this very well. Many highly useful diversifications may well be highly "unnatural".

8. The burden of proof is with both, not only with those who are inclined to advocate diversification. Those who do not care or even favor removal of diversification have just as well to prove that this is not dangerous. By homogenizing diversified mixtures and structures and by not using opportunities to diversify homogeneous conditions we may very well give away highly valuable ecological advantages which, once lost, are very difficult to reestablish.

9. Discussions between entomologists and silviculturists will be facilitated if both comply with proper terminology. A look at the SAF Forest Terminology will, for instance, quickly reveal that a sudden cutting of 50-60% of the volume of a virgin type can neither be called "selection" nor "method", particularly not with a delicate species. The less diversification there is to begin with, the more delicate is spruce and less can such procedures be expected to work. Over extensive areas spruce-alpine fir does occur in a climax structure (see Forest Cover Types of North America Type 206), a proof that the selection system deserves further attention.

The difference between "group" and "single tree" selection is a matter of degree only. Both "silvicultural systems" (or "cutting methods") maintain, or accomplish first and then maintain, uneven-aged structures, with all the well known ecological implications. Where cutting areas of several acres, or even of 20 to 40 acres, are under discussion, we are dealing with the ecology of completely open areas and of even-aged stands restocking them. "Clear cutting" also to be a "system" requires that it has proven to work on an operational scale, with everything under reasonable control: blowdown, insects, and reproduction.

No doubt, forest entomologists know all this very well. We use certain terms sometimes in a lose, sometimes in a strict sense. However, where ecological problems are involved there is no choice.

Here only the strictest use can work. Considering the fact that the recommended cutting practice in the Engelmann spruce-alpine fir type does not secure reproduction of spruce, our understanding each other might be facilitated if we concede that we are not dealing with silvicultural systems (or cutting methods) at all, but with entomological recommendations aimed at finding ways to liquidate this type without too serious losses.

10. Our discussion will furthermore be facilitated if we always clarify the levels of intensity involved. For example, the very "artifical" cultivation of spruce in Middle Europe outside its natural range seems to work well, however, the success depends entirely on a very high level of intensity, with careful hunting for each infested tree. Letdowns in intensity have lad to catastrophic losses, and it is questionable whether even this high level suffices to control after-effects of drought years such as 1959.

V. METHODS AND TECHNIQUES SECTION OF THE 1961 WESTERN FOREST INSECT WORK CONFERENCE

March 3, 9:00 - 12:00 Moderator: N. E. Johnson

A methods and techniques section was added to the 12th annual Western Forest Insect Work Conference. Participation in this part of the program was excellent and from the comments received, it turned out to be very well received by the members of the conference. Following is a list of the contributors:

Dr. J. P. Vite	Methods for studying oleoresin pressures in pines and its relationship to bark beetle attack.
Alan Berryman	Use of X-ray in Forest Entomology.
W. D. Bedard	A rearing method for bark beetles.
W. C. Guy	Some suggestions for better insect pictures.
Dr. R. G. Mitchell	A portable field microscope; a micre-slide projector for making drawings of insects.
V. Carolin	European pine shoot moth fumigation appartus.

Dr. G. T. Silver Dr. L. H. McMullen	A method for rearing forest defoliators (presented various techniques for trapping bark beetles, making artificial infestations).
R. L. Lyon R. H. Smith	Precision spray chamber. Methods used in studying the toxicity of resins to bark beetles.
B. E. Wickman	A method of preventing checking in tree sections.
T. W. Koerber	A laboratory set-up for taking close-up photographs of insects.
Dr. R. C. Hall	An inexpensive dendrometer.
Dr. R. W. Reid	A method for studying the behavior of the mountain pine beetle.
G. R. Hopping	A rearing method for Ips.
Dr. K. Graham	Methods used in studying attractants to ambrosia beetles.
Gary Pitmann	Device to produce fluctuating temperatures in temperature cabinet.
Roger Ryan	A bark thickness-area guage used in studies of the parasite Coeloides brunneri.
R. I. Washburn	A new method for sealing sleave cages. Use of flourescent dyes and their detection in spray studies.
M. M. Furniss	A bark punch for taking precise samples for Douglas-fir beetle studies.
G. Trostle	Land-clearing methods for site preparation in the spruce stands devastated by Englemann spruce beetle.
D. Hester	Use of beetle trap trees.
Dan Dotta	Posters to interest the public in bark beetles.
C. S. Schaefer	Instrumentation for recording temperatures in Monterey pine cones.

D. G. Allen	Inexpensive time switch for operating light traps.
Dr. J. A. Chapman	Photographic display of several techniques.
A. F. Hedlin	X-rays of insect infested seed.
T. Terrell	A method for preserving foliage for subsequent sampling.

MINUTES OF THE FINAL BUSINESS MEETING

March 3, 1961

The Chairman called the meeting to order at 1:05 p.m.

The minutes of the initial business meeting were read. Norman Johnson requested that Mr. Pittman's first name be corrected to read Gerry Pittman. Correction was made. Mr. Lejeune moved that the minutes be approved. Seconded by Norman Johnson. Carried.

The Chairman outlined the reasons for selection of Phoenix, Arizona, for the 1962 meeting. They were as follows: (1) the new Western Forest Biology Laboratory at Corvallis will not be complete by 1962 and (2) the new laboratory at Victoria, B.C., will not be ready until 1964.

Bill McCambridge asked who would be host. Chairman Wilford replied that the Rocky Mountain Forest and Range Experiment Station would be host with Cal Massey as Program Chairman. A lively discussion followed. There were several objections to Phoenix and many questions as to why Phoenix was selected. Mr. Lejeune felt that participation would vary directly with distance traveled.

Dr. Stark pointed out that attendance and participation in the meeting would be governed more by content of the program than by travel distance to the meeting.

Dr. Stark moved that Phoenix be selected for the 1962 meeting. Seconded by Ken Graham. Carried.

The Conference was in agreement that the 1963 meeting be in Corvallis, Oregon, and that Victoria, British Columbia, be considered for the 1964 meeting.

The Chairman outlined the theme of the 1962 meeting. "Insects Affecting Regeneration" is to be the theme for the first two days, followed by a seminar on the last day. The panel of the seminar to be made up of young research people presenting the work they are doing. This seminar need not follow the theme.

Dick Washburn asked for a more detailed definition of the theme. Dr. Stark explained that the theme would encompass all insects that affect the establishment of a forest stand (seed and cone insects, tip weevils, root weevils, tip moths, and defoliators).

Walt Cole felt that the program would be rather limited and asked Dr. Stark who would be prespective panel members. Ron. Stark stated that the University of California and the Pacific Southwest Forest and Range Experiment Station could contribute two, Weyerhauser Company one, Oregon State University one, Vancouver one or two, and Calgary one or two.

George Hopping asked if the theme applied to nursery insects. Dr. Stark replied that it did.

Dr. Eaton moved that the proposed theme be accepted. Seconded by George Struble.

Roy Shepherd felt that the theme was an excellent selection. He brought up two ideas of other themes that he felt the Conference should consider for future meetings: (1) devote one meeting to a program review as to what the research people are doing and (2) devote one program entirely to surveys.

Val Carolin asked for the question. Original motion carried (58 in favor and 5 opposed).

Dr. Stark suggested that Dr. Massey be given authority to select the program for the 1962 meeting.

Ken Wright offered another suggestion of a theme for a meeting. He relayed Bill Coulter's idea that the Conference devote one meeting to methodology.

The Chairman asked for a discussion as to whether or not the Conference should purchase 300 reprints of the Education Committee's report for distribution to membership and to colleges and universities.

Bill McCambridge asked if the distribution to colleges meant only those having a forest entomology curricula.

Dr. Stark stated that he felt copies should go to all colleges granting forestry degrees.

Phil Johnson stated that he didn't feel we should distribute reprints to all the members as most members probably get the Journal of Forestry. Phil did endorse the suggestion that universities receive copies of the report.

Jack Bonberg asked Ron Stark how many copies he would get as senior author. Ron replied that the senior author gets only a small number of reprints. He stated that it is the policy of the University of California to purchase 200 copies. He stated further, the 300 copies the Conference purchases could be used to supplement the 200 purchased by the university. Dr. Stark pointed out that the impact would be greater if we sent all universities a copy of the report under a cover letter.

Ralph Hall stated that the Conference should purchase 300 copies of the reprint to fulfill their obligation to the Education Committee; Dr. Hall so moved. Seconded by Phil Johnson. Carried (one opposed).

Dr. Stark moved that the listing of current research projects be included in this year's proceedings, and that the names of personnel doing the work be listed after each project. Seconded by Ray Lejeune. Carried.

Roy Shepherd accepted the appointment as Chairman of the Committee of Indexing of Unpublished Reports.

Dr. Eaton stated that he had doubts in his mind as to the value of the insect conditions report. He stated that there are several reports all similar to the one compiled by the Conference. He felt we should eliminate putting it out as a bound copy.

Dick Washburn reported that the original objective of the report was to furnish a source of information to the person who presents the insect conditions at each meeting. Dick agreed with Dr. Eaton.

Ken Wright suggested that the regions prepare the material in the same form as they have in the past but submit only two copies to the person summarizing the insect conditions

C. J. DeMars stated that had he received a one-page statement of insect conditions from each region, it would have been easier for him so summarize the insect conditions of Western North America.

Jack Bonberg moved that the Conference eliminate processing and distribution of the insect conditions report. Seconded by Dr. Eaton, Carried.

Dr. Stark outlined his ideas on the publishing of a bimonthly newsletter. He stated that he did not wish for the Conference to sponsor the letter as their own house organ. He volunterred to put the letter out on a trial basis. It would be patterned after the Canadian bimonthly report. The objective of the letter would be to report results of research immediately but it would not lessen the status of a publication.

Dr. Dave Wood asked if the bimonthly news notes would be restricted to the field of forest entomology in the Western United States. Would Canadian entomologists use the letter? Dave felt that we now have several entomological journals in which we could publish research findings.

Boyd Wickman stated that the Divisions of Forest Insect Research at the Forest and Range Experiment Station put out a quarterly report which covers progress of research studies.

Jack Bonberg stated that there is a need for a release of certain research information. The United States Department of Agriculture (USDA) has considered putting out a journal devoted entirely to forest pest problems. To put out a journal with a mailing list of 2,000 would cost $15,000 yearly. Material to be included would be centered around research, surveys and control.

Jack reports the Journal of Forestry claims to be short of forest insect articles.

Ralph Hall asked what happened to the Forest Worker. Bonberg replied that the journal died because of the lack of interest.

Dr. Dave Wood felt that note-type reports were not desirable as they tend to get too big.

Norman Johnson asked for an opinion from the Canadians on what they felt the value of their bimonthly newsletter was to them.

Dr. McGugan replied that the original intent of the report was to provide, in a brief way, highlights of research work to the general public. The letter gradually changed to a media for circulating results of research progress between the research people. People outside of forest insect research have contributed information to the letter. These contributors have all been Canadians; however, there are no restrictions against outsiders contributing information.

Dr. Stark pointed out that the Canadian bimonthly report was quickly accepted.

Dr. Eaton moved the proposal be tabled. Seconded by Jack Bonberg. Carried (one opposed).

Report of Committees:

Dr. Charles Eaton, Chairman of Nominating Committee, reported that his Committee recommended Norman Johnson of Weyerhaueser Company as the new Council member of the Executive Committee.

The Chairman asked for other nominations from the floor.

Jack Bonberg moved that nominations be closed. Seconded by Ken Wright. Carried. Norman Johnson elected by acclamation.

Phil Johnson, Chairman of Common Names Committee, reported his Committee met Wednesday night, March 1. Reviewed common names of insects that are to be submitted with recommendations for being accepted.

Phil encouraged Conference members to voice opinions on what common names of insects they would like to have accepted; urged members to study regulations concerning naming of insects.

Phil reported that forms are available for submitting common names of insects from all forest insect laboratories, Chairman of the Committee (Missoula Laboratory), and the Secretary-Treasurer (Region 2). Phil cautioned members to follow rules printed by Entomological Society of America.

Dr. Ron Stark, Chairman of Education Committee, reported his Committee met at noon, March 2. They discussed distribution of reprints. In near future, they plan to start contacting colleges and universities in the West regarding their entomology and pathology curriculum. Ron announced that Dr. Ed Sturgeon was appointed to the Education Committee.

Tom Koerber reported that a seed and cone insects meeting was held the evening of March 1. Those attending were persons interested in seed and cone insects. No proposals were drawn up.

Jack Bonberg, Chairman of the Ethical Practices Committee, reported that he and his fine staff have reviewed the new candidates for the chairmanship and that Russ Mitchell was selected for the chairmanship.

Chairman Wilford expressed for the group their appreciation for the excellent program and local arrangements provided for by Program Chairman, Ralph Hall; Co-Chairman, Ron Stark; and the Program Committees. Special thanks for the program provided for the wives of the attending members. A standing applause was given by Conference members to show their appreciation for the program.

Dr. Eaton announced that the Pacific Branch of the Entomological Society of America will meet at Santa Barbara, California, June 20-22.

Meeting adjourned at 3:00 p.m.

LIST OF CURRENT RESEARCH PROJECTS

ALASKA FOREST RESEARCH CENTER

Systematic insect collections

(1) To develop a list of insects associated with forest damage in Alaska. Downing.
(2) To provide data on the biology of these insects. Downing.
(3) To determine the yearly trends in individual forest insect populations. Downing.

Insects destructive of the flowers, seeds, and cones of trees - biology, ecology, and control

(1) The effect of insects on white spruce seed production. (A study in cooperation with the Division of Forest Management Research) Downing.

Black-headed budworm in Alaska - biology and control

(1) Development of the black-headed budworm in relation to elevation and aspect. Rose.

(2) Development of the black-headed budworm in relation to weather factors. Rose.

DEPARTMENT OF FORESTRY
LABORATORY OF FOREST ENTOMOLOGY AND PATHOLOGY
BRITISH COLUMBIA

Investigator(s)	Project Title
	Active Projects
Kinghorn, J.M.	Control of the black-headed budworm.
Ross, D.A.	Investigations on (A) cone and wood-boring Lepidophera, (B) particularly *Dioryctria* spp.
Evans, David	A study of the ecology and associates of an oak-gall wasp, *Besbicus mirabillis* Kinsey.
McMullen, L.H. and M.D. Atkins	General studies of the Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopk., in the interior of British Columbia.
McMullen, L.H.	Parasites and predators as natural control factors of the Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopk., in the interior of British Columbia.
Atkins, M.D.	The effect of temperature, air moisture and light on the activity and behaviour of the Douglas-fir beetle and several other scolytids.

Chapman, J.A.	A study of the biology, physiology and behaviour of ambrosia beetles, particularly, Trypodendron lineatum.
Dyer, E.D.A.	Factors influencing the abundance and distribution of ambrosia beetles, particularly Trypodendron lineatum.
Kinghorn, J.M.	Control studies of ambrosia beetles.
Hedlin, A.F.	Insects affecting seed production in Douglas-fir.
Smith, D.N.	Infestation level of Anobiidae in relation to strength deterioration of structural timbers.
Smith, D.N.	The separation of larvae of species of Anobiidae infesting wood in service in British Columbia.
Morris, O.N.	A comparative study of the polyhedroses of the western oak looper, Lambdina somniaria, and the western hemlock looper, L. fiscellaria lugubrosa.
Atkins, M.D.	Studies on the primitive beetle Priacma serrata (Lec.), (Cupedidae: Coleoptera).
Condrashoff, S.F.	Bionomics of aspen leaf miner, Phyllocnistis populiella Chamb.
Harris, J.W.E.	A study of the poplar and willow borer Sternochetus lapathi L.
Harris, J.W.E.	Population sampling of the two-year cycle spruce budworm, Choristoneura fumiferana (Clem.)
Wellington, W.G.	Investigations in ecological meteorology with special reference to the ecology of forest insects: General studies.
Edwards, D.K.	Influences of atmospheric electricity and pressure on insect behavior and deveopment.

Completed Projects

Evans, David	Descriptions of Erannis vancouverensis Hulst, with life history notes (Lepidoptera: Geometridae).
Condrashoff, S.F.	Douglas-fir needle miners, Contarinia spp. (Diptera: Cecidomyiidae).
Atkins, M.D.	Flight physiology and behaviour of the Douglas-fir beetle, Dendroctonus pseudotsugae Hopk.
Evans, D.	The life history of Melanolophia imitata Walker, with descriptions of the stages (Lepidoptera: Geometridae).

DEPARTMENT OF FORESTRY
LABORATORY OF FOREST ENTOMOLOGY AND PATHOLOGY
ALBERTA

Forest insect survey C. E. Brown

Objectives: 1. To make an annual appraisal of the status of destructive and potentially destructive forest insects.

2. To accumulate information on: (a) the species of insects inhabiting the forest; (b) the number and distribution of forest insects; (c) the interactions between host insects and their parasities, predators and diseases; (d) the hosts of forest insects; (e) the effects of different forest environments on different insect populations.

3. To participate in the research program of the laboratory by conducting research on problems indicated by survey activities, either independently or in collaboration with the research staff.

Ecology, morphology, and taxonomy of forest Geometridae, with emphasis on immature stages. W. C. McGuffin

Objectives: 1. A description and classification of the immature stages of the Canadian forest Geometridae. This will include: Life history studies and description of as many species as feasible; seasonal changes in the occurrence of geometrid species on various tree hosts; description of the behaviour of larvae and adults; attempts to find new and better ways of rearing Geometridae.

Bionomics and population sampling of the lodgepole needle miner.
R. F. Shepherd
(pro.tem.)

Objectives: Tabulating the generation epidemiology with the long-range objective of determining the causes of future population fluctuations.

The Biology of the pine root weevil, Hylobius warreni Wood, in Alberta and Western Canadian National Parks. H. F. Cerezke

Objectives: 1. To provide a more complete picture of the distribution and abundance of H. warreni and related species in Alberta.

2. To complete the studies on the life cycle of H. warreni commenced by Reid and Stark for this region.

3. To observe the behavior of adult weevils under controlled environmental conditions in the laboratory.

4. To compare the relative sizes of populations of the weevil in clear-cut and pine regeneration stands with adjacent undisturbed or mature stands. This will involve: (a) the determination of the relative number of larvae, pupae, and adults that occur under a

variety of conditions in the field; (b) the determination of the relative numbers of weevils and their damage involved with mortality to pine of regeneration size; (c) the determination of possible changes of environments resulting from stand disturbances and the relating of these to the development and survival of this insect.

Bio-taxonomic studies of the Scolytidae. G. R. Hopping

Objectives: 1. To establish the validity or synonymy of various species of bark beetles, chiefly in the genera Ips and Dendroctonus with the study of the Ips of North America taking priority.

2. To associate immature stages with parent stock and to supply such material to Dr. Thomas of the Sault Ste. Marie Laboratory for study, concommitant with studies of the adults.

Studies on the biology of the Engelmann spruce weevil, Pissodes engelmanni Hopkins. R. E. Stevenson

Objectives: 1. To determine the life history of the insect.

2. To learn the identities and incidence of parasites and predators.

3. To learn the incidence of weevil attack under a variety of stand conditions.

4. To determine the distribution.

Mountain Pine Beetles Studies. R. F. Shepherd (Co-ordinator)

Studies on the biology of the mountain pine beetle, Dendroctonus monticolae Hopk. R. W. Reid

Objectives: 1. To determine, each year, the period of flight, rate of brood development, and general life cycle of the mountain pine beetle in selected experimental areas.

2. To describe the interaction between the insects and the tree with special emphasis on the physiological condition of each. This work will begin with a study of the influence of bark moisture upon the initiation of the second flight and upon brood survival after establishment.

3. To study the relation between the productivity of established broods and tree characteristics in order to devise a system of detecting trees which will produce high numbers of beetles.

Population studies of the mountain pine beetle. R. F. Shepherd

Objectives: 1. To describe the distribution of beetle attacks over the host and the factors that influence this distribution and also to determine the different mortality factors acting on the beetle and their variability within and between hosts.

2. To devise a sampling system based upon the findings of the first objective which would be suitable for population sampling.

Factors affecting the attraction and susceptibility of trees to the mountain pine beetle. R. F. Shepherd and J. A. Cook

Objectives: 1. Develop techniques for measuring resin exudation and determining the relationship between amount of resin produced and success of beetle attack. Determine the tree characteristics which are associated with high and low resin production. This will involve determinations of the number and size of resin ducts, resin pressure and viscosity, growth rates and bark and crown characteristics. Determine the influence of environmental factors, particularly soil moisture upon resin production of the tree. Determine the distribution of resin ducts in relation to the depth and width of galleries, and the time of attack.

2. Determine the reason for congregation of beetles on certain trees. This will involve tests of tree characteristics such as diameter and bark, tests of the influence of successful and unsuccessful initial attacks upon the remaining population, tests of the influence of tree wounding, and tests of the influence smell and sound will have upon tree selection. Describe the behavior of flying adults as they respond to various environmental factors and how this may influence tree selection.

A study of climate in relation to the mountain pine beetle. J. M. Powell

Objectives: A study of the more important climatic factors affecting the mountain pine beetle in western Canada. The study of individual weather factors and the cumulative effect of these factors on the insect may provide a method of predictive forecasting for mountain pine beetle outbreaks. The microclimatic conditions in a number of mountain valleys and within the stand will also be investigated.

A study of the reproductive systems of the mountain pine beetle, *Dendroctonus monticolae* Hopk. H. F. Cerezke

Objectives: 1. To describe the internal reproductive systems of male and female beetles and to show the morphological changes that occur during the normal life span of adult activity.

2. To study the copulation process to learn the characteristics of sperm transfer and storage, and the functional sequence of the bursa copulatrix, spermatheca and collecterial glands.

3. To describe egg formation from oocyte to depostion.

PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION

New No.

FS-2-e1-5-PNW

Line Project Title: Douglas-fir beetle, ecology and control.
K. H. Wright
Study Objectives: (a) To determine the reasons for periodic outbreaks in the Douglas-fir region, and (b) to determine the rate of deterioration of trees killed by the Douglas-fir beetle.

FS-2-e3-2-PNW

Line Project Title: Spruce budworm - biology, ecology, and natural control.
V. M. Carolin and W. K. Coulter

Study Objectives: To determine: (a) The distribution of populations on trees and within stands as a basis for extensive sampling, (b) the effects of natural control factors upon population trends, (c) infestation characteristics, such as differential occurrence of damage (d) effects of spraying upon the budworm, its parasites, and associated insects, (e) variations in life history and habits with different tree hosts and environmental conditions.

FS-2-e3-3-PNW

Line Project Title: Black-headed budworm - biology and control.
V. M. Carolin and W. K. Coulter
Study Objectives: To determine: (a) the distribution of populations on trees and within stands as a basis for extensive sampling; (b) the effects and relative importance of major natural control factors, such as insect parasites and disease; (c) quantitative aspects of the life history capacity; (d) the relation between populations and subsequent defoliation and damage.

FS-2-e4-6-PNW

Line Project Title: Chermes, a forest insect pest, its biology, ecology and control.
K. H. Wright, R. G. Mitchell, and Paul E. Buffam
Study Objectives: (a) to determine the biology and seasonal history of the insect on its principal host trees in Oregon

and Washington, (b) to catalog the native insect predators of chermes and assess their effectiveness, (c) to import and colonize available foreign predators, and (d) to evaluate tree mortality and damage trends on permanent plots in Pacific silver firestands.

FS-2-e4(Unnumbered)-PNW

Line Project Title: Sitka spruce weevil - biology, ecology, and control.

K. H. Wright, and P. E. Buffam

Study Objectives: (a) To measure and evaluate the importance of the weevil in Sitka spruce stands in Oregon and Washington, and (b) to test resistance of other spruce species and hybrids to the weevil.

FS-2-e5-2-PNW

J. F. Wear and W. G. Guy

Line Project Title: Insect aerial surveys - development of methods.

Study Objectives: To develop and improve aerial techniques and equipment for locating and evaluating insect outbreaks and tree mortality in major timber types of western states.

OREGON STATE COLLEGE

1. Mass rearing of the Douglas-fir beetle. R. F. Schmitz.
2. Population dynamics of the Douglas-fir beetle. J. A. Rudinsky, R. F. Schmitz, L. N. Kline, W. H. Hendrickson.
3. Environmental factors influencing the rearing of spruce budworm under laboratory conditions. G. B. Pitman, J. A. Rudinsky (In cooperation with the Forest Service).
4. Resistance of conifers to bark beetle infestation. J. A. Rudinsky I. Otvos. (In cooperation with Boyce Thompson Institute.)
5. Factors influencing bark beetle flights in ponderosa pine. R. I. Gara, J. A. Rudinsky. (In coöperation with Boyce Thompson Institute.)
6. Biologies, distribution and destructiveness of five species of bark beetles in coniferous forests of western Oregon. D. G. Fellin P. O. Ritcher, J. A. Rudinsky.

PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION

New No.	Title
FS-2-e1	BARK BEETLES AFFECTING FOREST AND SHADE TREES
FS-2-e1-1	Studies in the control of pine bark beetles through the classification of trees according to their susceptibility to attack and by the selective logging of susceptible

trees from infested stands.
Assignment: Eaton, Hall, Struble, Wickman

FS-2-e1-2 Interrelation of fire and insects in pine stands.
Assignment: Struble

FS-2-e1-8 Resistance of trees to bark beetles.
Assignment: Smith

FS-2-e1-9 Studies to develop or improve methods of preventing or controlling miscellaneous bark beetles through the use of toxic oil sprays.
Assignment: Lyon

FS-2-e1-10 Mountain pine beetle - ecology and control.
Assignment: Struble

FS-2-e3 DEFOLIATING INSECTS AFFECTING FOREST AND SHADE TREES

FS-2-e3-4 Needle sheath miner, a pest of young pines.
Assignment: Stevens

FS-2-e3-7 Resistance of trees to insects other than bark beetles.
Assignment: Smith

FS-2-e3-11 Lodgepole needle miner--biology ecology and control.
Assignment: Lyon, Stevens, Struble

FS-2-e4 INSECTS OTHER THAN BARK BEETLES AND DEFOLIATORS AFFECTING FOREST AND SHADE TREES

FS-2-e4-7 Insects destructive of the flowers, seeds and cones of trees--biology, ecology and control.
Assignment: Koerber

FS-2-e5 DEVELOPMENT OF METHODS FOR CONDUCTING FOREST INSECT SURVEYS

FS-2-e5-1 Studies of methods for improving the accuracy and efficiency of forest insect ground surveys.
Assignment: DeMars, Hall, Stevens, Wickman

FS-2-e5-2 Studies of methods for conducting forest insect surveys from the air.
Assignment: DeMars, Hall, Stevens, Wickman

FS(Unnumbered) SURVEYS AND CONTROL OF FOREST INSECT PESTS

Conduct and coordination of forest insect surveys in Region 5.
Assignment: DeMars, Hall, Stevens, Wickman, Jessen

UNIVERSITY OF CALIFORNIA

1. The Scolytidae of California. Part of a larger California Insect Survey Project of the University. R. W. Stark, D.L. Wood.

2. Biology and ecology of a *Neodiprion* sawfly attacking ponderosa pine plantations. D.L. Dahlsten, R. W. Stark.

3. Biology and ecology of the Monterey pine cone beetle, *Conophthorus radiatae* Hopkins. C. H. Schaefer.

4. Cone and seed insects attacking forest trees of California with particular reference to the cone beetles. (Coleoptera: Scolytidae: *Conophthorus*). R. W. Stark, D. L. Wood.

5. Host selection by *Ips* and related genera of bark beetles. D. L. Wood and R. W. Stark.

6. Population dynamics of the western pine beetle, *Dendroctonus brevicomis* LeConte. R. W. Stark and D. L. Wood.

7. Media for the rearing of immature bark beetles (Scolytidae). W. D. Bedard (terminates June, 1961).

8. Mites predacious on bark beetle eggs. W. D. Bedard, E. Lindquist (terminates June, 1961).

9. Radiographic techniques in the detection, sampling and biological studies of wood-boring insects. A. A. Berryman and R. W. Stark.

10. Survey of the nematodes infesting bark beetles in California. William R. Nickle of the Department of Plant Nematology at the Davis campus.

BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, Inc.

BTI-Project 59: "The Life Habits and Control of Bark Beetles"

Personnel assigned: J. P. Vité and Robert I. Gara

Line Project Number: FS-2-e4-3-INT

Line Project Title: Sucking insects other than the balsam woolly aphid - biology, ecology and control. Washburn.

Objectives:

1. To determine life history and habits of the spruce mealybug Puto sp.

2. To determine the influence of insect predators or parasites on its abundance.

Line Project Number: FS-2-e3-13-INT

Line Project Title: The larch casebearer--biology, ecology and control. Denton.

Objectives:

1. To record the establishment and spread of the larch casebearer in western larch.

2. To determine the extent of natural control by parasites.

3. To determine the possibilities of biological control by introducting one or more species of parasities known to be effective in the eastern half of the country.

Line Project Number: FS-2-e3-5-INT

Line Project Title: Diseases of forest insects other than bark beetles. Cole.

Objectives:

1. To identify the infectious diseases of important species of forest insects other than bark beetles.

2. To develop methods and techniques for studying these diseases and for propagating and otherwise handling effective ones.

3. To determine the effect of these diseases on their hosts, and the possibility of artifically establishing them in infested stands where they do not occur naturally.

Line Project Number: FS-2-e1-1-INT

Line Project Title: Tree classification based on susceptibility to pine beetles, and selective logging. (Formerly two line projects, combined in revision of 12/17/58) Johnson.

Objectives:

To determine in Forest Service Region 1, (1) the prevalence of high risk trees in typical operable ponderosa pine stands, (2) the rate and cause of subsequent changes in applied risk ratings, (3) the degree to which the western pine beetle will attack trees of different risk ratings, (4) the demonstration of applications of the ponderosa pine risk rating system, and (5) to determine the effectiveness of the risk rating system in preventing outbreaks of the western and mountain pine beetles in old-growth ponderosa pine stands.

Line Project Number: FS-2-e3-2-INT

Line Project Title: Spruce budworm--biology, ecology, and natural control. Cole.

Objectives:

1. To correlate spruce budworm population levels with damage to host tree species, including both growth loss and mortality and to define damage.

2. To determine factors governing rise and fall of spruce budworm populations, measure the effectiveness of these factors, and develop methods of predicting trends from field collected population data.

Line Project Number: FS-2-e1-5-INT

Line Project Title: Douglas-fir beetle--biology, ecology and control. Furniss.

Objectives:

1. To develop a system of sampling populations of Douglas-fir beetle.

2. To develop a system of sampling the natural enemies of Douglas-fir beetle and determining their effectiveness.

UNIVERSITY OF IDAHO

1. The biology of Conophthorus monticolae Hopk. in Northern Idaho. M. S. thesis, nearing completion by D. L. Williamson.

2. The Biology and Ecology of Dioryctria abietella (D & S) in Northern Idaho. In initial phases by J. A. Schenk.

3. Barbara colfaxiana (Kearff) as a pest of Douglas-fir Cones in Northern Idaho. E. C. Clark. Completed. To be published as F.W.R. Exp't. Sta. Res. Note; Spring, 1961.

4. On the Damage Caused by the Engelmann Spruce Weevil in Idaho. E.C. Clark. Completed. Manuscript in process of revision. To be published, probably in Jour. For. in near future.

5. Other projects initiated by Dr. E. C. Clark and in various stages of completion. (Titles are tentative and not those of Dr. Clark.)

   a. Seed Loss in Douglas-fir Attributable to the Douglas-fir Cone Midge, Contarinia oregonensis Foote. Some raw data only. Analysis and completion of this study is scheduled.

   b. Seed Loss in Western White and Ponderosa Pines Attributable to Laspryresia spp. Some raw data. Analysis and completion of this study is scheduled.

   c. Determination of Megastigmus Infested Seed by Flotation Methods. Planning stage only. No future scheduling as yet.

6. The Identification, Biology and Ecology of the Major Cone and Seed Insects of Idaho Conifers. J. A. Schenk. Idaho's contributory project to W-72. (Active).

ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

1. Engelmann spruce beetle--biology, ecology and control.
   R. H. Nagel, W. F. McCambridge

2. Black Hills beetle--biology, ecology and control.
   N. D. Wygant, W. F. McCambridge

3. The biology, ecology, and control of the Douglas-fir tussock moth. M. J. Stelzer

4. Studies of methods for improving the accuracy and efficiency of forest insect ground surveys.
   B. H. Wilford, M. E. McKnight, F. M. Yasinski, John F. Chansler

5. Studies of methods for conducting forest insect surveys from the air.

6. Southwestern, roundheaded, and Colorado pine beetles and associated bark beetles.
   C. L. Massey, H. E. Ostmark

7. Diseases of forest insects other than the bark beetles.
   C. L. Massey, M. J. Stelzer.

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COMMON NAMES COMMITTEE PROGRESS REPORT

The following items were reported by Phil Johnson at the first business session of the 12th Western Forest Insect Work Conference at Berkeley, California on March 1, 1961:

1. Formation of the new Common Names Committee immediately following the 11th Conference in Ogden in March 1960.

2. The Committee Chairman completed review of all correspondence by previous Conference committees and noted tthe actions taken.

3. All Committee correspondence was segregated by years and filed at Missoula.

4. The Committee had for its first business the consideration of a suggested common name "Douglas-fir seed midge" for Contarinia oregonensis Foote, proposed by committee member Alan F. Hedlin, Victoria, B. C.

5. The Committee has under consideration a standardized reporting form for membership use in proposing common names of western forest insects.

6. The Committee chairman mimeographed and distributed to Conference members CNC lists 2A and 3 as a guide in proposing common names.

7. An informal brochure was prepared by the Committee chairman for all CNC members including:

   a. Names of CNC members and Committee chairman for the period 1955-61.

   b. Permanent references dealing with procedures and proposing common names to the Committee on common names, Entomological Society of America.

   c. Lists of suggested common names for some western forest insects (Lists 2A and 3).

   d. A copy of the rules of order covering the business of the CNC of the Western Forest Insect Work Conference.

   e. Definitions of "western", "forest insect", etc., for help in delineating the geographic and subject matter of the CNC committee.

MINUTES OF MEETING OF COMMON NAMES COMMITTEE

The meeting was called to order at 7:00 p.m. by Chairman Johnson in a room of the Hotel Durant. The following committee members were present: Valentine M. Carolin, Jr., Portland; David Evans, Victoria; Norman E. Johnson, Berkeley (Centralia, Wash.); Philip C. Johnson, Missoula, Montana, chairman; George R. Struble, Berkeley; and Bill H. Wilford, Fort Collins, Colorado, ex officio.

Guests present included Charles B. Eaton, Berkeley; George R. Hopping, Calgary; and Charles Schaeffer, Berkeley.

The Committee reviewed the list of 20 names furnished the Committee members earlier this year by Val Carolin and discussed proposed common names. The following action was taken:

1. The Committee approved the following common names:

   Douglas-fir cone moth (*Barbara colfaxiana* (Kearf.))

   Ponderous borer (*Ergates spiculatus* Lec.)

   Emarginate ips (*Ips emarginatus* (Lec.))

   Arizona five-spined ips (*Ips lecontei* Sw.)

   Oregon ips (*Ips oregonis* (Elchh.))

   Monterey pine ips (*Ips radiatae* Hopk.)

   Western drywood termite (*Kalotermes minor* (Hagen))

   Flatheaded pine borer (*Melanophila gentilis* (Lec.))

   Western platypus (*Platypus wilsoni* Sw.)

   Pine needle-sheath miner (*Zelleria haimbachi* Busck)

   Coastal dampwood termite (*Zootermopsis angusticollis* (Hagen))

2. The Committee could not agree on common names for the following forest insects:

   Dioryctria abietella D.&S. (recommended waiting for taxonomic clarification).

   Dioryctria auranticella (Grote) (recommended waiting for taxonomic clarification).

   Malacosoma constricta Stretch (no reason stated; probably Committee opinions too diverse).

   Xylotrechus nauticus (Mann.) (no agreement on any common names proposed to date).

3. The Chairman was instructed to write to Jim Kinghorn at Victoria to seek his opinion on common names for *Gnathotrichus retusus* (Lec.) and *G. sulcatus* (Lec.). Members present indicated a strong inclination to accept any common names proposed by Mr. Kinghorn for these two species.

4. George Struble was directed to contact Dr. Gorton E. Linsley, Berkeley, to check the reported use by Dr. Linsley of the common name "California deathwatch beetle" for *Hadrobregnus gibbicollis* (Lec.) in a 1943 publication. If the use of this common name by Dr. Linsley could be substantiated, there appeared to be favorable sentiment for its adoption by the Committee.

5. George Hopping agreed to furnish justification statements for common names of *Ips* species approved by the Committee at this meeting (See 1 above.).

6. Val Carolin was directed to contact William K. Coulter, Portland, and, together, to consider common names for *Pseudohylesinus grandis* Sw. and *P. granulatus* (Lec.). The Committee indicated a strong inclination to accept any common names proposed by these men for these two species.

7. The Committee agreed to add *Contarinia oregonensis* Foote to the list of names that should receive early consideration for common naming, since the common name--Douglas-fir seed midge--proposed by Alan Hedlin, Victoria, did not meet with Committee approval. Extracted comments of Committee members would be attached.

The Chairman was directed to write to Alan Hedlin and explain the Committee action regarding Mr. Hedlin's proposed common name for *Contarinia oregonensis* Foote.

The Chairman was directed to circularize the Conference membership to obtain its approval or rejection of common names approved by the Committee at this meeting.

The Chairman was directed to search the earlier correspondence of Committee actions to ascertain the reasons for ESA rejection of certain common names proposed by the Conference from List 2A; and to provide Committee members with a list of these reasons and names as a prelude to reconsideration of the proposal.

A suggested form for the proposal of common names of western forest insects by Conference members, previously circulated to Committee members by the Chairman, was discussed. Certain minor changes in format were discussed and the Chariman was authorized to make the necessary changes and to process and distribute the form. It was agreed that copies of the form should be stocked at several locations accessible to the Conference membership. The members are to be notified by the Conference Secretary of the availability of the form and urged to use it in sending common name proposals to our Committee.

The meeting was adjourned at 10:00 p.m.

Respectfully submitted,

/s/ Philip C. Johnson

PHILIP C. JOHNSON
Acting Secretary
Common Names Committee

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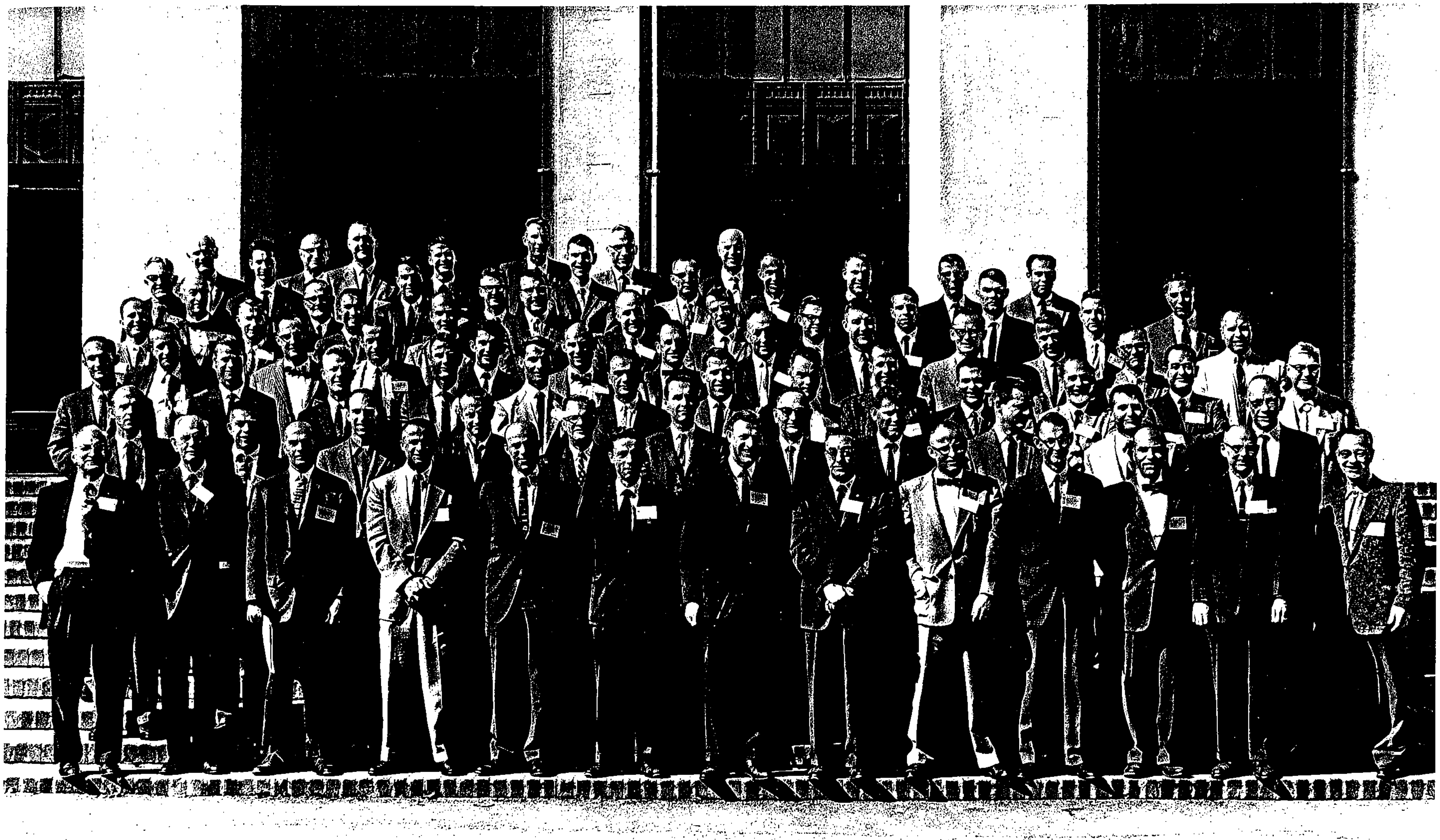

W.F.I.W.C., Berkeley, California - March 1-3, 1961

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6. Tom Harris, Bill McCambridge, William Rose, David Bein, Ned Simmons, Daniel Dotta, John Masson, Don Dahlsten, Eric Jessen, C. J. DeMars.
7. Benton Howard, Russel Mitchell, Edward Sturgeon, Clifford Johnson.
8. Harold Offord, Willis Wagner, Archie Tunnock, Fred Dickinson, W. T. Bailey.