

MY RECOLLECTIONS OF THE FIRST YEARS IN FOREST ENTOMOLOGY

by

H. E. Burke

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MY RECOLLECTIONS OF THE FIRST YEARS IN FOREST ENTOMOLOGY

H. E. Burke

Soon after I graduated from Washington State College in 1902, I received a letter from J. L. Webb who was then in the Black Hills of South Dakota engaged on studies of the Black Hills beetle under an assignment from Dr. A. D. Hopkins of the Bureau of Entomology. This letter informed me that Dr. Hopkins was looking for an assistant in forest insect investigations and that Webb was recommending me for the job. In due time I received an appointment as Field Agent at a salary of \$50 per month which took effect October 1, 1902, with instructions to report to Webb at Elmore, South Dakota. This was the beginning of my work with forest insects under the Bureau of Entomology. What I could not foresee at the time was that for the next 32 years, I would be continuously employed in forest insect investigations and would be treated to the challenging experiences that go with pioneering effort in a phase of entomology that was then relatively new in the western states.

Not long ago, I was requested by Paul Keen and John Miller, who are preparing a summary of investigations of the western pine beetle, to write up an account of the first attempt at western bark beetle control on the Northeastern Oregon Project in 1910. In doing this it seemed pertinent to include other material connected with the early development of forest entomology in the west. In order to keep the story from becoming too long and involved, it was decided to limit it to my own recollections of the projects and the men connected with this work during the years when the Division of Forest Insect Investigations was directed by its first Chief, Dr. A. D. Hopkins. This period covers the years from about 1901 to 1923.

HOW FOREST INSECT INVESTIGATIONS WERE STARTED

To start at the beginning we have to go back to the Hatch Act passed by Congress in 1887. This law appropriated money for the organization of the State Agricultural Experimentations. Most of these stations soon established departments of entomology. The West Virginia Station at the University of West Virginia, Morgantown, decided to establish such a department in 1890. There were two applicants for the position of entomologist. One wanted a salary of \$2,000 (real money in 1890) and a secretary. The other, A. D. Hopkins, offered to do the work for nothing if he were allowed to live on his farm. Hopkins was given the position and started on his official entomological career.

On a trip made through the state of West Virginia in September 1890 Hopkins found great quantities of dead spruce in Randolph County. An examination indicated that bark beetles were the cause. This discovery caused Hopkins to make further investigations in the forests of the State which started him on the road to becoming the Father of Forest Entomology in the United States. A trip was made to Europe in 1892 to collect specimens of the European bark beetle destroyer, *Clerus* (*Thanasimus*) *formicarius* L., for introduction into the forests of West Virginia to prey on the southern pine beetle.

As the leading authority in the United States on forest entomology, Hopkins was chosen by the Division of Entomology, U. S. Department of Agriculture, to make an investigation of the Pacific Coast forests during the summer of 1899. On this trip he found the western pine beetle and the mountain pine beetle killing numbers of trees in the pine forests of California, Oregon, Washington and Idaho.

One stop on the trip was at the Washington State College at Pullman. Here Hopkins visited C. V. Piper, entomologist of the Washington Experiment Station. Together they made a trip into the pine forests of western Idaho to study various insects, one of these the western pine beetle.

As a result of this trip, Piper induced one of his students, J. L. Webb, to take up forest insects as a major. Webb, therefore, was probably the first college student of forest insects in the United States. Webb collected forest insects in western Idaho during 1900 and 1901 and in studying them corresponded with Hopkins.

In 1901 the Chief of the Bureau of Forestry of the Philippines requested Gifford Pinchot, Chief of the Bureau of Forestry of the U. S. Department of Agriculture, to get him a forest entomologist. Pinchot passed the request on to Hopkins who replied there were none, but that he would train one if given time. This suggestion was followed and Webb, the only known student, was appointed a field assistant in the Bureau of Forestry in the fall of 1901 and sent to Hopkins at the University of West Virginia to train for the Philippine position. As a side light, it should be said that Webb did not know that a field assistant was supposed to have expenses, so he worked the winter of 1901 at \$25 per month and subsisted himself.



ANDREW DELMAR HOPKINS, 1857-
Washington, D. C. March 1909

Dr. A. D. Hopkins was the first chief of the Division of Forest Insect Investigations and directed this work in the Bureau of Entomology from 1902-1923. Previous to that he had been: farmer, 1877-1890; entomologist, West Virginia Experiment Station, 1890-1902 and vice-director, 1897-1902; Professor of Economic Entomology, University of West Virginia, 1896-1902; author of many bulletins on insects and holder of many scientific honors. He has often been called the Father of Forest Entomology in America.

Hopkins' experience in western forest areas was limited to brief trips. In 1899 he made a trip out of Washington, D. C., lasting from April 9 to June 17, in which he visited areas in California, Oregon, Washington and Idaho, which was quite remarkable in its results. In this short period he collected 4,363 specimens and took 760 notes. Later developments showed that he had uncovered and correctly interpreted most of the important forest insect problems of the region. As a result of this trip, he published "A Preliminary Report of the Insect Enemies of Forests in the Northwest." In 1902, 1903, 1904 and 1905 he made trips into the Black Hills, Pacific Coast, Colorado and southwestern areas. In 1911 he visited the Northeastern Oregon Project and areas in northern California. His last trip to the west was made in 1915 when he made the rounds of western field stations.

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The appointment of Webb by the Department of Agriculture to work on insects under Hopkins stirred Howard, Chief of the Division of Entomology, into action. He started to work toward the establishment of an Office of Forest Insect Investigations in the Division.

In the meantime the Black Hills Beetle had started its destructive work in the yellow pine forests of the Black Hills of South Dakota and Wyoming.

In May 1902 Webb was appointed an Assistant Forest Expert in the Bureau of Forestry and sent to the Black Hills to investigate the trouble under the direction of Hopkins, who was to be appointed July 1 Chief of the new Office of Forest Insect Investigations in the Division of Entomology.

Since Webb was expected to take the Philippine position, an assistant to take his place was needed. I had collected some with Webb in 1900 and 1901 and was recommended by him for this appointment. Being already in the Division of Entomology on a three-month appointment to work on the codling moth at Boise, Idaho, I was appointed October 1, 1902, as Special Field Agent of the Division, to investigate the damage to forests and forest trees by insects and was sent to the Black Hills to receive training from Webb. On November 1, 1902, I was appointed an Assistant Forest Expert in the Bureau of Forestry and ordered to Washington to work on forest insects under Hopkins, following Webb in by about a week.

The Office of Forest Insect Investigations therefore completed its first six months with Dr. A. D. Hopkins, an appointee of the Division of Entomology, in charge with J. L. Webb and myself, appointees of the Bureau of Forestry, as assistants. During the spring of 1903, W. F. Fiske, Assistant State Entomologist of Georgia, was appointed a special field agent in the Division of Entomology and assigned to work on forest insects under Dr. Hopkins. All expenses for the work were paid by the Bureau of Forestry.

This organization continued until July 1, 1904, when the Division of Entomology became a Bureau and Webb and I were transferred from the Bureau of Forestry to the Bureau of Entomology. Webb did, however, spend the field season of 1903 in the Philippines as an appointee of the Philippine Bureau of Science.

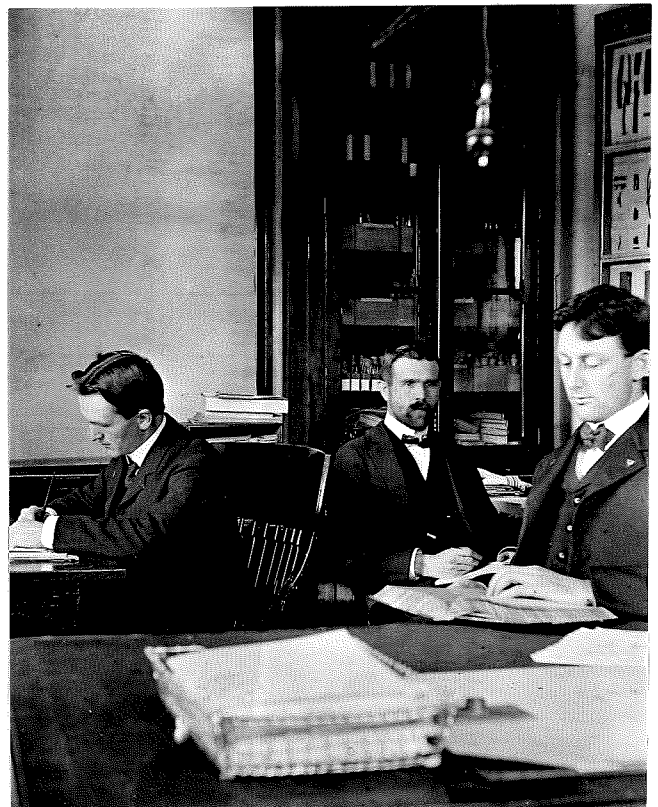
It was during the winter of 1902-03 that Dr. Hopkins suggested to Webb and myself that each of us specialize on some important family of forest insects as Hopkins had specialized on the Scolytidae. Webb selected the Cerambycidae and I the Buprestidae. Dr. Hopkins also submitted a plan for dividing the United States into four major forest areas for forest insect field work with a man specializing on the insect problems in each area. The areas suggested were the Eastern, the Southern, the Rocky Mountains, and the Pacific Coast. Webb took the Rocky Mountain region due to his experience with the Black Hills beetle and in the yellow pine forests of Idaho. I selected the Pacific Coast mainly because I was from that section and already familiar with some of the conditions.



THE FIRST OFFICE OCCUPIED BY FOREST ENTOMOLOGISTS IN THE OLD
INSECTARY, U. S. DEPARTMENT OF AGRICULTURE. Washington, D.C.
December 1902

(Seated left to right) H. E. Burke, Assistant Forest Expert; J. L. Webb, Assistant Forest Expert; and A. D. Hopkins, in charge of Forest Insect Investigations. Standing in background is F. C. Pratt, Assistant in Truck Crop Investigations.

Another picture in the same office in, 1902 shows Webb (left), Lee and Burke. Lee was the first stenographer and clerk employed by Hopkins. He worked for one winter only and was replaced by E. C. Wood.





PIONEER FOREST ENTOMOLOGISTS AND FOREST PATHOLOGISTS
Black Hills, South Dakota. July 1902

(Left to right) J. L. Webb, Assistant Forest Expert; Dr. Hermann VonSchrenk, in charge of Forest Pathology, Bureau of Plant Industry; Burns, Assistant in Forest Pathology; Dr. A. D. Hopkins, in charge of Forest Insect Investigations.

The epidemic of the Black Hills beetle, which ran from about 1898 to 1907 in South Dakota, was the first case of western bark beetle depredations to receive serious attention from foresters. It resulted in the heavy killing of ponderosa pine. The Black Hills outbreak so impressed Gifford Pinchot that he took aggressive action which finally resulted in the establishment of the Division of Forest Insect Investigations.

As a result of the studies that were made in the Black Hills, control methods were devised and a limited amount of control work was done. The epidemic soon subsided, however, and no field stations were set up for continued studies in this area.

EXPLORATORY WORK IN THE WESTERN FORESTS, 1903 - 1910

In April 1903 I left Washington with orders to proceed to the Grays Harbor country of western Washington and establish a station whose field of operation would be Washington, Oregon and California. The main projects were to determine (1) the span worm that had defoliated large areas of hemlock and spruce about 1891, (2) the maggot or other insect that causes the injury to living hemlock and produces a defect in the wood known as black check, (3) the bark weevils that cause damage to reproduction of spruce, fir and other conifers and (4) the bark and wood-boring insects that damage Douglas-fir.

The station was established at Hoquiam, Washington. About all that could be found out about the span worm was that it had occurred a number of years before and had done a lot of damage. Some old snags were found in the Hoquiam River basin that were said to be the remains of trees killed by the span worm. The hemlock bark maggot was found and cages were placed on the trees to rear the adults. A similar bark maggot was found in the bark of the grand fir. Several species of bark weevils were found. Among these was a new species that severely injured the terminals of Sitka spruce. Various types of girdled trap trees of Douglas-fir, Sitka spruce, western hemlock and Pacific red cedar were made at regular intervals throughout the season and numerous insects and notes on their biology were collected. Trips were made to Willapa Harbor, Pialschie and to Moscow, Idaho, to study forest insects at these places.

The winter of 1903-04 was spent in Washington, D. C., working on reports and on collections of insects made during the summer.

For the field season of 1904 I returned to Hoquiam, Washington, with trips to Palo Alto, California, Snoqualmie, Smiths Ferry, Idaho, Elmore and Nemo, South Dakota, and St. Louis, Missouri. This season I succeeded in rearing the adults of the hemlock bark maggot and the grand fir bark maggot and determined the main points in the biologies of these insects and of the Pissodes in the spruce terminals. A Pissodes working in the basal bark of young spruce and one in the basal bark of Douglas-fir were also studied. Many observations were made on numerous other forest insects such as the bark beetles, the wood-stainers and the wood-borers. The western oak span worm was studied and reported in epidemic form for the first time. At Smiths Ferry, Idaho, a new Pissodes was found in the terminals of Engelmann spruce and a study was made of an epidemic of the western pine beetle in a commercial stand of yellow pine and of the Douglas-fir beetle in a commercial stand of Douglas-fir. This was probably the first study made of such epidemics.

On July 1, 1904, the Division of Entomology was made a Bureau and I was appointed temporary Field Agent transferred from the Bureau of Forestry. This was a promotion in salary from \$600 to \$1200 per annum and was the realization of one of my youthful ambitions to have a government job at \$100 per month.

The winter of 1904-05 was spent in Washington, D. C., as before. The main feature was the publishing of U.S.D.A. Circular No. 61 "Black check in western Hemlock." This was the first scientific paper that I published.



THE WASHINGTON OFFICE, 1904-1906

In 1903 Dr. Hopkins moved his office from the Insectary to these quarters in a private building at 904 B Street, S. W. In this office practically all of the work was done on the *Dendroctonus* and *Pissodes* bulletins. This room was occupied until 1908. Left to right in this picture are W. F. Fiske, Special Agent for the Southern States; E. C. Wood, clerk and stenographer; Dr. A. D. Hopkins; J. L. Webb, Special Agent for Rocky Mountain States; J. F. Strauss, Artist; and H. E. Burke, Special Agent for Pacific Coast States.

On the grounds of the National Museum are seated (left to right) Strauss, Webb and Burke. Standing are Van Horn and Wood. Van Horn came into the Division as a Preparator and was rated as an entomologist of great promise. He mysteriously disappeared in February 1909. No trace of him was found but it was suspected that he was drowned in the Potomac River.





FOREST INSECT INVESTIGATIONS, WASHINGTON, D.C.
November 21, 1905

(Left to right) W. F. Fiske, Phillips, and J. L. Webb. In 1903 W. F. Fiske, then Assistant State Entomologist of Georgia, was appointed by Hopkins as a Special Field Agent to study the forest insect problems of the Southern States. He continued on this assignment for a few years only and was then transferred to the Gipsy Moth work in the New England States. Fiske became well known for his work on the introduction of parasites of the Gipsy and Brown Tail Moths.

Phillips was in charge of Bee Culture for the Bureau of Entomology.

Part of the field season of 1905 was spent at Hoquiam and Pialschie with a trip to Rainier in August. The main feature of this season's work was the finding of the larva of the cedar pole borer which was damaging many standing red cedar. We now knew that the borer was a flathead, but which one? A new *Pissodes* was found infesting the alpine fir on Mt. Rainier and the mountain pine beetle was found to be killing western white pine at Longmires.

Since it was thought that the main facts about insects in the forests of the Pacific Northwest had been determined and because Dr. Hopkins had found extensive bark beetle damage to yellow pine and sugar pine on a trip to the Yosemite in 1904, it was decided to move the Pacific station from Pialschie to California in 1906. Professor J. H. Comstock's report that on a trip to the Yosemite in 1905 he had seen a great flight of small moths and much dying lodgepole pine probably had its influence too.

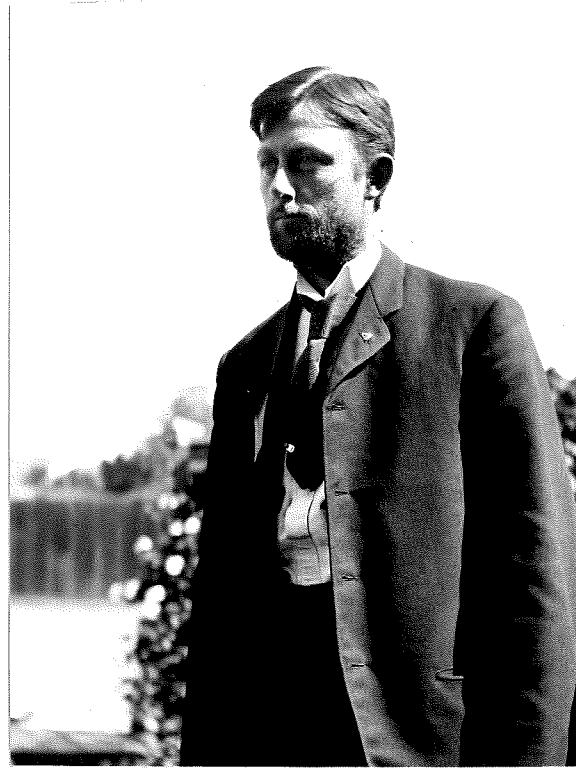
During April 1906 I completed some observations at Pialschie which included the finding of fragments of a *Trachykele* beetle indicating that a species of *Trachele* might be the borer of the living cedar. The move to California was made early in May shortly after the San Francisco earthquake. After a few weeks at Palo Alto I went to Wawona. I spent a week there, ten days in the Mariposa Grove of Big Trees, and then established temporary headquarters at Summerdale (now known as Fish Camp). Many insects were collected and infested trees marked for further study. Small sugar pine and yellow pine were cut for trap trees. The period from July 10 to August 11 was spent in the Yosemite with one week in the little Yosemite and one week in the Tuolumne Meadows. The return to Fish Camp was made August 12 and the investigations continued there until September 17.

One of the principal results of the season's work was the discovery in the Mariposa Grove that *Trachykele* was the destructive borer of the Pacific red cedar. The Yosemite may seem a long ways from the red cedar forests of the Pacific Northwest, but we already had the boring larvae and only needed to connect it with the adult to determine the species. The finding of *Trachykele opulenta* larvae and young beetles in a small Sequoia in the Mariposa Grove proved that the borer of red cedar was also a *Trachykele*. And the fact that *Trachykele blondeli* beetles were found in the red cedar forests indicated that species was the one causing the damage.

The western pine beetle was found killing scattering yellow pine in both Fish Camp and the Yosemite areas. The mountain pine beetle was found killing scattering sugar pines and yellow pines in the Fish Camp area and large numbers of lodgepole pines in the Little Yosemite just north of Lake Tenaya and around the Tuolumne Meadows. No needleminers were found, but the foliage of the trees on some areas looked thin and abnormal.

One important discovery in 1906 was a new species of *Dendroctonus (jeffreyi)* which was killing Jeffrey pine around the top of Yosemite falls and in the Little Yosemite.

At Fish Camp an epidemic of the fir tussock moth (*Notolophus osleri*) was studied and numerous parasites reared. The defoliation of the tops of many



At Palo Alto, California, after field season in the Yosemite country. September 19, 1906

HARRY EUGENE BURKE, 1878- . Special field agent in codling moth investigations, July 1-September 30, 1902; special field agent, assistant forest expert, temporary field agent, expert and agent, entomological assistant, assistant in forest entomology, specialist in forest entomology, associate entomologist, entomologist, and senior entomologist in Forest Insect Investigations from October 1, 1902 to June 30, 1932. In charge of forest insect investigations in Pacific States 1903-1907; specialist in flathead borers 1907-1910; in charge of northeastern Oregon bark beetle control project 1910-1911; in charge of Forest Insect Station 5 1911-1913; in charge of Pacific Slope Station 1913-16; in charge of shade tree insect laboratory at Los Gatos, California, and Stanford University 1916-1925; forest insect investigations in national parks 1925-1930; shade tree insects 1930-1932; shade tree insects in Division of Fruit and Shade Tree Insects 1932-1934; retired without prejudice June 30, 1934. Author of numerous papers on flathead borers, forest insects, shade tree insects, and co-author of the book "Forest Insects" in the American Forestry Series.

large white firs caused the death of a large percent of the tops and the loss of the seed crop for that year.

After a few weeks at Palo Alto in late September and early October studying the insects of Monterey pine and the Monterey cypress, I returned to Washington, D. C., October 17. The winter of 1906-07 was spent as usual working up the notes taken during the summer and in classifying and filing the insects and the information about them. A special study was made of the Buprestidae, particularly of the larvae. This included a key to the various genera.

The field season of 1907 from May 31 to October 24 was given over to a series of studies in northern and southern Utah with trips to Joseph, Oregon, and to Palo Alto and Pacific Grove, California. The results of the 1907 season were the recording of numerous observations and the determination of important points in the biology of the mountain pine beetle, the western pine beetle, and the red turpentine beetle. A new *Pissodes*, afterwards described as burkei by Dr. Hopkins, was discovered attacking the trunks of living alpine fir near Kamas, Utah. An infestation of the mountain pine beetle found near Joseph, Oregon, was one of the starting points of the great northeastern Oregon epidemic which killed millions of lodgepole and yellow pines during the next five years.

The winter of 1907 and practically all of 1908, 1909 and the first four months of 1910, except for occasional short field trips, were spent in Washington, D.C. working on the numerous notes and specimens collected during the first five years of forest insect investigations.

One of the field trips during this period included Custer, South Dakota, August 21-24, 1908, to study the end of the great Black Hills beetle epidemic. All that could be determined was that the epidemic appeared to be over. Only seven infested trees could be found. I also visited Anaconda, Montana, from August 27 to September 7 on the same trip to investigate the relations of forest insects to the killing of trees and other vegetation around the smelter areas. The conclusions were that the insects had practically no relation to the smelter-killed trees. Most forest insects were very scarce, seemingly due to being scattered through a great amount of slowly dying timber. The report on this investigation was used as evidence in several suits for damages caused by the smelter smoke.

Thus far in this autobiography I have retraced some of the trails which I followed in western forest entomology from 1902 up to the spring of 1910. This was largely a period of exploration of the field to locate the more important problems. After this period the Bureau of Entomology began to develop both control and research programs in the western forests.

This account brings us up to the Northeastern Oregon Bark Beetle Control Project which was the first large undertaking of its kind in this country and marked the beginning of a considerable expansion of the Division of Forest Insect Investigations. It seems best to interrupt the biographical sketch at this point in order to give an account of the Northeastern Oregon project itself and of some of the men who were connected with it.

THE NORTHEASTERN OREGON BARK BEETLE CONTROL PROJECT



FIRST OFFICE OF PROJECT AND FIELD STATION. BAKER, OREGON
September 1911

(Left to right) W. B. Turner, Special agent in charge of cooperation with private owners; and H. E. Burke, Agent and expert in general charge of the project.

a. Developments during the fall of 1910.

The Northeastern Oregon Forest Control Project really started August 17, 1907, when at the request of Supervisor Howard O'Brien of the Imnaha (Wallowa) N. F. I examined dying lodgepole and yellow pine on the divide between Little Sheep and Big Sheep Creek near Joseph, Oregon. The mountain pine beetle was found to be the main depredator, but the western pine beetle was also present in the yellow pine. During the preceding three years, 90 to 95 percent of the lodgepole and much of the yellow pine had been killed on an area of over 100,000 acres.

During the spring of 1910 W. C. Calder, an agent of the Wallowa Timber Company of Warren, Pennsylvania, stationed at Baker, Oregon, became alarmed at the dying yellow pine near Baker and started a movement among the private owners to have something done about it. From the Forest Service he heard of the Office of Forest Insect Investigations and started corresponding with Dr. A. D. Hopkins. Forest Ranger W. D. Edmonston of Colorado and I were ordered to Baker to represent the Bureau of Entomology at a meeting of private owners, forest

officials and others interested in protecting the timber. Private owners from Baker, La Grande, Portland and Spokane were present and forest officers from Portland and Sumpter (Whitman) National Forest.

May 15, 1910, the party traveled to Anthony Creek in the Whitman National Forest and examined the infested timber. The mountain pine beetle was found to be the main depredator in both the lodgepole and the yellow pine. The western pine beetle was found in the yellow pine, especially in the larger trees, usually in the bark left unattacked by the mountain pine beetle.

May 16 the party went to Austin on the divide between the Powder and the John Day rivers. Around Austin where the forest was mostly yellow pine the dying timber was rather scattered and mostly the work of the western pine beetle.

As a result of these meetings, Forest Assistant B. T. Harvey and Forest Ranger R. E. Smith were detailed to work under my supervision and make examinations of the Wallowa National Forest and the Whitman Forest to determine just where the infestations were and just how many trees were infested. Ranger Edmonston went to Medical Springs to examine the timber on private holdings adjacent to the Wallowa Forest.

Following these meetings, I moved to Sumpter to make headquarters for the project and to demonstrate to the private owners and visiting forest officials the infesting insects and their work. Investigative trips were made through the infested areas in both the Whitman and the Wallowa Forests.

By July 1 it was determined that the infestation was widespread, involving at least 2,000,000 infested trees, and that the infesting insects were so far advanced that no effective control work could be done on the 1909-1910 infesting broods. It was decided to spend the summer studying the infestation and working with the various owners to convince them that a cooperative control project was practical against the infestation developing during the 1910 season.

Forest Ranger Edmonston was made an Agent and Expert in the Bureau of Entomology and transferred from the Forest Service. Edmonston arrived in Baker several days before May 15, 1910, and in company with the Whitman Forest officials examined the infested area west of Baker and selected the Anthony Creek area as the proper one for demonstrating to the private owners the seriousness of the infestation. After the trips with the private owners and others to Anthony Creek on the 15th and to Austin on the 16th, Edmonston spent some time at Medical Springs examining private holdings on the Wallowa Forest. Later trips were made through both the Wallowa and Whitman Forests. After July 1, when it was decided that no control would be undertaken against the 1909 broods, Edmonston spent most of July and August at Sumpter and Joseph cruising infested areas. About September 1, Sumpter was made his headquarters and he cooperated with the forest officials in working up plans for fall control.

August 3, Agent W. B. Turner of the Bureau arrived from Washington, D. C., with instructions to work with the private owners of timber and help them to organize and work for an appropriation for forest insect control work in the area.

September 1, Baker was made headquarters for the project and Turner and myself located there.

September 18, various private timber owners organized the Baker Forest Protective Association and determined to undertake forest insect control.

Control work started on the Northeastern Oregon Project on October 28, 1910, with the establishment of one camp by the Baker Forest Protective Association in private timber at Cold Springs near Lockharts and one camp by the Forest Service in the Whitman National Forest on Wind Creek near Sumpter.

The primary object of these camps was the training of cruisers and foremen for the main control camps that were expected to be started in the spring of 1911 and to experiment with several methods of control.

The Association camp consisted of E. L. Gerber, manager; E. J. Maberry, cruiser-foreman; four woodsmen; one cook; Agent W. B. Turner; and Expert H. E. Burke. One of the woodsmen, J. J. Sullivan, became an entomological ranger and was with the Bureau for a number of years.

Instruction started immediately with the cruising of the timber and the plotting and marking of the infested trees. After six days of cruising instruction was given in the proper methods of destroying the infesting insects. Infested trees were felled and peeled, felled and scored on top, and felled and burned. Cruising was then continued until November 12 when treatment was taken up again and continued until November 27 when a deep fall of snow caused the closing of the camp for the winter.

The Forest Service camp was composed of Ranger R. E. Smith, manager; from 2 to 13 woodsmen; one cook; and Expert W. D. Edmonston. On reporting for work on October 27, the men were instructed in the determination of insect-infested trees and in the methods of treating them by Expert Edmonston and Ranger Smith. Due to the heavier infestation, most of it in lodgepole, spotting and treating went on together. Edmonston could mark enough infested trees in a few hours to keep the crew busy treating for a day or more. The camp was closed November 19 because of heavy snow.

The Association covered 3,640 acres and treated 723 merchantable trees and 130 saplings at a cost of \$806. One hundred of the trees treated were lodgepole. The Service covered 340 acres and treated 1,120 trees; 1,056 of the trees treated were lodgepole, 61 were yellow pine, and 3 were white-barked pine. The 61 yellow pine were merchantable, but most of the others were not considered so though many of the lodgepole were large and looked like good timber

b. Control work during the spring of 1911.

I spent the winter of 1910-11 in Baker, Oregon, consulting with timber owners and working up data and plans. Edmonston stayed in Sumpter at the headquarters of the Whitman Forest to assist the forest officers. Turner returned to Washington to help present the project to the Bureau and to Congress.

February 8 and 9 Edmonston and I made a trip to the Highland Mine in the mountains east of Haines. Fifty percent of all of the lodgepole over 10 inches in diameter were found infested by the mountain pine beetle and a number of Engelmann spruce by the Engelmann spruce beetle.

During the winter Congress appropriated money for forest insect control and on March 8, \$15,000 was allotted to the Whitman.

Dr. Hopkins spent March 25-30 at Baker looking over the project area and talking over plans for the work. Agent Turner arrived in Baker April 1 and started at once to work up cooperation among the owners and to assist the Baker Forest Protective Association.

Control work started April 5, 1911, with the establishment of Forest Service Camp 1 on Deer Creek near Sumpter. Camp 2 was started April 6 on Anthony Creek near North Powder. These two camps were used as training camps for training foremen and cruisers for the other camps. Edmonston had charge of the control work in the field for the Bureau and Assistant Ranger Ephraim Barnes for the Forest Service.

Additional camps were started from time to time until nine camps in all were working. As soon as one area was worked, the camp was moved to another. In all, 28 camp areas were worked.

May 3 the Baker Forest Protective Association started its 1911 control work by establishing a camp on Sutton Creek under the management of L. D. W. Shelton. Small mobile camps were sent out from this camp. May 26 a camp was established at Cold Springs, but due to lack of funds this camp was turned over to the Forest Service on May 28 and became Camp 7.

Control work was continued by the Forest Service to June 30 when all of the camps were closed. The Association continued until July 10.

While the control work was in progress, my time was largely spent demonstrating and explaining the work to the various visiting owners and officials. Owners from as far away as Warren, Pennsylvania, visited the project. Among these were E. D. Wetmore, President of the Wallowa Timber Company of Warren, Pennsylvania, W. B. Sellers of the Shevlin Lumber Company, Secretary C. S. Chapman of the Oregon Forest Fire Association, State Forester Elliot of Oregon, District Forester Cecil of District 6, Dr. Hopkins from April 11 to 16, and many small owners, newspaper men, etc.

Several companies sent cruisers to be instructed in the work. These men worked in the camps as regular employees. Among them were E. J. Maberry and E. V. Gerber of the Wallowa Timber Company, William Long of the Inland Lumber Company of Spokane, J. B. Larsen of the F. A. Kribs of Portland. Josef Brunner of Forest Insect Station 1 sent Lew Thomas, Hugo Kneiff and Al Wagner to assist in the work and receive training.

The organization as carried out was composed of myself in general charge for the Bureau of Entomology, Forest Supervisor Henry Ireland for the Forest Service, and Cruiser L. D. W. Shelton for the Association. The actual

NORTHEASTERN OREGON BARK BEETLE CONTROL PROJECT



Examining mountain pine beetle infested ponderosa pine, Miner Creek area, Whitman National Forest, near Sumpter, Oregon. April 16, 1911. Dr. A. D. Hopkins in center with control crew.



Preliminary training camp. (Left to right) Woodsman Stockburger, Agent and Expert H. E. Burke, Woodsman J. J. Sullivan, Woodsman Ike Miller, Cruiser-foreman E. J. Maberry, and Woodeman Henkel.

NORTHEASTERN OREGON BARK BEETLE CONTROL PROJECT



Control camp of the Baker Forest Protective Assoc. Fall of 1910.



Reconnaissance of control area, July 1911. On the summit of Elkhorn Mountain are (left to right) F. C. Craighead, an unidentified agent, and P. D. Sergeant.

P. D. Sergeant was engaged by Edmonston as a worker on several control projects in Colorado before coming to the Northeastern Oregon project in April 1911. He had previously been a deputy United States Marshal in Oklahoma. He was a special cruiser assistant to Edmonston until July 1911 when he was appointed as Agent. He moved with Edmonston to the station at Klamath Falls, Oregon, in the fall of 1911 and was later assigned to the station at Ashland, where he remained until November 15, 1924. He resigned to take a job as foreman for the McCloud River Lumber Company on bark beetle control projects, but after a year or so with the company joined the Water Department of the City of Ashland.

managers of the control work in the field were Expert W. D. Edmonston for the Bureau, Assistant Ranger Barnes for the Service, and Cruiser Shelton for the Association.

Edmonston directed the work in the field, placing the camps and instructing the cruisers and foremen. Barnes and Shelton supplied the men, equipment and provisions and moved the camps.

Each camp was composed of one camp foreman, from one to three cruisers, three crew foremen, from 6 to 14 woodsmen, one cook, and sometimes a cook's helper. The treating crews were composed of a crew foreman, two woodsmen and additional men to pile brush when that had to be done.

The standard wage for a camp foreman was \$3 per day and board, for a cruiser \$2.75, a crew foreman \$2.50, a woodsman \$2.25, and a cook \$75 per month.

The control work covered 109,610 acres, parts of 22 townships, along the eastern edge of the Whitman National Forest in Baker and Union counties. The Service covered 94,890 acres, about 35,000 acres being government land and 59,890 private. The Association covered 14,720 acres, all private.

The Service treated 11,403 (2,914,130 board feet) of yellow pine and 15,170 (1,295,960 board feet) of lodgepole. The Association treated 2,265 yellow pine and 3,728 lodgepole, total board feet 610,310.

The maximum number of trees treated per section was 571 yellow pine and 1,074 lodgepole; the average number treated was 62 yellow pine and 207 lodgepole.

The total cost of the spring control was \$25,582.97 of which \$2,000 was spent by the Association. To this, to get the total cost of the project, should be added the \$1,681.55 spent for fall work.

The control work demonstrated conclusively that in this infestation the mountain pine beetle was the insect responsible for the damage to all species of trees - yellow pine, lodgepole pine and white-bark pine. The western pine beetle was sometimes present, but practically always under conditions which indicated that it had attacked the tree after it had been attacked by the mountain pine beetle. The western pine beetle never was found in the young yellow pine, lodgepole pine nor white barked pine. In a few instances, the red turpentine beetle seemed to be the primary cause of the death of lodgepole.

Apparently the infestation of the mountain pine beetle first became epidemic in the lodgepole pine and then spread upward into the white bark pine and downward into the yellow pine.

In June orders were received to recommend 10 men for appointment as agents to the Bureau. A. G. Angell, C. C. Goodpasture, George Hofer, Hugo Kneiff, Ike Miller, J. D. Riggs, Phil Sergeant, J. J. Sullivan, Lew Thomas and Al Wagner were recommended and appointed.

When the project closed I was ordered to take charge of Forest Insect Field Station 5 at Yreka, California, and to take with me Angell, Sullivan and Riggs. Edmonston was placed in charge of Station 6 at Baker with Goodpasture,

Hofer, Miller and Sergeant. Kneiff, Thomas and Wagner were ordered to report to Josef Brunner in charge of Station 1 at Columbia Falls, Montana. Agent Turner was ordered to Station 7 at Spartanburg, South Carolina. He took with him Hamilton Farnum who had been taking notes on the infesting insects during the control work. Farnum was later appointed an agent and worked for the Bureau for several months at Spartanburg and at Washington.

During July and August, Edmonston and his crew made a survey of the control area to determine the amount of new infestation that was developing. F. C. Craighead, now the chief of the Division of Forest Insect Investigations, was a student assistant for the summer and spent some of his time with this survey. This was his first experience in the forests of the Pacific Coast. *Nov - 1910*

c. Some of the Cooperators

The Private Owners

W. C. Calder probably was the main personnel reason for the Northeastern Oregon Control Project. As the agent at Baker for the Wallowa Timber Company, Calder became alarmed at the dying of the timber and did something about it.

Calder was about 40 years of age in 1910, a native of the middle west, very good looking and always well dressed. His reputation was a little shady, he having been a dealer in mining stock, insurance and particularly in investing money for more or less rich widows wherein the widow usually lost the money. At the time of the project, Calder was married to the widow of Mason of Holly, Mason and Marks, the leading hardware dealers in Portland.

As agent for the timber company, it was Calder's duty to buy timber land and to look after the timber, fire protection, etc. It was the same old cut-throat game of buying your timber so you could surround an area and prevent the other fellow from getting in or having a way of getting his timber out without paying you for the privilege.

At the time of the project the only way to get timber out was by railroad and the only railroad into the timber near Baker was the Sumpter Valley. This road was supposed to be a common carrier but it was owned by the Mormon family of Eccles of Utah. This family owned timber lands in the Baker section, at Hood River and other points so had considerable influence. Cars were often short when other owners desired to get out their timber. This caused considerable friction between the Mormons and other owners of timber which made it rather difficult to form a cooperative project among the various timber owners. Calder, in particular, was in bad because he had said a great deal about the Sumpter Valley and the Mormons.

Calder, however, was all energy and enthusiasm and with the aid of Turner did get the various owners together. The Baker Forest Protective Association was formed and 3 or 4 thousand dollars was collected. Calder also kept after the Forest Service and the Bureau until they got behind the project.

E. L. Gerber, the Association manager for the 1910 fall control work, was about 25. He came from a circus family and was born on the road. Gerber was a timber land lookout for Calder and had some cruising experience. As manager for

the control work, he hired the personnel and saw that the camp was supplied and outfitted. He also did some insect spotting of infested trees. One of the men hired was J. J. Sullivan who became an entomological ranger for the Bureau.

E. J. Maberry, the cruiser-foreman for the 1910 Association control work, was also about 25 and a native of southern Idaho where his father was a horse raiser. Maberry seemed to know his work well having had cruising experience with the Warren Timber Interests in New Mexico as well as in Oregon. While Gerber was strickly a Calder man, Maberry had been trained by Shelton and was more of a Shelton man. In a way it looked as though the Company was playing safe and had Shelton keeping an eye on Calder. Maberry worked under Shelton in the 1911 control work carried on by the Association.

L. D. W. Shelton, manager of the 1911 Association control work, was about 65 at the time of the project. He was an experienced surveyor and timber cruiser and had made the original surveys for parts of western Washington. The town of Shelton on Puget Sound was named for him. Shelton was a good field manager but did not think much of Calder, the Bureau, or the Forest Service so ran the control more or less on his own.

Mr. E. D. Wetmore, president of the Wallowa Timber Company, was about 50 and a man of wide business interests. He was a good backer of the project and reported to Washington that he was well satisfied with the way the control was conducted.

The Forest Service

At the time the project started in 1910, C. S. Chapman was the District Forester of District 6 of which the Whitman and the Wallowa Forests were a part. Chapman was a trained forester who had considerable training and experience in various parts of the United States. He was a good cooperater and did all that he could to make the work a success. Later he became the secretary of the Oregon Forest Fire Association and then worked for the Weyerhaeuser Timber Company in Washington State until his death a few years ago.

George H. Cecil was the Associate District Forester of District 6 at the time the project started. He visited the project several times, but was not as good a cooperater as Chapman and did not favor the control work. Cecil followed Chapman as District Forester. Later he became Supervisor of the Angeles Forest in District 5 and then forester for the Los Angeles Chamber of Commerce which position I believe he still holds.

Henry Ireland was supervisor of the Whitman National Forest with headquarters in Sumpter. Ireland was about 50 years of age and one of the old Interior Department political appointees. He was a carpenter by trade in west-central Oregon and when appointed fought forest fires by riding up to the fire on a horse with his rifle on his shoulder and watching the timber burn. This was the usual method of forest fire fighting in those days. Soon after the start of the century, however, methods improved and forestry became a profession. Ireland made good and soon rose to the position of

supervisor of the Whitman National Forest which contained several areas of very good yellow pine accessible to a good market. Ireland was a good co-operator, but did use the bark beetle infestation to increase his timber sales. The more receipts the more important the position. He remained the supervisor of the Whitman until his death about 1918.

The forest assistant on the Whitman was M. L. Merritt. Merritt was a forestry graduate of the Iowa State College and had been in the Philippine Forestry Service. He was much interested in the insect work, but became seriously ill and was in the hospital most of the time during the project. Merritt afterward transferred to Alaska and later became assistant regional forester in charge of operation for Region 6.

Three of the rangers on the Whitman were R. E. (Kan) Smith, Ephraim Barnes and H. B. Rankin. Smith was a Kansas boy who had joined the Service without any previous forestry experience. He was a serious student, however, and had taken several short courses in forestry. He made the original insect survey on the Whitman and had charge of the 1910 control work for the Service. He did not like control work so was transferred to other work in 1911. Later he transferred to Alaska and was there for a number of years.

Barnes was a young middle westerner, also without technical forestry training. He was made manager of the 1911 control work for the Service, but in the middle of it was promoted to be Supervisor of the Ochoco Forest with headquarters at Prineville in central Oregon. Afterwards he was made supervisor of the Minam Forest with headquarters at Baker. Later, about 1918, he left the Service.

Rankin was an older man who had been a railroad station agent before joining the Service. He saw something of the infestation and the control work but was transferred to western Oregon where he became Supervisor of the Siuslaw Forest.

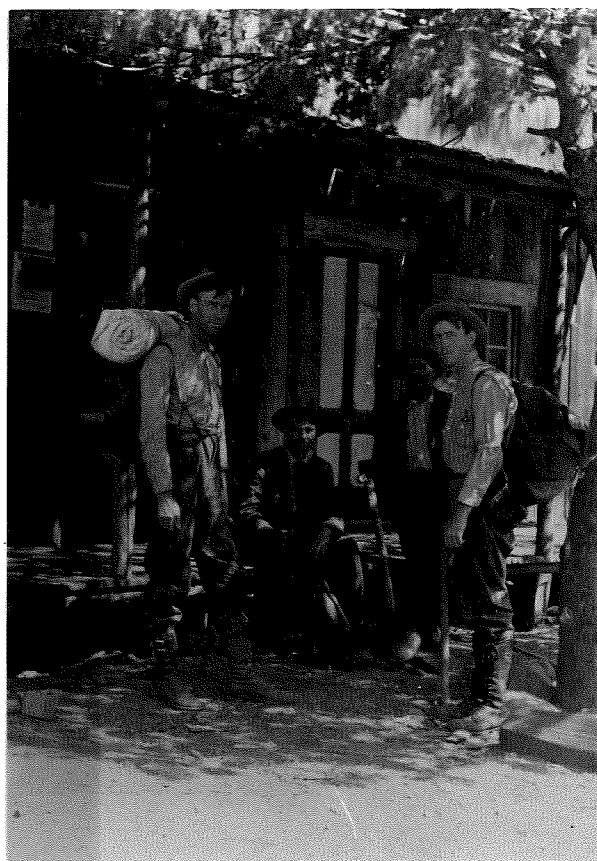
W. T. Andrews, logging engineer for the District, spent some time in the infested areas. He did not think much of control work and believed that the best plan was to sell the timber before the insects could kill it.

THE STATION AT YREKA, CALIFORNIA

On July 1, 1911, I was placed in charge of what was to be known as Forest Insect Station 5 to be located in California. The old mining town of Yreka was selected as the point at which to set up a field station because of the interest in western pine beetle control which had been shown by timber owners in that vicinity. Soon after July 1 the Baker Station was transferred to Edmonston and I moved to Yreka, arriving there on July 8. As soon as arrangements could be made, a dwelling house near the edge of town was rented for office and laboratory use. Accompanying me on this move from Baker to Yreka were Bureau agents, A. G. Angell, J. D. Riggs and J. J. Sullivan. These men were on temporary appointments, but later took Civil Service examinations which qualified them for the position of Entomological Ranger.



FOREST INSECT FIELD STATION, YREKA, CALIFORNIA. 1911 - 1912
Office and laboratory



Entomological Rangers, J. D. Riggs (right) and J. J. Sullivan at Cecilville, California, starting on reconnaissance of Salmon River country. September 1911.



A. G. Angell, Agent (right) and H. E. Burke, Entomological Assistant, in charge of station. October 1911.

Angell was employed by the Bureau for one year only. He was a cruiser with the Forest Service in the 1911 spring control work of the Northeastern Oregon Project. Appointed as an Agent July 1, 1911, he spent most of the next year attached to the Yreka station. He was the Bureau representative on the Maffatt Creek Control Project during the winter and spring of 1912 and during May and June was detailed to Baker to make a recruise of the northeastern Oregon control areas. He afterwards became a Ranger on the Whitman National Forest and made a name for himself by organizing a cattlemen's cooperative association that really cooperated. Later he was attached to the Supervisor's headquarters of the Whitman at Baker and then to the North Pacific Region headquarters at Portland where he had charge of the CCC work for the Forest Service. I believe that he died in Portland in 1943.

J. D. Riggs was camp foreman for the Forest Service on the Northeastern Oregon project and with the Forest Insect Station 5 at Yreka, Placerville and Ashland from July 1, 1911, until about August 1, 1916, when he resigned to go into mining.

J. J. Sullivan was a woodsman for the Baker Forest Protective Association in the 1910 fall control work for the Northeastern Oregon Project, and a cruiser in the 1911 spring control work. He served as Agent and later as Entomological Ranger with Forest Insect Station 5 at Yreka and Placerville from July 1, 1911, to September 1915, and was then transferred to the Northern Rocky Mountain Station. Sullivan left the Bureau in June 1916 to go into lumbering.



J. D. RIGGS

J. J. SULLIVAN

About October 1, 1911, Forest Ranger J. M. Miller was detailed to the Yreka station by the Forest Service to assist on the control work that was being developed on the Klamath National Forest. In November Miller was transferred to the station staff as Entomological Assistant, having qualified through a special examination for appointment by the Bureau.

Although the Yreka station initiated the first large scale western pine beetle control projects, old correspondence in the Bureau files shows that at least two earlier attempts were made by Dr. Hopkins to start control in this region. These deserve mention because of their historical interest.

In 1905 Ranger Baldwin of the Santa Barbara Forest Reserve reported bark beetle infestations in the south-eastern part of this reserve. His report was referred to Dr. Hopkins who made recommendations for control measures by letter. This led up to the first recorded attempt to control bark beetles in any western area, so Southern California can file its claim to this distinction if it so desires.

The area was in Seymour Canyon on Sawmill Mountain, about 20 miles west of old Fort Tejon. The timber was Jeffrey pine and the infesting insects were Melanophila gentilis and Ips oregoni. Logging slash was supposed to have caused the infestation. Dr. Hopkins had recommended burning the infested bark and in September 1905 Ranger Baldwin undertook to carry out the control work. Eleven rangers were detailed to this job and they burned 55 piles of slash in two weeks. As the control area was a steep mountain slope and the fire season was still on, each pile had to be burned in a large pit. One of the fires got away and in the words of Baldwin "it was hell for the swampera chasing up and down the shale slopes and the firemen got pretty well blinded." Ranger Baldwin also reported, "I find in the case of slash cut after July 15 and exposed to the direct rays of the sun, both larvae and in lesser degree the adult beetles are shrivelled up and killed by the heat." This observation pointed toward the possibilities of using solar heat to control bark beetles, but the point seems to have been overlooked by the Bureau of Entomology as it was not until 15 years later that the solar heat method of control was "rediscovered" and given serious attention.

The next attempt to set up control work in California occurred in 1908. Early in that year, Victor S. Barber, a brother of H. S. Barber of the Bureau of Entomology, called on Dr. Hopkins in Washington to inquire about some bark beetle infestations he had seen east of Oroville, California. Barber was a surveyor who had done some work in the forests near Stirling City, California, for the Diamond Match Lumber Company.

For some time Dr. Hopkins had desired a practical man to investigate and demonstrate bark beetle control to private timber owners. Finding that Barber was acquainted with officials of the Diamond Match Company and other private owners of timber in California, Dr. Hopkins had him appointed as Agent of the Bureau in March 1908 and sent him to California to see what he could do. Unfortunately Barber did not arrive at a very good time for forest insect control work among the private timber owners.

When the Diamond Match Company started up its operation in northern California a few years before 1908, the company had employed E. A. Stirling

(for whom Stirling City was named) as forester. During the first year, operation was conducted according to strictly professional forestry plans. No profits were made, however, so the next year there was less scientific forestry and more old time lumbering. Some profits were made under this shift in program so the third year still more of the forestry program was dropped and more attention given to lumbering and profits. By the fourth or fifth year, forestry was given up altogether and Stirling left the Company to become Forester for the Pennsylvania Railroad where he remained for a number of years.

Barber arrived at about the time when forestry had been discarded and when anyone connected with forestry in Washington was unpopular. He tried to contact some of the owners in San Francisco without much success, so went back to the forests and tried to make contacts there. He made collections of bark beetles in the vicinity of Chester, California, which were later mentioned by Hopkins in Bulletin 83. However, after several months Barber concluded that there was not much chance of interesting private timber owners in bark beetle control so he quietly went into other work without leaving a forwarding address or notifying Dr. Hopkins of his change in plans. After 3 or 4 of his monthly pay checks came back to Washington unclaimed, the Accounting office appealed to the Bureau of Entomology, who finally contacted Barber and persuaded him to resign in the customary manner.

The control work for which the Yreka station provided the technical supervision developed during the fall of 1911 and the ensuing winter and spring into three main undertakings known as the Moffat Creek, Craggy Mountain and Barkhouse projects. These projects and some of the developments which followed during the next few years largely set the pattern for a long list of bark beetle control projects that have developed in the California region. So again it seems desirable to digress from this autobiography in order to give a fairly complete story of these first western pine beetle control projects.

MOFFAT CREEK, CRAGGY MOUNTAIN AND BARKHOUSE BARK BEETLE CONTROL PROJECTS

Had it not been for a rather sudden interest on the part of the Southern Pacific Land Company in pine losses on its timber holdings, the Station at Yreka would in all probability not have been established. As it worked out, however, this Company called the attention of the Forest Service and the Bureau of Entomology to a western pine beetle infestation on the Klamath National Forest and started action which led to control, not only on the Company's holdings but on adjacent private and national forest lands.

When the Southern Pacific extended its line from Sacramento to Portland during the 1880's it received a grant of every alternate section of land for 20 miles on either side of the right of way. While most of the agricultural land in this grant was rapidly sold, the Company held on to its timber until lumbering developments made it possible to dispose of the stumpage at a good profit. In 1910 it still held many sections in Northern California awaiting logging developments.

About 20 miles south of Yreka was the center of the Moffat Creek area where railroad sections were checker-boarded with other private timber holdings. The stand of timber covered about 10,000 acres and contained around 150 million board feet. To protect this timber from trespass and fire the Company employed as its agent, W. E. Glendinning, who owned and lived on a quarter section in the heart of the Moffat Creek basin. Glendinning was an observant individual and during the summer of 1910 he noted that a number of trees were dying from some cause other than fire. He corresponded with G. M. Homans, then State Forester of California, who sent William Hodge, Assistant State Forester, to Moffatt Creek to investigate conditions.

Hodge and Glendinning examined a number of recently dying trees in the area, chopped into the bark and decided that the mortality was due to bark beetles. This conclusion was in line with that of Forest Assistant S. T. Dana who had made a silvical study and report upon the Klamath areas in 1908. Dana had observed scattering yellow pine infested with the western pine beetle all over the Forest and surmised that "A succession of favorable seasons might cause a great deal of damage, but all we can do at present is to watch for developments." Glendinning and Hodge estimated that the amount of dying timber in 1910 had increased about 50 percent over that in 1909 so it was evident that something was developing in the Moffat Creek area.

Hodge reported conditions to the Regional Forester of the Forest Service in San Francisco, who detailed Ranger J. M. Miller to make a further examination of conditions in Moffat Creek and nearby national forest timber. Miller and Forest Assistant Jesse R. Hall of the Yreka office made a trip to the Glendinning ranch in November 1910. Although they found that the western pine beetle was doing a considerable amount of damage in this area, national forest lands were not involved to any extent. The Forest Supervisor, W. B. Rider, then suggested that an examination be made of areas west of Yreka where large acreages of national forest timber interlocked with those of the Southern Pacific Land Company. Miller and Hall went over certain of these areas, mainly the watersheds of Big Humbug Creek and other tributaries of the Klamath River, and found conditions quite similar to those on Moffat Creek.

Miller made a report on these examinations to the Forest Service in January 1911 in which he attributed most of the loss that was occurring to the western pine beetle, but also called attention to flathead and Ips infestations and to the decadent condition of certain pines which appeared to be dying slowly. This report and some of the correspondence regarding the Klamath situation reached Dr. Hopkins through the Forest Service office in Washington. Dr. Hopkins had not previously been informed of this activity and he immediately wanted to know what Miller was doing and why he was making examinations under the pretense of being a qualified entomologist and without the approval of the Bureau of Entomology. He requested that the Forest Service cease these goings-on until he could look into the situation first hand; so the matter rested until Dr. Hopkins made his western trip in April 1911. After inspecting the Northeastern Oregon project, he went to Yreka where he was met by Miller.

Dr. Hopkins first wanted to see the Moffat Creek area and talk to some of the private owners so he and Miller hired a team and drove out to the Glendinning ranch. A day spent in going over that area convinced Dr. Hopkins that this area presented a good opportunity for a demonstration control project. He was impressed with the infestation and the interest shown by the private owners. He decided immediately that Yreka was the place to locate a field station to further this project.

On the return to Yreka Dr. Hopkins found that the Forest Supervisor was lukewarm toward control work in Moffat Creek. Mr. Rider argued that the Klamath River areas in Big Humbug and Barkhouse creeks would provide the best conditions for the Forest Service to participate in a demonstration project, because of the large holdings of government-owned timber. Dr. Hopkins remarked that the Forest Supervisor's proposals looked like a "Big Humbug" to him and left Yreka without reaching any understanding with the Forest Service; but he was determined to go ahead with his plan of locating a field station at Yreka in order to develop control work among the private timber owners.

After Dr. Hopkins left for Washington, Mr. Rider decided that more factual information was needed on conditions in the Forest Service areas. He assigned Forest Assistant A. D. Hodson to make a survey with Miller's help and three rangers were added to the party to make up a timber survey crew. Five sections were selected in the Barkhouse Creek area where losses seemed to be heavy & 10 percent cruise made of both the dead and green stand. In addition all infested trees were located and mapped. Although the term "spotting" originated on the Northeastern Oregon project, it became officially established on this survey to describe the activity of marking and mapping infested trees. Hodson prepared a report which showed that the accumulated loss in this area had been very heavy on some sites and that an average of 30 percent of the original stand had been lost on the area cruised. This study was completed early in May 1911.

After I arrived at Yreka in July 1911 preliminary surveys were started and carried on during the fall as a basis for control plans, not only for Moffat Creek but also in the Big Humbug and Barkhouse areas.

The first control work to get underway was in the Big Humbug Creek drainage. The name of this project was changed to Craggy Mountain in order to lend a little more dignity to the title. The Southern Pacific Land Company agreed to pay for the cost of treatment of trees spotted on its lands. The Forest Service proposed to handle most of the cost by contributed labor of its year-long men. The Forest Supervisor was sold on the idea that it was a good thing for his rangers to have something to do during the winter season and "bug work," as it was soon termed, seemed to offer a good outlet for pentup energy. About 10 men altogether, consisting of District rangers and guards, were called in and assigned to this project. The Forest Service set up a camp and paid for their subsistence.

The camp was moved into the Big Humbug Ranger Station on January 5, 1912, and work was started with about two feet of snow on the ground. Riggs, Miller and Sullivan were assigned to the camp to do the spotting, supervise

control methods, and keep a detailed set of records. The work was new to all of the crew but they were fairly enthusiastic. The Craggy Mountain area was completed on March 22 and on March 25 the camp was moved into Barkhouse Creek where the work continued until April 24.

For a good part of the time the Craggy Mountain camp was in charge of Forest Assistant Shirley W. Allen. Allen was not only a good camp foreman but he had the happy faculty of keeping the crew in a good humor. His songs, jokes and irrepressible good nature went far toward keeping up morale during the bad weather in January and February which interrupted progress of the work. His "Bug Song" to the tune of Casey Jones became a classic among the natives of the Klamath River country.

"Oh, we've chopped 'em all down and you can't find a beetle,
We've burned 'em all up and you can't find a bug,
We treated all the trees so you can't find a beetle,
No, you can't find a beetle on the Big Humbug."

As this was the first project concerned with the western pine beetle, a number of experimental phases were added to it. Time and cost records were kept to determine the most economical methods of treating infested trees. Among the ideas tried out were the use of blasting powder to fall the trees, the use of saddle horses to get men out to the more isolated trees, and the employment of small mobile camps composed of 2 or 3 men each instead of one central camp. None of these ideas turned out to be very efficient.

The Moffat Creek project got underway March 14 and continued until May 10, 1911. It was financed entirely by the private owners on a cooperative basis with W. E. Glendinning supervising the work. Agent A. G. Angell was assigned from the Yreka station to assist on the project and give it technical supervision.

A report upon all three projects was prepared in June 1912. This shows that 544 infested trees were treated on the Craggy Mountain area, 383 on Barkhouse and 373 on Moffat Creek; totaling 1300 trees with a volume of 1,772,000 board feet.

Some interesting developments followed the initial work on the Klamath areas. In the fall of 1912 the Craggy and Barkhouse areas were recruised and it was found that during the summer following control work the beetles had killed about 75 percent as much timber as in 1911. This reduction of only 25 percent indicated that satisfactory results had not been achieved, so the Forest Service reworked the areas during the spring of 1913. This second working of the areas was followed by a fairly satisfactory reduction of the infestation. The amount of timber killed during the season of 1913 was only about 45 percent of that killed in 1912. This amounted to a total reduction during the two seasons following the initial control work of about 70 percent.

It was here that Dr. Hopkins stepped in with his percentage principle of control. He maintained that if from 50 to 75 percent of the infestation is removed by artificial control work, natural factors of control then take over and hold the beetles to a normal or endemic condition. He recommended

against any further control work on the Craggy and Barkhouse areas, so the Forest Service did not carry on work during the spring of 1914.

In the meantime Ralph Hopping had been appointed as Forest Examiner to supervise all of the bark beetle control programs of the Forest Service in the California district. One of Hopping's first moves was to question the percentage principle of control. He believed that if there was any infestation within an area it should be treated. He examined the Craggy and Barkhouse areas during the spring of 1914 and found infested trees fairly plentiful. He predicted that this untreated infestation would increase and openly criticized the Bureau of Entomology for its short-sighted policy of percentage control. Much of this criticism got into official correspondence channels which reached Dr. Hopkins and Chief Forester Graves in Washington. The matter soon developed into the proportion of an inter-bureau controversy.

Mr. Graves decided to see for himself what all this dispute was about and made plans to visit the Craggy and Barkhouse areas in the spring of 1915. In April he made a trip to Yreka and I accompanied him on an inspection of the areas with Hopping, Forest Supervisor Rider and W. E. Glendinning who had then become an Entomological Ranger in the Bureau of Entomology. What we found was of little comfort to opponents of the percentage principle. The infestation left on the areas in the spring of 1914 had not increased; on the other hand it had declined without benefit of control work to such an extent that there were fewer infested trees to be seen than at any time since 1910. This condition convinced Mr. Graves that the strategy of percentage control was sound and he later issued a statement reviewing the entire controversy and giving the endorsement of the Forest Service to the recommendations of the Bureau of Entomology.

As the percentage principle has worked out on many western pine beetle projects since then, a percentage of the total infestation is about all that it is possible to find and treat anyhow. Even with the most careful work from 10 to 25 percent of the infestations is missed, so percentage control is the best that can be hoped for.

THE CRAGGY MOUNTAIN BARK BEETLE CONTROL PROJECT



Control crew moves from Northfork Camp to Cayuse Gulch. March 17, 1912.

Infested Tree Felled with Powder.

Most of the men hired on this project were local ranchers and miners. These men knew how to use blasting powder and figured that it was easier to shoot down infested trees than saw them down.

Tom Lane, a member of the crew, had a box camera and wanted a picture just as the blast exploded. He lashed his camera to a stake, 15 feet from the tree, tied a string around the tree at the height where the blast would occur and attached one end of the string to the camera shutter. The picture was a success, but the front part of Lane's camera was wrecked.



SOUTHERN ROCKY MOUNTAIN STATION

Colorado Springs, Colorado. 1913-1919

(left to right) W. D. Edmonston, in charge; A. B. Champlain, and B. T. Harvey.

From Baker, Oregon, Edmonston went to Klamath Falls, then to Ashland, and in the fall of 1913 to Colorado Springs, Colorado. With him went Hofer and Harvey. Champlain was later added to the staff to carry on studies of the biologies of forest insects and devoted considerable time to the parasites and predators of bark beetles. J. H. Pollock was appointed as Entomological Ranger in 1914 and specialized in studies of forest Adelgids. This station was closed in 1919 when Edmonston and Hofer moved to Tucson, Ariz., and Pollock was transferred to the Ashland station. Harvey and Champlain in the meantime had resigned.



Reconnaissance party, head of Williams Canyon. Manitou, Colorado. 10-19-14.

(left to right) W. D. Edmonston, A. B. Champlain, E. R. Spyer and J. H. Pollock. Spyer was a visiting Carnegie student interested in the parasites of bark beetles.

THE STATION AT PLACERVILLE, CALIFORNIA

The station was continued at Yreka for only a little more than one year. A central location in the California pine region seemed more desirable and accordingly Forest Insect Station 5 was moved from Yreka to Placerville during the first part of November 1912.

In February 1913 all of the technical men in Forest Insect Investigations were called to Washington for a conference on plans and organization. I spent February 27 to March 5 at the conference and then stayed in Washington until May 29 to do some special work on the flatheads, particularly *Agrius*, one species of which was connected with the dying of many chestnut trees.

At the conference it was decided to place the western forest insect work under three stations, the Northern Rocky Mountain, the Southern Rocky Mountain and the Pacific Slope with headquarters at Ashland, Oregon. I was placed in charge of the Pacific Slope but remained at Placerville to complete the investigations already started. A sub-station on forest tree seed insects was to be started at Ashland with Miller in charge.

Before I returned to Placerville on June 3, 1913, due to the preliminary work done in 1912, control work against the western pine beetle started near Bray, Siskiyou County, and in the Yosemite. The first, the Antelope Creek Project, was carried on by the McCloud River Lumber Company with the assistance of J. D. Riggs. It so convinced the Company of the value of bark beetle control that they made it a regular part of their operations for a number of years. This probably was the first time that any private timber company had adopted such a plan. The work in the Yosemite under the direction of J. M. Miller was the first forest insect control work conducted in any of the national parks. It also was carried on for several years.

During July and August I assisted the C. A. Smith Company to cruise part of its timber near Pino Grande to determine the insect loss in a mature stand of mixed yellow pine and sugar pine. This stand between the Middle Fork and the South Fork of the American River was considered by timbermen to be one of the finest stands of timber in California.

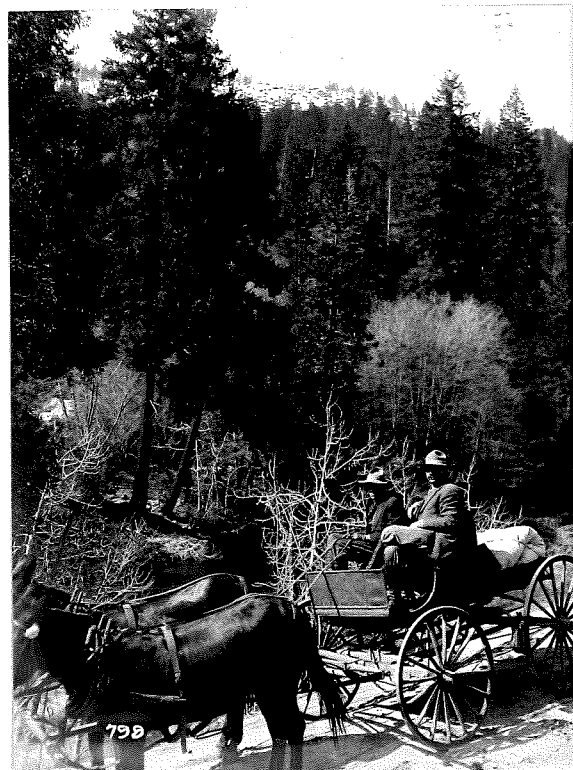
A careful cruise of the area indicated that while there had been no insect epidemics for a number of years there was a constant annual loss of the best trees. On 1,284 acres cruised in one solid block, there were 14 killed sugar pine (77,735 board feet) and 16 killed yellow pine (95,230 board feet) all killed in 1913 and a total of 290 killed sugar pine (1,572,745 board feet) and 121 killed yellow pine (327,205 board feet). The cream of the timber was being killed. Ninety-one of the dead sugar pine were over 5 feet in diameter and it was these large trees with the clear lumber that made the lumbering profitable. This probably was the first time that a lumber company had made such a detailed study to determine the actual loss caused by tree-killing insects.

FIELDS TRIPS OUT OF THE PLACERVILLE STATION, 1913.



Above is the Davis cabin on the tract of timber owned by the C. A. Smith Lumber Company near Pino Grande. This was the field headquarters for the protection work of the Company and was used as the base camp for the 1913 forest insect survey. Mr. Davis, representative of the Company and Entomological Ranger J. J. Sullivan made a preliminary reconnaissance in May 1913.

Photo at right shows Sullivan and P. D. Sargent on a trip up the American River Canyon near Kyburz in April 1913.



Besides carrying on this project (Onion Creek project) I made a number of observations on the biologies of various forest insects. Among these was the biology of the *Oryssus*, a hymenopterous insect of which little was known, but which when the biology was finally determined, changed the major classification of the order Hymenoptera. Another project started was a study of the oak twig girdler, a pest which caused considerable damage to live oak in California. This study probably aroused my interest in the investigations of shade tree insects which I carried on for a number of years.

I spent the field seasons of 1914 and 1915 and part of 1916 at the Pyramid Ranger Station about 40 miles east of Placerville on the Tahoe road. Close by were sugar pine, yellow pine, Jeffrey pine, lodgepole pine, white fir, red fir, Douglas-fir, mountain hemlock, incense cedar and Sierra juniper.

Many observations were made on the bark beetles and on flathead borers. The flathead borers of the genus *Trachykele* were given special attention. Three species of this little known genus were found and carefully studied. One caused considerable damage to the wood of incense cedar, one to the wood of juniper sought for pencils and the third bored in the wood of the tops of white and red fir.

Considerable attention was also given to the project "The relation of Mistletoe on living trees to attacks by tree-killing insects," which had been assigned to me. It was found that 64 percent of virgin growth yellow pine and 73 percent of virgin growth Jeffrey pine in typical areas near Pyramid were mistletoe infected. The conclusions drawn from the study were (a) trees infected by mistletoe are not more subject to attack by *Dendroctonus* beetles than trees not so infected, in fact it looked as though badly infected trees were less liable to attack than trees free of infection; (b) trees weakened by mistletoe do not contribute to the increase of *Dendroctonus* beetles.

Before and after the regular field seasons studies were made of the insects living in the trees and shrubs in the vicinity of Placerville. Special attention was given to the flatheaded borers of the genus *Agrilus* and to the bark-mining midge which causes the birdseye pine. Many parasites and other insects were reared and sent to the specialists in Washington. Several trips were made to Palo Alto to study the oak twig girdler.

The Antelope Creek project and the Yosemite Control project continued more or less under the direction of the Placerville station, but due to the poor lumber market, no new private lumber company undertook any control work. The C. A. Smith Company which had been such a good cooperator finally failed because of too much timber which they were not able to carry.

Ever since I had been in forest insect investigations, I had felt that my main interest was the working out of the biologies of the various species. The Northeastern Oregon Control project had gotten me off of the track somewhat but several years away from a control project area had convinced me that I was not interested in control work and that it would be best to return to biological investigations if possible.

Early in 1916 Dr. Hopkins sent out a new plan of organization for comments. This seemed an opportunity for me to make the change so I accepted it. During 1915 the control work had been carried on by the rangers under the direction of Dr. Hopkins in Washington. This had caused more or less friction with the stations. In my comments on the plan, I recommended that all of the work be placed directly under the stations with Miller in charge of the Pacific Slope station at Ashland and that I be placed in charge of a laboratory to investigate the biologies of tree-killing insects. This plan was approved and it was decided to locate my work at Los Gatos, California, with a laboratory giving most of its attention to biological studies with special attention to shade tree problems.

Probably the most important scientific work done at Placerville was the determination that *Oryssus* is parasitic. At least this is the work mentioned in such general works on entomology as Comstock's "Introduction to Entomology" and Essig's "Insects of Western North America." The article "Oryssus is Parasitic" was published in the Proc. Ent. Soc. Washington in 1917. The work done on the flatheaded borers was also published in 1917 as Department Bulletin No. 437, "Flatheaded borers affecting forest trees in the United States."

THE LABORATORY AT LOS GATOS, CALIFORNIA

The move from Placerville to Los Gatos was made in November 1916. Because of its growing importance on the Pacific Coast, the work at Los Gatos soon became almost entirely the study of shade tree insects. Scientific Assistant F. B. Herbert was attached to the laboratory from November 1, 1916, to June 30, 1920; Entomological Preparator E. T. Armstrong from November 1, 1916, to October 1, 1917; Assistant Entomological Inspector R. D. Hartman from March 15, 1918, to December 1, 1923; and Entomological Ranger W. E. Glendinning from August 1, 1919 to May 15, 1922.

Among the principal insects studied were the Pacific flathead borer, California oak twig girdler, elder borers of the genus *Desmocerus*, cypress bark beetles, Monterey pine bark beetles, the carpenter worm, California oak worm, penstemon caterpillar, cypress barkscale, European elm scale, *Matsucoccus* scales, madrone psyllid and the unusual lead cable borer.

The time spent at Los Gatos was a time of publication as well as a time of investigation. Twenty-two papers were published on flatheaded borers and various shade tree insects. Among these were Farmers' Bulletin 1076 "The California Oak Worm," with Herbert; and Department Bulletins 838 "Cypress Bark Scale" and 1223 "The European Elm Scale in the West" by Herbert.

THE LABORATORY AT STANFORD UNIVERSITY, CALIFORNIA

A reduction in the appropriations for the fiscal year 1921 caused the resignation of Herbert and I decided to look for a new location where laboratory expenses would be small. Stanford University offered laboratory

THE STATION AT ASHLAND, OREGON



The Ashland station, which was maintained from 1913 to 1924, was at first set up as sub-station under Placerville. During the period of its existence the Ashland station occupied various quarters in the town. Above is the Ashland Normal School which was occupied from 1916 to 1918. Below is the first office and laboratory, 1913 to 1916.





PERSONNEL AT THE ASHLAND STATION, APRIL 1915

(left to right) Dr. A. D. Hopkins, Chief of Division of Forest Insect Investigations; W. E. Glendinning, Entomological ranger; J. M. Miller, Entomological Assistant; and Entomological Rangers J. E. Patterson, J. D. Riggs, P. D. Sargent and F. P. Keen.

From 1919 to 1924 the station was housed in the residence building (shown at right) in the town of Ashland. This picture was taken in February 1920 following a heavy snow and cold snap in the Rogue River Valley.





CONFERENCE OF BUREAU OF ENTOMOLOGY AND FOREST SERVICE MEN
AT ASHLAND, OREGON. JUNE 1917

From 1915 to 1919 the Ashland station carried on a series of studies of bark beetle infestations in the Rogue River and Klamath River watersheds which led to some new proposals regarding control methods. These recommendations were considered in a series of conferences with the Forest Service which resulted in the initiation of several experimental control projects.

(Top row, left to right) Albert Wagner, John M. Miller and A. J. Jaenicke.
(Bottom row, left to right) F. P. Keen, Thomas Snyder and Ralph Hopping.

Hopping represented Region 5 and Jaenicke Region 6 of the Forest Service. Snyder was on a special trip from the Washington office of the Bureau of Entomology. Albert Wagner, Entomological Ranger, had just been transferred from the Missoula station of the Bureau which had been closed down when Josef Brunner left for West Virginia.

space rent free so I moved to Stanford in March 1921. Officially the move was made November 1, 1921.

For the first few years the work at Stanford continued as at Los Gatos. The investigations of the Pacific flathead borer and the lead cable borer were completed. Bulletin 1107 "The Lead-cable borer or 'Short Circuit Beetle' in California" was published December 4, 1922, and reprinted July 1923 with R. D. Hartman and T. E. Snyder as co-authors. The work on the Pacific flathead borer was submitted as a thesis to Stanford University and I received the degree of Doctor of Philosophy June 15, 1923.

Several new shade tree insect pests became important and were investigated. Among these were the live oak leaf gall, Andricus bicornis, Bakers mealy bug and the Monterey pine sawfly which defoliated numerous trees in the native forests near Monterey. The importance of the work done by the laboratory on shade tree insects is indicated by the fact that the State Highway Department took up pest control for the trees planted along the State highways and selected W. E. Glendinning of the laboratory staff to have charge of the work. This was May 15, 1932. Another member of the staff, R. D. Hartman, was taken by the State Department of Agriculture, December 1, 1923, to head its nursery service.

In the fall of 1923, Dr. Hopkins retired as chief of Forest Insect Investigations and Dr. F. C. Craighead replaced him. This caused some reorganization of the work and the discontinuance of shade tree insect investigations in the west for a time.

To carry this story further would be going beyond the first years in forest entomology. During the period that I have covered thus far in this account of my experiences, the Division of Forest Insects was concerned mainly with finding out which were the most important forest insect problems, determining the taxonomy and biologies of the insects concerned, and developing direct methods of control. In later years the trend in forest insect investigations has been to place more emphasis on ecological studies and the control of insects through forest management practices. Since 1923 I believe that the western field laboratories have been larger, better equipped and staffed with more technical men. The story of these developments belongs to another period and since I started out to give my recollections of the first years in forest entomology this seems to be a good point at which to close this autobiographical sketch.

SOME OF THE MEN WHO PIONEERED IN WESTERN FOREST ENTOMOLOGY

To this account I would like to add some short biographies of men with whom I worked during the first years. I will include only those men who have either passed on or have long been separated from the Bureau of Entomology. My account will have to be far from complete as biographical material, but I will give the impressions of these former associates of mine that I have carried down through the years. In a true sense they were real pioneers of forest entomology in the west.

JESSE LEE WEBB
1878-1942



Washington D. C. 1904

J. L. Webb was the first assistant selected by Dr. Hopkins to work on western bark beetle problems. He was born near Bloomington, Illinois, April 9, 1878, and was educated in Iowa, Washington and West Virginia; taking his B.S. degree from Washington State College in 1900 and his Masters degree from the University of West Virginia in 1902. Webb started the study of forest insects in 1900 while on a trip to the pine forests near Moscow, Idaho. Both the western pine beetle and the mountain pine beetle were studied.

About October 1, 1901, Webb was appointed a student assistant in the Bureau of Forestry of the U. S. Department of Agriculture and assigned to work under Dr. A. D. Hopkins at the University of West Virginia at Morgantown. This training was to fit Webb for the position of Forest Entomologist of the Philippines. Webb spent the winter at Morgantown working on forest insects.

About May 1, 1902, Webb was promoted to Assistant Forest Expert and sent to the Black Hills of South Dakota to work on the Black Hills beetle. This

probably was the first forest insect experimental work carried on by a United States government official. Various kinds of trap trees were tried and studies were made on the life history, parasites, predators and associates.

The winter of 1902 was spent in Washington classifying the insects and summarizing the known information on them. When the United States was divided into investigating areas, Webb took the Rocky Mountain states and in the division of the insects, the round-headed borers.

About May 1, 1903, the Philippine position came up again and Webb, against his will, accepted and went to Manila. On arriving there he was assigned to the Bureau of Science instead of the Bureau of Forestry and ordered to work on mosquitoes instead of forest insects. Seeing no opportunity to work on forest insects, Webb resigned after a few months, shipped as a steward on a transport, sailed west by way of Suez and around the world back to Washington. About November 1, 1903, he was re-appointed an assistant forest expert in the Bureau of Forestry and again assigned to work under Dr. Hopkins.

The field season of 1904 was spent at Flagstaff, Arizona, working on the southwestern pine beetle, that of 1905 near Boise, Idaho, on the western pine beetle, that of 1906 in the Black Hills of South Dakota on the control of the Black Hills beetle (probably first U. S. forest insect control project), the field season of 1907 in southern Arizona and New Mexico on the biology and economic importance of the southwestern pine beetle and the Engelmann spruce beetle, and that of 1908 in southern Mississippi on the biology and economic importance of the southern pine sawyer, Monochamus titillator (Fab.).

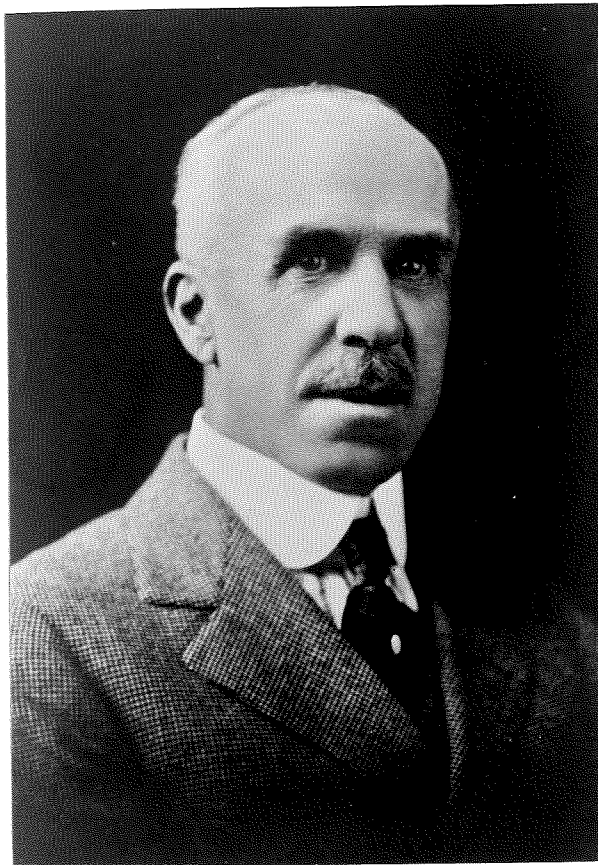
The winter seasons of 1903-08 and practically all of 1909-10 were spent in Washington working on the insects and information collected during the field work, doing systematic work on the round-head borers and preparing manuscripts for publication.

Sometime in 1912 Webb transferred to Southern Field Crop Insects, first working on rice insects. For a number of years he was Washington representative for the Division since Dr. W. D. Hunter, the chief, maintained headquarters in the field. When the Division was divided, Webb went with Insects Affecting Man and Animals working the field seasons of 1916-18 near Topaz, Nevada, on horse flies. From 1918 to the time of his death on January 20, 1942, Webb spent most of his time at the Washington headquarters of the Division.

Webb's principal publications were "The Western pine-destroying Bark beetle" Bul. 58, Part II, USDA B.E. 1906; "The Southern pine Sawyer" Bul. 58, Part IV, USDA B.E. 1909; "Injuries to Forests and Forest products by Round-headed Borers" Yearbook USDA for 1910, 1911; "A Preliminary Synopsis of Cerambycoid Larvae" Tech. Ser. Bul. 20, Part V, USDA B.E. 1912; "How Insects affect the Rice Crop" Farmers' Bul. 1086, USDA 1920; "Horse flies: Biologies and relation to western agriculture" USDA Bul. 1218, 1924, in cooperation with R. W. Wells and the Nevada Agriculture Experiment Station.

Webb married Florence Evans of Garrisonville, Virginia, in 1904. One son Delmar Evans Webb, was born in 1907.

WILLIAM DOUGLAS EDMONSTON
1870-1936



Colorado Springs 1917

Edmonston was another of the men selected by Dr. Hopkins who had a large share in the first developments of forest entomology in the west. He was born in Edinburgh, Scotland, March 28, 1870; the son of the Scotch artist, Samuel Edmonston, and Jane Douglas Edmonston. A graduate of the School of Fine Arts of the University of Edinburgh, he was an artist of considerable ability and exhibited some of his water colors at the Royal Scottish Academy and at the Royal Academy of England.

It is also interesting to note that Edmonston was interested in insects as a youth. While exhibiting some moths and butterflies at one of the Empire Exhibitions held in Edinburgh, Edmonston met Dr. C. V. Riley, Chief of the Division of Entomology, U. S. Department of Agriculture. Dr. Riley was in Edinburgh with an exhibit of American insects. Edmonston helped Dr. Riley arrange his collection and had many interesting talks with him.

The Edmonstons came to the United States in 1890 and settled at Brunston near Larkspur, Colorado; Edmonston sharing a studio with his father. The depression of 1893 coming on soon afterward destroyed the sale of art works

and Edmonston turned to scene painting in Denver theaters, mining and storekeeping before finally getting into forestry and forest entomology. If there had been no depression of 1893, there probably would have been no forest entomologist Edmonston.

Edmonston probably entered the federal service sometime in 1901 as a ranger on what is now the Pike National Forest. At that time it was under the Interior Department. He rose to the position of ranger in charge of the Plum Creek reserve which became part of the Pike Forest after the reserves were transferred to the Department of Agriculture in 1905. Edmonston was transferred to the Department of Agriculture with the forest and became head ranger on the Pikes Peak Forest Reserve.

Edmonston's introduction to forest insect work was made October 5-13, 1905, when he made several trips in the vicinity of Colorado Springs and Palmer Lake, Colorado, with Dr. A. D. Hopkins to study infestations of the Black Hills beetle. From then on Edmonston spent considerable of his time in cruising bark beetle infestations and in conducting control operations in the various forests of Colorado. Sometime in 1907 or 1908 he was assigned to the Bureau from the Forest Service to work under the direction of Dr. Hopkins on the practical application of insect control work in the national forests. Except for some time spent at headquarters in Washington in February and March 1909 the time was spent in the national forests of Colorado, southern Wyoming and eastern Utah until his detail to the North-eastern Oregon Project in May 1910.

During the work in Colorado, Edmonston experimented with various methods of treating trees infested with the Black Hills beetle. At least one infestation was controlled by felling the infested trees, sawing them into lumber and burning the slabs. Various cost methods by contract treating were tried. In fact, practically all of the methods of spotting and treating were tried except sun curing and oil treating.

After the moving of Forest Insect Station 6 from Baker to Klamath Falls in September 1911, Edmonston and his crew of Hofer and Sergeant spent considerable time inspecting timber west of Klamath Falls and in trying to interest the various timber owners in bark beetle control. As a result of this work, the Parker's Station Project was carried on in Klamath County from April 1 to May 17, 1912. The infestation was western pine beetle in yellow pine and mountain pine beetle and *Melanophila* sp. in yellow pine and sugar pine.

Some time during the fall of 1912 Edmonston moved from Klamath Falls to Ashland. February 26 to March 8, 1913, was spent in Washington, D. C. attending the first conference of forest entomologists. At that time it was decided to carry on Forest Insect Investigations in the field with an eastern field station at Falls Church, Virginia, with S. A. Rohwer in charge; Northern Rocky Mountain at Missoula with Josef Brunner; Southern Rocky Mountain in New Mexico or Colorado with W. D. Edmonston; and Pacific Slope at Placerville with H. E. Burke.

Edmonston spent most of the summer of 1913 in the vicinity of Ashland studying various forest insects. One trip was made to Placerville in June to consult with Burke about transferring the station. October 13 he left

for Albuquerque, New Mexico. Since no quarters could be obtained in the government building at Albuquerque he continued on to Colorado Springs and established the Southern Rocky Mountain station with Agent George Hofer and Entomological Assistant B. T. Harvey.

From 1913 to 1924 Colorado Springs was the headquarters of the Southern Rocky Mountain station but considerable time was spent at Sabino Canyon near Tucson, Arizona. Edmonston was in charge and Hofer was on the staff. At various times B. T. Harvey, A. B. Champlain, J. H. Pollock and Morris Chrisman were attached to the station.

Most of the work of the station consisted in the collection of specimens and biological notes for the specialists on the various forest insects, especially Scolytidae, Buprestidae, Cerambycidae, Hymenoptera, Diptera and Isoptera. Experimental work was conducted on the control of the aspen borer and on borers in mesquite. Results of these experiments were published in Farmers' Bulletin 1154 "The Aspen Borer and How To Control It" by George Hofer and Bulletin 1197 "Protection of Mesquite Cordwood and Posts from Borers" by F. C. Craighead and George Hofer. Results of the collections were published in practically all of the forest insect publications.

Edmonston spent part of the spring of 1921 at North Fork, California, studying improved methods of surveying and controlling pine beetles developed by the Pacific Slope station. A visit was paid to the Shade Tree Insect station at Los Gatos and Palo Alto. Later a survey of the Kaibab National Forest, Arizona, was made and a serious infestation of the Black Hills beetle reported.

In 1922 and 1923 Edmonston conducted control operations against the Black Hills beetle on the Kaibab. In October 1922 surveys were made on the Dixie and Powell National Forests in Utah and infestations of the Black Hills beetle reported. In August 1923 these infestations were re-surveyed and the conditions reported. In April 1923 a survey of the Gila National Forest in New Mexico was made and in November 1923 a survey of the Lincoln National Forest, New Mexico. A scattering infestation of the southwestern pine beetle in low grade timber was reported from the Lincoln.

In 1924 Edmonston and Hofer conducted a number of control experiments against the Black Hills beetle on the Kaibab under the direction of Dr. Craighead. In 1925 and 1926 they assisted Dr. M. W. Blackman in his experimental work on the Black Hills beetle on the Kaibab. The results of this work were published in Technical Publication 36 of the New York State College of Forestry - "The Black Hills Beetle" by M. W. Blackman.

Headquarters for the Southern Rocky Mountain Station was supposed to have been moved from Colorado Springs to Albuquerque in the spring of 1924, but no records can be found that show this move to have been made. Edmonston spent the winter of 1924 in Tucson and the winter of 1925 at Kanab, Utah, where he had access to the Kaibab. For all practical purposes the station was closed on December 1, 1926, when Edmonston took a three-month furlough and Hofer was transferred for several months to the Federal Horticultural Board.

Some time was spent in the spring of 1927 on the Prescott National Forest, Arizona, studying an infestation of Ips in second growth yellow pine. Part of June and most of August were spent with Burke in the Yellowstone National Park and July in the Glacier National Park. Drawings were made of the lodgepole needletier and the lodgepole sawfly which were used in Department Circular 224 by Burke on these insects. Edmonston returned to Prescott in September and to Tucson for the winter.

In February 1928 Edmonston was transferred to the Pacific Slope laboratory at Palo Alto to work on life history charts of forest insects and to assist in the national park work. Part of the summer was spent in the Yosemite National Park on life history charts and in making some insect drawings and paintings for the Park museum. From the summer of 1928 until his retirement for disability on August 1, 1932, Edmonston spent most of the time at the Palo Alto laboratory working on life history charts and drawings of forest and shade tree insects. Many of these were used in several bulletins of the Department and in the books "Forest Insects" by Doane, Van Dyke, Chamberlin and Burke; and "Practical Tree Surgery" by Millard F. Blair.

In 1917, during the first World War, Edmonston at the age of 47 applied for service in the Engineers but did not pass the physical examination so was not accepted.

In 1896 Edmonston married Laura Kinner of Douglas County, Colorado. By her he had two children, one now Mrs. Howard Cox of Denver and Samuel who died in 1926. Edmonston was divorced in 1914 and married Mrs. Cora Schneckenberger of Tucson in January 1925. After his retirement in 1932, Edmonston lived in Tucson where he died November 7, 1936. Mrs. Edmonston survived him.

Edmonston was a cultured gentleman and a delightful companion in the field or office. He also was a keen observer and a philosopher. In his younger days he was an aggressive director of control work and got much done against considerable opposition. For some reason the Forest Service officials in the field were against insect control work and it was a constant struggle to keep a project going even after the plans had been agreed upon in Washington.

Edmonston was not a warm admirer of the Pinchot type of conservationist. He had lived among the old ranchers, stock raisers and miners of the old wide open range days and sympathized with them. He saw how ruthless the Pinchot men could be if a man ventured to disagree with the statements they made even if they seemed very wild which many have since proven to have been. In fact, Edmonston himself would have been let out on what the writer considers to have been false charges if Dr. Hopkins had not had him transferred to the Bureau of Entomology in 1910.

WILLIAM BURKE TURNER
1867 - 1924

William Burke Turner was in charge of securing the cooperation of the private owners of timber in the Northeastern Oregon control project. Turner arrived at Baker August 3, 1910, and spent the field season of 1910 and April to July 1911 in the field on the project. January to April 1911 were spent at Bureau headquarters in Washington assisting Dr. Hopkins with plans and working for an emergency appropriation for forest insect control work.

Besides working with the private owners at Baker, Turner made a trip to Portland and Seattle in November 1910 to confer with several large owners of timber. Among these was Henry Hewitt, a tough old lumberman of bygone days. Turner was told by several that Hewitt would throw him out of the office if he asked for cooperation but they got along fine and Hewitt agreed to cooperate in control work.

In December 1910 a trip was made to Spokane to attend the meetings of the Western Forestry and Conservation Association. Turner made a talk on the pine beetle depredations which was received with a great deal of interest. The writer believes that this was the first time the subject was ever presented to that Association. J. F. Kimball of Klamath Falls was present at this meeting and first heard of the pine killing beetles. This caused him to check over the timber in his care on his return home and to apply for government assistance when he found some infestation. This application caused Edmonston and his staff to move to Klamath Falls in September 1911 and start the work that finally resulted in large scale insect control operations in southern Oregon.

On his trip back to Baker from Washington in March 1911, Turner visited Boston, Minneapolis, Two Harbors and Duluth to contact timber owners. In June 1911, Turner made a trip into central Oregon to look over bark beetle infestations reported by private owners. The heavily infested areas on the Paulina National Forest were found and reported.

Turner's work on the Northeastern Oregon project was very successful. He was enthusiastic about the work and knew how to get along with the old type individualistic timber owner and lumberman as well as with the politician. He assisted materially in getting the emergency appropriation for the control work and in getting the private owners to form the Baker Forest Protective Association on September 18, 1910. This Association probably was the first lumbermen's organization to contribute money to forest insect control work. Much more cooperation with the private owners probably would have been had if the work had been continued as started by Turner.

At the close of the Project in July 1911 Turner was ordered to Washington and assigned to Forest Insect Station 7 at Spartanburg, South Carolina. The remainder of the 1911 field season was spent with private owners who were losing timber by the depredations of the southern pine beetle and in working up public interest in forest insect control. Apparently no one was placed in charge of the work at Spartanburg and conditions became very unpleasant. In the upheaval that followed, Turner left Forest Insect Investigations and joined the staff of Gypsy and Browntail Moth Investigations as a special agent. This was about February 1, 1912.

April 14, 1914, Turner took the Civil Service examination for Scientific Assistant and was appointed to that position with Cereal & Forage Insect Investigations January 1, 1915. Several years were spent at the Hagerstown, Maryland, laboratory. About August 1, 1921, Turner transferred to the Sacramento, California, laboratory where he had charge of the insectary. Here he remained until his death June 11, 1924.

Turner was born in Indiana shortly after the close of the Civil War. At an early age he was apprenticed to a druggist and learned that trade. In the early 1880's the family moved to Yam Hill County, Oregon. Turner married there, inherited \$10,000 and farmed for a number of years. At the end of that time he had enjoyed life thoroughly but had no farm or money. He then was a pharmacist in Portland for a time.

In the early nineties one of the U. S. Senators from Oregon, who was a friend of Turner's father, had Turner appointed a clerk on the Senate rolls. For the next ten or more years Turner remained with the Senate. Just before he was to have received permanent status his Senator was defeated and Turner was dropped. Being a friend of Dr. Howard, the Chief, and Mr. Clifton, the chief clerk, of the Bureau, an Oregonian, and the Northeastern Oregon Project in progress, he was appointed an agent and sent to Baker about August 1, 1910.

So far as known to the writer, Turner published the following:

- 1918 Female Lepidoptera at Light Traps. Jour. Agric. Res. Vol. XIV(3): 135-149.

Some observations made that indicate that gravid female moths as well as males come to light and may be trapped before the eggs are laid.

- 1920 Lepidoptera at Light Traps. Jour. Agric. Res. Vol. XVIII(9): 475-481.

Results of further observations on moths attracted to lights. Gravid females composed 23.35 percent of all moths captured out of a total of 3,152 moths of 61 species.

- 1924 The Tule Billbug. Jour. Econ. Ent. Vol. 17(5):528-532.

Biology, economic importance and control of Calendra (Sphenophorus) discolor Mann., an enemy of small grains planted on newly reclaimed swamp lands.

JOSEF BRUNNER



(left to right) Brunner and Webb while on a field trip in the northern Rocky Mountain region. August 1910.

Josef Brunner was a native of the German state of Bavaria. After graduating from one of the German forest academies and working for the Bavarian forest service for a few years, Brunner became interested in big game hunting and came to the United States and Montana about 1900. He hunted and wrote hunting stories for such magazines as "Outing." These stories attracted attention and he was requested to write a nature book for the Boy Scouts of America. "Tracks and Tracking" was published by the Outing Publishing Company in 1909 and has been used for a number of years as a reference book for the Boy Scouts.

While hunting in the Snowy Mountains of central Montana, Brunner in 1908 noticed quantities of dying pine and studied the same. Finding insects under the bark he started corresponding with Dr. Hopkins and was invited to join the staff of Forest Insect Investigations and to conduct a control project against the mountain pine beetle which was the destructive species. This project was so interesting and such a success that Brunner remained with the staff and continued the investigation of forest insects in Montana.

When the forest insect field stations were established in 1911, Brunner was placed in charge of Station 1, the Northern Rocky Mountain station, with headquarters at Columbia Falls, Montana. Several years later headquarters were moved to Missoula. Studies were made of the Black Hills beetle in eastern Montana and of the mountain pine beetle and western pine beetle in western Montana. Several control projects were carried on in cooperation with various owners. Special work was done on pitch moths and three Department bulletins were published: #111, "The Sequoia Pitch Moth, A Menace to Pine in Western Montana"; #255, "Douglas-fir Pitch Moth"; and #295, "The Zimmerman Pine Moth."

Brunner continued with Forest Insect Investigations until 1917 when because of serious differences with Dr. Hopkins he was separated from the service. He then moved to West Virginia to engage in farming. In the opinion of the writer Brunner was a good investigator and a keen observer.

GEORGE HOFER
1863 - 1944



Hofer was one of the men selected by Edmonston from among the woodsmen employed on the Northeastern Oregon project for a permanent appointment as Agent. He was born in Switzerland, but little is known about his early life. Previous to his employment by the Bureau of Entomology, he seems to have been engaged in mining activities around Sumpter, Oregon.

Edmonston had Hofer with him on all of his moves after the Northeastern Oregon project closed down. They were together at the field stations at Klamath Falls and Ashland, Oregon, Colorado Springs, Colorado, and Tucson, Arizona. Hofer was promoted from Agent to Entomological Ranger and then to Scientific Aide and had reached the Senior Grade when he was retired in October 1927 for disability.

Hofer was a careful worker and much of his time was spent on collecting and studying the biology of forest insects in Colorado and Arizona. Many of the records on round-headed borers published by F. C. Craighead and on flatheaded borers published by Burke were made by Hofer. He published

Farmers' Bulletins 1154 "The Aspen Borer and How to Control It," and with Craighead Bulletin 1197 "Protection of Mesquite Cordwood and Posts from Borers."

Hofer seems to have been a confirmed bachelor all of his life. His personality was such that he was always well liked by everyone who became well acquainted with him and he formed many lasting friendships. He always referred to himself as "Geehofer" and was usually called this by his friends. Before his retirement he bought a dessert place near Sabino Canyon which he called his "cactus ranch" and it was here that he died March 25, 1944, at the age of 80.

*Submitted
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BARTLE T. HARVEY

Bartle T. Harvey was forest assistant on the Crater National Forest of western Oregon in 1910. Because of difficulties with the Supervisor, Harvey was transferred to the Whitman about June 1 and assigned to the insect work. After some instruction in insect reconnaissance, Harvey made a survey of the Wallowa Forest and then a trip through central Oregon and the Blue Mountains of southeastern Washington, reporting on insect conditions in the Malheur, Deschutes and Wenaha Forests. Despite this work which was very satisfactory to the Bureau, Harvey was asked by the Forest Service to resign and did so on November 30, 1910.

Harvey was the son of F. L. Harvey who was entomologist of the Maine Agricultural Experiment Station and Professor at the University of Maine about 1889 to 1900. Due to a change in administration Professor Harvey lost his position and killed himself. This tragedy had an unfortunate influence on the growing son which he was never able to overcome. It developed into a distrust of his fellowmen which probably explains some of the actions which followed.

Harvey was a graduate of the University of Maine and of the Yale Forest School. After graduation he worked one year for a Maine timber company and then took the U. S. Civil Service examination. From this he was appointed a forest assistant in the Forest Service and assigned to District 6. Upon his resignation after the 1910 work on the Northeastern Oregon Control Project, Harvey went to Portland and took up newspaper work. This was not very successful.

Some time in 1912 Harvey was appointed an entomological assistant in the Bureau of Entomology and assigned to Forest Insects. His first problem was the study of fire-killed and insect-killed timber to determine the damage caused by borers and other insects. Most of this study was conducted in the lower Columbia River basin.

When Forest Insect Station 6 was moved from Klamath Falls to Ashland in the winter of 1912, Harvey was stationed there and made a study of the California Prionus and the effect of the root-boring habits of its larvae on the dying of the tops of oaks and other trees. I believe he discovered that the larvae left the roots to pupate in the soil.

In 1913 Harvey was transferred to Station 2 at Colorado Springs. This transfer was made against his wishes. While in Colorado, Harvey made a number of very good notes on the biologies of various species of Buprestidae.

Late in 1915 or early in 1916, because of a matrimonial tangle, Harvey was transferred to Station 1 at Missoula. This transfer was supposed to give him another chance, but orders went ahead to Brunner in charge of Station 1 that Harvey was no good and to get rid of him. At this time, the relations between Brunner and the Chief of Forest Insects were not too good, so Brunner and Harvey got together and preferred charges against the Chief. The charges were considered, the Chief was reprimanded, but Brunner and Harvey were separated from the Service in 1916.

Late in 1916 or early in 1917 Harvey obtained a position as entomologist with the Brazilian government. For several years he was stationed at the National Museum in Rio de Janeiro. Later he left the Service and became an English teacher. Several years ago the last edition of the Naturalists Directory listed the name of Harvey as still interested in insects.