

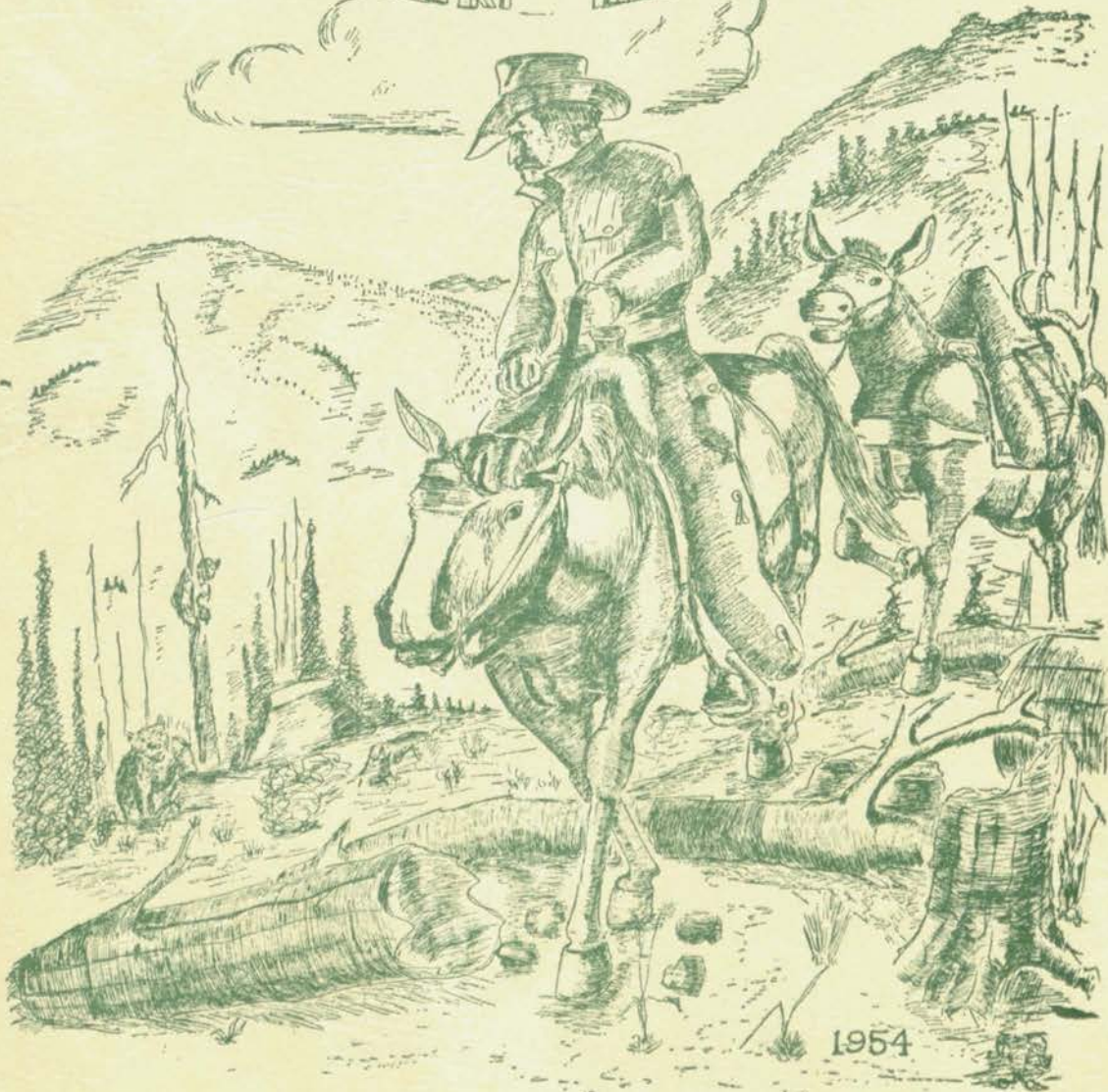
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BOOK NO. 1

FORESTRY KAIMIN

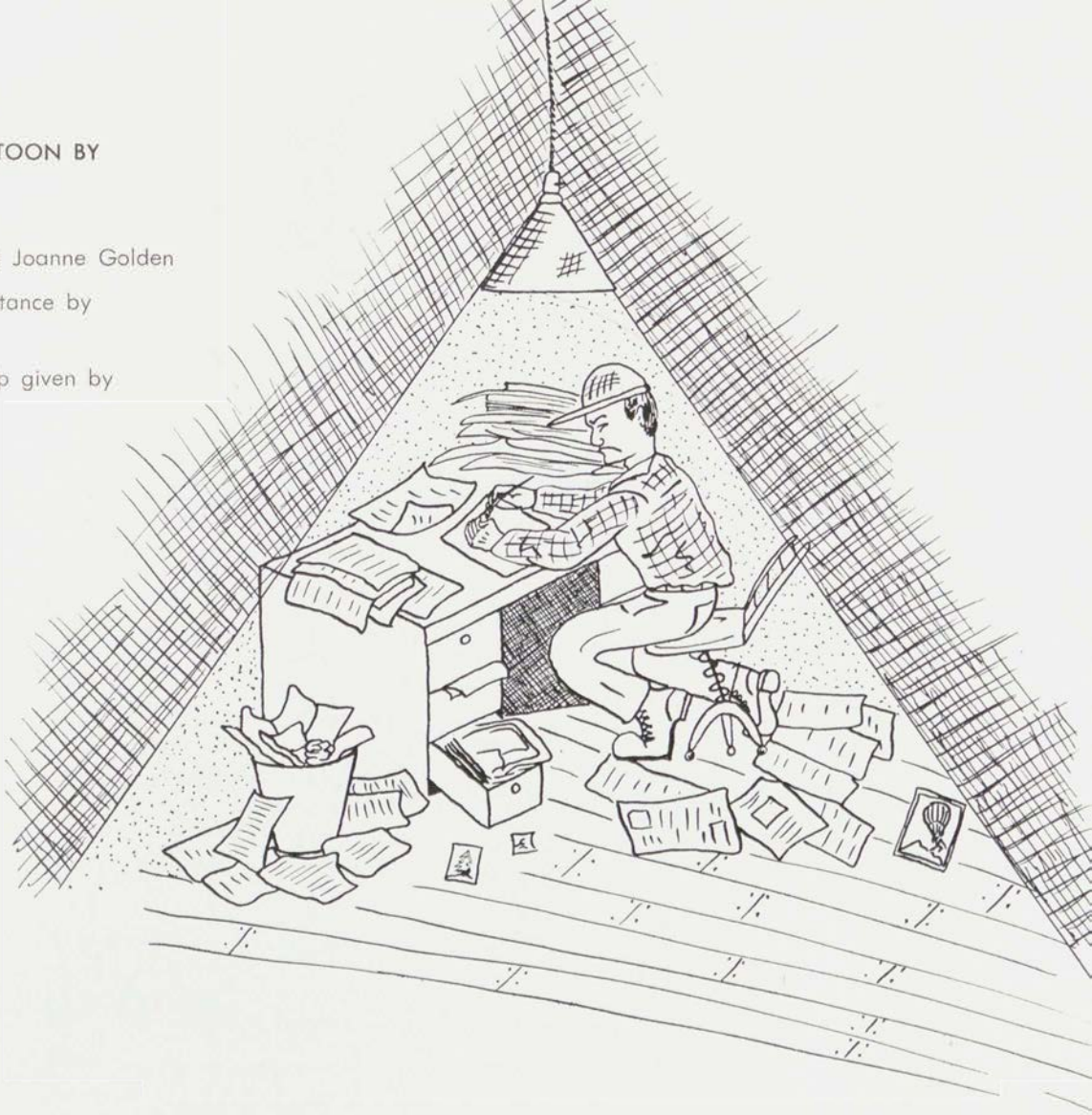


COVER AND CARTOON BY
DAVE OWEN

Cartoons by
Wayne Fichtel and Joanne Golden

Photographic Assistance by
Howard George

Thanks for the help given by
the ad chasers



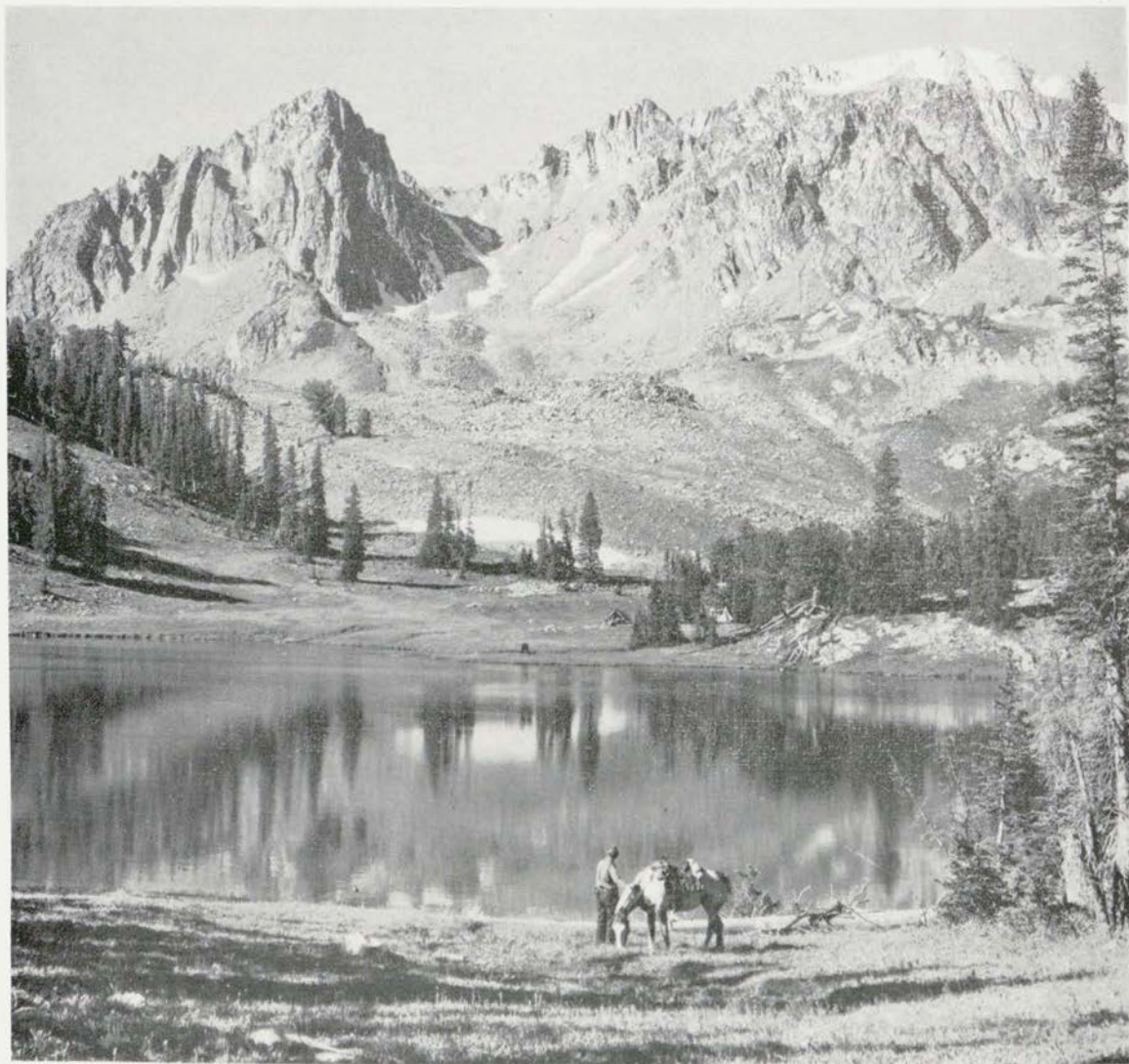
AGAIN

by

AL KELLEY, JR.

What a mad race
With deadlines to face,
With work to be done
Always on the run,
With hours of hard sweat —
Always something more to get;
But it was our fate
To be terribly late
Just nothing went right
Neither day nor night.
That's how it seemed,
But what did it mean?
The Kaimin of course.
What other great force
Could cause that struggle
To straighten the muddle?
But now that it's done
We can say it was fun,
And proudly we report
After a fashion of sort
As was always our aim
Here it is again . . .

The Forestry Club's



1954

Forestry Kaimin

Dedication



It is doubtful if any one individual has done as much for the Forestry School as "Tom" C. Spaulding. A graduate of the University of Montana in 1906, he later took his masters degree at the University of Michigan. Then followed jobs as supervisor of the St. Joe and the Lewis and Clark Forests. He became a professor here when the Forestry School was known as the Ranger School. He became dean in 1923.

During the approximately twenty years that he served as dean, he did much for the school and its students. The students were free to come to his house and consider it home; he was like a father with his warm, understanding heart and his willingness to help them with their problems. The school benefited from his great interest in providing proper facilities for education.

He was largely responsible for the acquisition of many of the major improvements in the Forestry School. Among them were the Forest Nursery obtained in 1927, Arboretum in 1932 (no longer existing), and the Lubrecht Forest in 1938. In addition he devoted much of his time and effort in helping secure buildings and campus improvements.

The school lost him as dean in 1944, but he remained as a professor. In the summer of 1952 he received an honorary Ph.D. degree from the Baltimore School of Forestry. Last year he retired from the school staff. This summer, to the sorrow of all those who knew him, Tom Spaulding passed away.

We, the members of the Forestry Kaimin Staff, feel therefore that it is only fitting that this issue of the Kaimin should be dedicated to him.

Foreword . . .

Once again the foresters complete another successful year — including Bertha. She's still with us, despite the efforts of the New Hall girls, Kams and Dregs, and the Lawyers.

Coach Helwig and his teams were active in intramural sports. They made a terrific showing and took second place in the intramural standings.

Kaimin Staff . . .



Sitting, left to right: Zane Smith, editor; Ted Reiger, photo editor; Jack Hautzinger, business manager; Paul Bruns, advisor, and Jan Dickey, feature writer.

Standing, left to right: Dick Johnson, associate editor; Al Kelley, layout manager; Pete Stofie, feature writer, and Glenn Freeman, photo developer. Russ Dahl, advertising manager (not present).

Thanks to Johnny Lowell and all those who helped him, this years Forester's Ball was a great success. Life Magazine came, the gym floor warped, and the foresters made money. What more could happen to make a more unusual, yet successful ball?

The Kaimin Staff wishes to present to you this permanent record of 1953 - 1954.

Some Sampling Techniques Used in Inventory of Mature Forest Stands in the Northwest

by MYRON B. SAVAGE and DON A. STUBB, Rayonier Corp., Hoquiam, Washington

OUTLINE

1. Objectives
 - a. Management Requirements.
 - b. Photography Needed to Conduct the Survey.
2. Methods of Sampling
 - a. Plot Size.
 - b. Number of Samples Required.
 - c. Distribution of the Sample.
3. Method of Recording the Sample Data
 - a. Tabulation and Analysis.
 - b. Tabulation of Information (Plot Cards).
4. Statistical Analysis of the Sample
 - a. Basic Considerations.
 - b. The Arithmetic Mean.
 - c. The Variance and Standard Deviation.
 - d. Coefficient of Variation.
 - e. Standard Error of the Mean.
 - f. Sampling Error.
5. Summary
6. Bibliography

1. OBJECTIVES

Vertical Aerial Photographs have become a must in inventory studies, and their use has significantly and economically aided foresters in cutting costs, constructing better, more accurate planimetric as well as topographic maps. Conventional systems of inventory in the past have not only been very time consuming but have not provided significant information of any proof of the results. Application of statistical analysis to inventory information must necessarily be based upon a sample of some size, shape or entity. A strip line system, a method most commonly used is difficult if not impossible to correctly analyze and evaluate. It does not lend itself to statistical analysis unless the estimates are kept separate by some uniform unit.¹ Errors in pacing result in inaccurate map construction and inaccurate estimates.

a. Management Requirements

It is not the intent of this paper to discuss methods and techniques of photo interpretation and mapping. Needless to say such a subject requires a separate treatise.

Therefore, the reader must assume that good aerial photographs have been used, a desirable scale of 1:12000, 12 inch focal length, panchromatic minus blue, and that standard photogrammetric techniques of map construction have been employed with the resultant transfer of the interpreted forest stands to the base sheet by some form of radial plot.

The completed base map showing the forest

types to be inventoried serves as a basis of area determination and forest types concerned.

The requirements of good forest management dictate that sampling error, the error that is possible if the sample is not truly representative of the unit sampled, shall not exceed plus or minus 10% of the actual volume of the stands. A 95% probability is considered essential. These requirements mean that any estimate submitted for use in planning must be within plus or minus 10% of its true value, exclusive of technique errors, ninety-five (95) times out of a hundred. In this case, it is 2 Standard Deviations, one Standard Deviation being only 67% of the time.² Management requires not only a good estimate of the forest stands but an accurate map showing the area of any type and its proper geographic location. Vertical aerial photographs make possible both of these requirements.

b. Photography Needed to Conduct the Survey

Experience in the Northwest hemlock-spruce area thus far, indicated vertical aerial photographs exposed at 12,000 feet above the mean datum with a 12" focal length camera using panchromatic film with a minus blue filter to be the optimum for most efficient use. Various altitudes, focal lengths, film and filters have been experimentally tried, but none of the other combinations offers so much general use as the panchromatic minus blue. The principal advantage of infra-red film over panchromatic is the more apparent contrast between deciduous and coniferous species. To the inexperienced interpreter this becomes paramount and the other disadvantages of infra-red are overlooked. Shadows appearing in the photos, because of the extreme contrast register very black and detail cannot be seen in them. In the rougher terrains this disadvantage becomes more ominous. In dense forest stands of full stocking normally found in the hemlock belt the few holes in which the ground might have been seen on a panchromatic film are, in the most instances, too black to discern any detail whatever on infra-red. This disadvantage is of increasing importance if either elevational or tree height determinations are to be made. Finally, experience will show that although forest typing differentiations may be more easily made on infra-red photography just as accurate typing can be made on panchromatic

(Continued on Page 14)

¹ Timber Cruising, Girard and Gevorkiantz.

² Refer to any book on statistical methods.



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Ph.D.—University of Nebraska—1936
Plant Ecology, Forest Botany and Plant
Anatomy



A CLASS IN ACTION



MRS. HELEN ETTINGER

Librarian



Office Staff

DONNA GOODMANSEN and LOIS LARSON
Secretaries



The latest additions to our faculty staff...



GENE S. COX—Gene has received all of his education at Duke University, getting his B.S. in 1947, his M.F. in 1948, and his Ph.D. in 1953. During World War II he spent three and one-half years in the Army Transportation Corps, seeing duty in the South Pacific, India, and Europe. During the summer of 1947, Gene was research assistant in the Plant Physiology Laboratory at Duke, and from 1948 to 1949 he was research forester for the Duke School of Forestry. Prior to coming to MSU in 1953, Gene spent the years 1951-53 as assistant professor of forestry at the Stephen F. Austin State College, Nacogdoches, Texas. This past summer he spent doing research on soil factors influencing the growth of Ponderosa Pine in Western Montana.

LOUIS W. POWELL—Louis received his B.S.F. in forest management from Oregon State College in 1950, and his M.F. in silviculture from Duke University in 1951. He spent two years, eight months in the Infantry, in both Germany and Japan. During the summers of 1946-47, Louie worked for the USFS in the Rogue River National Forest. In 1949 he spent the summer working for the Oregon State Board of Forestry, and spent the summer of 1950 with the Magnolia Lumber Co., Ashland, Oregon. During the next three years he worked again for the Oregon State Board of Forestry. From July, 1951, through March, 1953, he was at Astoria, Oregon, and from March, 1953, to November, 1953, he was at Salem, Oregon. During this time he worked on inventory and management planning of 140,000 acres of state-owned land in Clatsop County, Oregon, doing the inventory work with the use of aerial photos. He spent this past summer scaling on the Lolo. As for his future, Louis hopes to continue teaching and to get his Ph.D. His main interest is in aerial photo interpretation.



JAMES O. KLEMMEDSON—Jim is a native of Colorado and has had his schooling in Texas, California, and in his home state of Colorado. He spent two and one-half years at the University of Texas and then graduated with his B.S. degree from the School of Forestry at the University of California in 1950. In 1953 he received his M.S. in range management at Colorado A. & M. College. Jim spent the summers of '44, '45, '47 and '48 working as an engineering aid, under the Soil Conservation Service in Colorado. As a soil conservationist he worked from June, 1950, to September, 1951, on farm and ranch planning in the San Luis Valley. In the summer of 1952, Jim was ranch planning in the White River country, and in the summer of '53 was working on the agriculture conservation program in North and Middle Parks, Colorado. In September of 1951 he was back at Colorado A. & M., this time as an instructor in range management and as range conservationist for the Colorado Agriculture Experiment Station. He left there in June of 1952. This past summer, Jim worked for the Montana Department of Fish and Game, doing a range survey of the Blackfoot-Clearwater Game Range. Jim enjoys teaching and doing research work, and hopes someday to return to the University of California for his Ph.D. His primary interest is soil-plant relationships.

JAMES L. FAUROT—Jim is a native of the Dairy State of Wisconsin and is 31 years old. He received his B.S.F. here at Montana in 1949, and did graduate work here in 1950 and 1951. He has also spent three years in the Air Force in England and Germany. Jim spent the summer of 1946 as an engineering aid for the USFS, and in '47 was on a survey crew in McNary, Arizona, for the Southwest Lumber Mills, Inc. In 1948 he spent the summer as a cruiser for J. Neils Lumber Co., Libby; worked on timber sales for the USFS from June, 1949, to December, 1949, at Trout Creek, Montana, and was logging engineer for the E. L. Johnson Logging Co., Tuscara, Montana, from May to November, 1950. In 1951 and 1952, Jim was back at MSU as an instructor in forest engineering. He left the Forestry School to go to Medford, Oregon, as district engineer on the Medford Forest District. Jim is happily enjoying teaching, but does hope to take time out for his Masters in logging engineering at either Washington or Oregon State. Someday hopes to get his Ph.D.—probably in ecology.



DON M. DRUMMOND—Don was born on the Hopi Indian Reservation in Arizona and did his early growing up in northern Idaho until his senior year in high school. He finished his last year of high school and his college work in Utah, receiving his B.S.F. from Utah State Agricultural College, School of Forestry, Logan. In 1939 he received his M.F. at Louisiana State University, Baton Rouge. Don is married and has three children. Following school he worked with the Forest Service on the Cache and Wyoming National Forest and on the Uintah and Ouray Indian Reservation in Utah. From 1939 through 1942, he was an instructor in forestry at Arkansas Polytechnic College, Russellville, Ark., and through 1943 was an instructor in aerial navigation at Thompson-Robbins Field, Helena, Ark. From 1943 through 1948 he was assistant state fire warden for the state of Utah, and from 1948 to 1953 held the same position plus being extension forester in Nevada. At present Don has been teaching courses and doing research in the field for forest fire control in his capacity as assistant professor here at MSU. He is particularly interested in the use of tractors and weather influences on fire behavior, and hopes to do research on fire control problems in the Northern Rocky Mountain area. Along with this work, Don hopes to develop an effective way to teach forest fire control as a course.

Masters



A STUDY OF THE PONDEROSA PINE RISK RATING SYSTEM

by JOHN S. SPENCER, JR.

The western pine beetle (*Dendroctonus brevicomis* Lec.) presents a serious threat to the ponderosa and Jeffrey pine stands of the Western United States unless control measures are taken. Methods for the control of this bark beetle have involved many factors, and one method, the ponderosa pine risk rating system, has been highly successful in certain portions of the country.

The ponderosa pine risk rating system is an indirect method of beetle control developed in 1937 by the U. S. Bureau of Entomology and Plant Quarantine at Berkeley, Calif., working in cooperation with the California Forest and Range Experiment Station. The risk rating system involves the removal from a stand of trees those which are classified as being of high susceptibility to bark beetle attack. Cuttings of this type are called sanitation-salvage cuts and allow rapid speed of coverage of the affected area as only a small percentage (approximately 16 per cent by volume) of the stand is composed of high-risk trees. The residual stand is "bug-proofed" for an average period of ten years after logging by this system.

Studies conducted by the Berkeley Forest Insect Laboratory provide conclusive proof of the effectiveness of the system to protect the reserve stand. Results of these studies showed that a removal of about 16 per cent of the stand by volume resulted in a reduction of insect losses by more than 70 per cent over a ten-year period.

A study conducted by the writer to determine the correlation between rate of growth and risk classes found equally satisfactory results. It was learned that there is a significant difference between rate of growth and individual risk classes. There is also a definite gradation in growth rates with risk I trees

THE DEVELOPMENT OF REPRODUCTION FOLLOWING A SEED TREE CUTTING OF A LARCH STAND IN NORTHWESTERN MONTANA

by WILLIAM J. FREDEKING

Recently the Northern Rocky Mountain Forest and Range Experiment Station of the U. S. Forest Service gathered data on stand development following the seed tree cutting of a western larch (*Larix occidentalis* Nutt.) stand. The stand under consideration had been logged by commercial methods in the period 1942 to 1945. The author's purpose was to analyze the information gathered and to determine whether a 76 per cent by volume cutting, without any seedbed preparation or other reproduction considerations, would reproduce larch as against its associate species.

The analysis disclosed that seven years after logging the area was only 49 per cent stocked to all reproduction. This included reproduction on the area at the time of logging as well as reproduction subsequent to the cutting. An additional 10 per cent of the area was covered by large residual trees and considered unavailable to reproduction. Larch maintained a slight advantage in the new stand over its associate Douglas fir [*Pseudotsuga taxifolds* (Poir.) Britt].

If the attempt is to reproduce western larch, the productivity obtained by this method of logging is generally considered low. A larger residual stand of larch seed trees, some seedbed preparation favoring larch reproduction, or both appears necessary to obtain satisfactory larch reproduction.

exhibiting the fastest rate and risk III and IV the poorest.

Thus the ponderosa pine risk rating system is desirable from a silvicultural as well as an entomological basis and satisfies most of the objectives of forest management.

Seniors



ED BARKMAN

Ed hails from Watkins Glen, N.Y. He is a timber management major. In 1951 and 1952, he worked at the Forest Nursery and in 1953 worked for the county surveyor.



DONALD C. CALHOUN

Don is a forestry major from Inglewood, Calif. He has attended El Camino College and U.C.L.A. Since coming here, he has played a year with the Forestry Club softball team. Don spent four seasons on the Sequoia National Forest doing K.V., fire guard, and suppression crew foreman.



GEORGE A. DEVAN

A range management major from Missoula, George spent his summer of '51 working for the Idaho Fish and Game Dept.—Fisheries Division. In 1952, he worked on the Tongas National Forest in Alaska. In 1953, he worked at Lolo R. S. doing fire fighting.



JACK M. DOLLAN

Jack is another timber management major and hails from Missoula. He is a member of the Forestry Club and a member of Druids for 2 years. Served as treasurer of Forestry Club his senior year; also assisted with Forestry Ball finances. Jack has spent 3 seasons on the Powell Ranger District, Lolo N. F., as fire control aide and timber aide doing cruising, scaling and spruce beetle detection work.

RICHARD A. FAUROT

Richard, a timber management major from St. Croix Falls, Wis., is a member of the Forestry Club, and has served as assistant chairman of the exhibition room committee of the Forester's Ball. He has also served on the wood butcher's committee and in 1953 was the editor of the Kaimin. He is a member of Scabbard and Blade and intra-mural forestry ski team. In 1950, he worked with the B.R.C. on the Cabinet N.F. In 1951, he worked in the mill at the Lincoln Lumber Co., and 1952-53 saw him as a smokejumper out of Missoula.



FRANK A. FOWLER

Frank hails from Lanham, Md. While here at MSU he has served as bull cook in the Forestry Club, a member of Phi Sigma, and president of Wesley Foundation. He has also played softball, basketball and volleyball. His summer work consists of a year of range research in Miles City and two years as a smokejumper. Frank is a timber management major.



DAVID A. GRAHAM

Another timber management major from Missoula, Dave has been active in Forestry Club and helped on Forester's Ball. He is a member of Lambda Chi Alpha and the Air Force Reserve. He is also on the honor roll. The summer of 1945 he started working on the St. Joe N.F. with the B.R.C. and has worked there since, except the fall of '49 when on the Cabinet N.F.



PHILIP C. HANSON

Phil is a timber management major from Missoula. He was active in Forestry Club, as chairman of gym decoration on Forester's Ball for 3 years and business manager of Kaimin for 3 years. He is an active skier, and also a member of Druids. In 1950, he worked on the Salmon N.F., in 1951 and 1953 out of McCall, Idaho as a smokejumper, and 1952 worked on the Boise N.F. with the Idaho Timber Survey.



ELBERT B. HILL

A forest management major from Champion, Neb., Elbert was a member of Forestry Club and helped on Forester's Ball. In 1951 he worked with the USFS in Kingston, Idaho, as a headquarters guard. In 1952 he was there again as head scaler on timber sale to Ohio Match Co. 1953 saw him working at Hanson's Conoco station and dear old MSU.



DICK JOY

Dick comes from Alexandria, Va., and is a range management major. He attended San Francisco State College in 1949-50. He was active in Forestry Club, serving as property manager, assistant treasurer and treasurer. Also worked on Forester's Ball. Dick is a member of Druids, Scabbard and Blade, Pershing Rifles and Sigma Chi. Was also on Forestry Club bowling team. He spent a season on Plumes N.F. with B.R.C. and three seasons on Beaverhead N.F. as headquarters guard and alternate ranger.



FAY KISER

Fay is a timber management major from Lonview, Wn. An active member of Forestry Club, Fay was president of Druids, on the athletic board of the club, and has worked on Forester's Ball. He was active in softball and touchball. In 1950, he worked in a sawmill in Missoula, 1951 as a carpenter's helper, 1952 he scaled for the USFS, and in 1953 worked on school forest.





EVERETT KYTONEN

JOHN H. LOWELL

John hails from Sioux Falls, S. D., where he attended South Dakota State College in 1950. John is a timber management major. He was active in Forestry Club as Chief Push for this year's Forester's Ball. He was vice president of Druids and a member of Wesley Foundation and a talented square dance member of Royals. He spent the summers of 1952-53 working out of Missoula as a smokejumper.



BARTLETT McNAMEE

Bartlett come from Scarsdale, N. Y., and is a timber management major. He was active in Forestry Club and served as chairman and advisor on gym decorations committee for Forester's Ball. He is a member of Alpha Phi Omega, Phi Delta Theta, and was on Frosh football. In 1950 he worked on Nez Perce N. F.; 1951, mail carrier in Scarsdale, and 1952-53 worked on St. Joe with road location and timber management.



DANIEL J. O'ROURKE

Another range management major, Dan hails from Santa Barbara, Calif. He was doorway chairman and advisor on Forester's Ball for four years. An active member of Forestry Club, he served as spring hike chairman one year and chief cook for three years. Dan is a member of Druids. He spent two seasons in Missoula as a smokejumper. The past year he was assistant ranger on Anaconda District of Deerlodge N. F.



JAMES A. PFUSCH

James hails from Valley City, N. D., and in 1949-50 attended State Teachers College there. He is a timber management major. Jim has been vice president of Forestry Club and chairman of gym and bar decorations for Forester's Ball. Also a member of "Old Forester's Quartet", and intra-mural swimming. He cruised timber for J. Neils in 1952 and was ditpatcher on the Lewis and Clark N. F. in 1953.



HENRY J. PISSOT

Henry is a forest management major from Butte. He is married and has children. He has worked for Northern Rocky Mountain Forest and Range Experiment Station. Did timber survey in Idaho and Montana in 1951-52-53. Summer of 1954, he prepared a report entitled: "Forest Resources of North Idaho."



MARTIN E. REED

Martin is another timber management major from Missoula. He is a member of Forestry Club, served on the loan fund committee, and was senior representative to executive board. He was chairman of chow committee 1953 and 1954 Forester's Ball, and also a member of Druids. Was on Forestry bowling team his fourth year. In 1951-52-53 worked for Northern Rocky Mountain Forest and Range Experiment Station Economic Survey.



GEORGE E. STONE

George was active in Forestry Club, was cook his last year, and helped out on Forester's Ball. He is a member of Druids and "Old Forester's Quartet." He was a member of campus grounds committee. He is a timber management and utilization major, hailing from Missoula. He spent three seasons on Flathead N. F. doing timber sale work and assistant dispatcher.



MONTÉ SUPOLA

Monte is a range management major from Pompey's Pillar, Mont. Worked on Forester's Ball and has been on Varsity-Freshman football, and intra-mural softball. He was lookout in 1951, carpenter in 1952, and was headquarters guard at Wisdom in 1953.



WILLIAM M. TALIAFERRO

Bill is a forest management major from Bartlesville, Okla. He attended U. of Tulsa a year before coming here. He worked on Forester's Ball and in charge of layout for 1953 Kaimin. He is a member of Wesley Foundation. He was with B.R.C. on the Clearwater N. F. in 1950, on fire crew on Coeur d'Alene in 1951, brush disposal at Kingston in 1952, and timber marking at Kingston in 1953.



ROBERT H. WALKUP

Bob is a forest management major from Hayward, Calif., attending U. of Calif. before coming here, where he was on the Glee Club and Varsity wrestling. He spent two seasons on B.R.C., two as F.C.A. on the St. Joe, and four as smokejumper in Missoula.



JAMES H. WHITE

Jim is a forest management major from Great Neck, N.Y. He is a member of Forestry Club and active with Forester's Ball. Jim worked two seasons on Kaniku N. F., and one season on Lolo N. F. in fire suppression work, cruising, and scaling.



HARRY S. WOFFENDEN

A timber management major, Harry hails from Eureka, Montana. He is a member of Forestry Club and likes hunting and fishing. In 1951-52, he worked for J. Neils Lumber Co. as cruiser and road location.



GERALD G. WRIGHT

Jerry is a timber management major from Ripon, Wis. Attended Mich. Tech. and Ripon College before coming here. He was president of Forestry Club, served on doorway committee, and advisor for Forester's Ball. He is a member of Druids, and Silent Sentinel his fourth year. He was also in intra-mural sports. Worked on B.R.C. in 1949-50, Division Forest Pathology in Missoula in 1951-52, and J. Neils Lumber Co. in 1953.



Some Sampling Techniques

(Continued from Page 5)

by the experienced interpreter and will, in addition, have the other advantages of better detail for other determinations. Few photographers can successfully expose good infrared, primarily due perhaps to inexperience as well as the fact that most aerial cameras are not corrected from the standard manufacturers calibration for the exposing of panchromatic film.

Photographs exposed at lower elevations than 1:12000 (1000 feet per inch) do not reveal such additional information to the forest interpreter to be of significant economic value to warrant the additional cost of flying. Conversely, photos at scales smaller than 1:12000 do significantly decrease the information available to the interpreter to warrant the expense at 1:12000. Such photographic coverage varies from 1½c to 3c per acre depending, of course, upon the difficulty or risk of the contractor in complying with the specifications.

2. METHODS OF SAMPLING

a. Plot Size

One of the problems faced in setting up inventory procedures for mature timber stands is the selection of the most efficient size and shape of plot. A field sample of various sizes of rectangular and circular plots taken in a typical area revealed experience similar to that of Johnson and Hixon.³ The circular plot was soon eliminated because it had a higher coefficient of variation and a circular plot was more difficult to take in dense brush and down logs than a rectangular plot which can be run as a strip.

The one-half (½) acre plot, 1 chain by 5 chains, was selected as the most efficient plot. This decision was reached on the basis of the lower coefficient of variation and the fact that travel conditions in the area are often extremely difficult due to brush and down timber. Therefore considerable time is saved by taking a fewer number of large plots over taking a greater number of smaller plots.

b. Number of Samples Required

The number of plots required in order to meet the standards of accuracy set up by management is computed by use of the following formula.⁴

$$n = \frac{N \times T^2 \times C^2}{Na^2 + T^2 \times C^2}$$

where

n = number of plots to be taken

N = total number of possible plots (Area to be sampled timber number of plots/acres)

T = standard deviation

C = coefficient of variation (as a decimal)

a = allowable sampling error (as a decimal)

See Table I for the effects of area, coefficient of variation, and sampling error on sample size.

In Table IA note that once the sampling area reaches 640 acres any additional increase in the size of area does not materially affect the number of plots taken. Also note how radically the percent of cruise increases as the area drops below 640 acres in order to maintain the given standards.

Tables IB, IC, and ID demonstrate the great influence of coefficient of variation on the number of plots required to maintain the sampling error of plus or minus 10%. Reducing variation by finer stratification of the timber stands is apparently the only practical means of reducing the required number of plots.

Table IE shows the tremendous reduction in the required number of plots achieved by increasing the allowable sampling error. The practicality of this means is quite limited.

In Table IF it is seen that, in larger acreages, the size of the plot does not materially influence the number of plots required. However, experience has indicated that at least on the coastal area of the Olympic Peninsula, the coefficient of variation of a 1/5 acre rectangular plot will usually be about 20% higher than that for a one-half (½) acre rectangular plot which will approximately double the number of plots required. Because of the difficulty of field travel in that area this is a very important factor to consider.

c. Distribution of the Sample

In order to be reliable a sample must be representative. It should also be a random sample. However, many believe that the application of sound judgment to the problems of taking the sample will give results more accurate than those obtained by a purely random sample.

The stratified area is divided into a sufficient number of blocks to assure a representative distribution of the sample. The plots are apportioned to these blocks in proportion to the percentage of the merchantable area in the block. These plots in each block are apportioned among the various merchantable timber types in proportion to the percentage of area of each type in the merchantable area of the block.

Next the area is marked into ten (10) acre squares and numbered across the top and down the side. Using a table of random numbers select the location of the plot.

(Continued on Page 22)

3 Floyd A. Johnson and Homer J. Hixon, "The Most Efficient Size and Shape of Plot to Use for Cruising in Old Growth Douglas Fir Timber," *Journal of Forestry*, Jan., 1952, pp. 17-20.

4 Timber Cruising. Girard and Gevorkiantz.



Hearing the Pledge

Taking the Oath

Forestry Club Initiation:



Kissing Bertha

Off to the Law School

Signing After the Climb

**Here's
How
It's
Done!**

Executive Board



Back row, left to right: Lew Foster, vice president; Ted Reiger, Kaimin photo editor; Jack Hautzinger, Kaimin business manager; Bill Taliaferro, property manager; Gene Kuhns, vice president of conclave; Dick Johnson, sophomore delegate; Zane Smith, Kaimin editor; Dave Owen, assistant treasurer; Larry Helwig, Senior athletic manager.

Front row, left to right: John Lowell, chief push; Jack Dollan, treasurer; Jerry Wright, president; Bill Overdorff, secretary; Joe Meuchel, conservation officer.

Club

Seniors...



Back row, left to right:
Front row, left to right:

Bill Taliaferro, Bill Overdorff, Dick Joy, Gene Kuhns, Phil Hanson, Jim Pfusch, John Lowell
Fay Kiser, Marty Reed, Dan O'Rourke, Frank Fowler, Dick Faurot, Larry Helwig

Juniors...



Back row, left to right:
Middle row, left to right:
Front row, left to right:

Ted Reiger, Pete Stoffle, Lew Foster, John Holden, Bob Poole, Adrian Grill
Ralph Jaskowski, Ralph Emerson, Jim Eckland, Adrian Swenson, Al Kelley, Bob Greenan
Bud Hanson
Jack Hautzinger, Bob Moore, Jack Chamberlin, Dave Owen, Don Williams, Joe Meuchel

Sophomores...



Back row, left to right: Kelsey Smith, Barney Sedlacek, Dick Johnson, Jean Campbell, Dick Sandman, Joanne Golden, Arne Royce, Harlan Hayes, Pete Leveque
 Middle row, left to right: Tom Patterson, George Grandy, Dan Daniels, Pat Ryan, Jerry Omundson, Gary Seitz
 Front row, left to right: (kneeling): Greg Eilerman
 Ken Cardwell, Jim McLain, Al Crozer, Jack Phelps, Pete Heinz, Dal Johnson

Freshmen...



Back row, left to right: Sonny Clark, Don Morrissey, Carl Neufelder, Jack Hoffman, Ed Bloedel, Charles Thorsen, Wayne Todgey
 Middle row, left to right: Whitney Schmitt, Al Morris, Joe Duft, Rich Gibson, Tom Kovalicky
 Front row, left to right: Jim Pfadt, George Arnold, John Galea, Mary Meagher, Jan Dickey, John Pinter

Members



Awards

RALPH JASZKOWSKI won this year's Silas Thompson, Jr., Award, given each year to a junior in the Forestry Club, for his outstanding curricular and extra-curricular activities during his sophomore year.

This \$150.00 scholarship is given by Dr. and Mrs. Thompson each year in honor of their son, Silas, who died in the Man Gulch fire of 1949.

GEORGE STONE was the recipient of the 1953 Alumni Award. This award of \$25.00 is given to the outstanding junior in forestry each year, at the annual awards convocation.

Montana Druids...

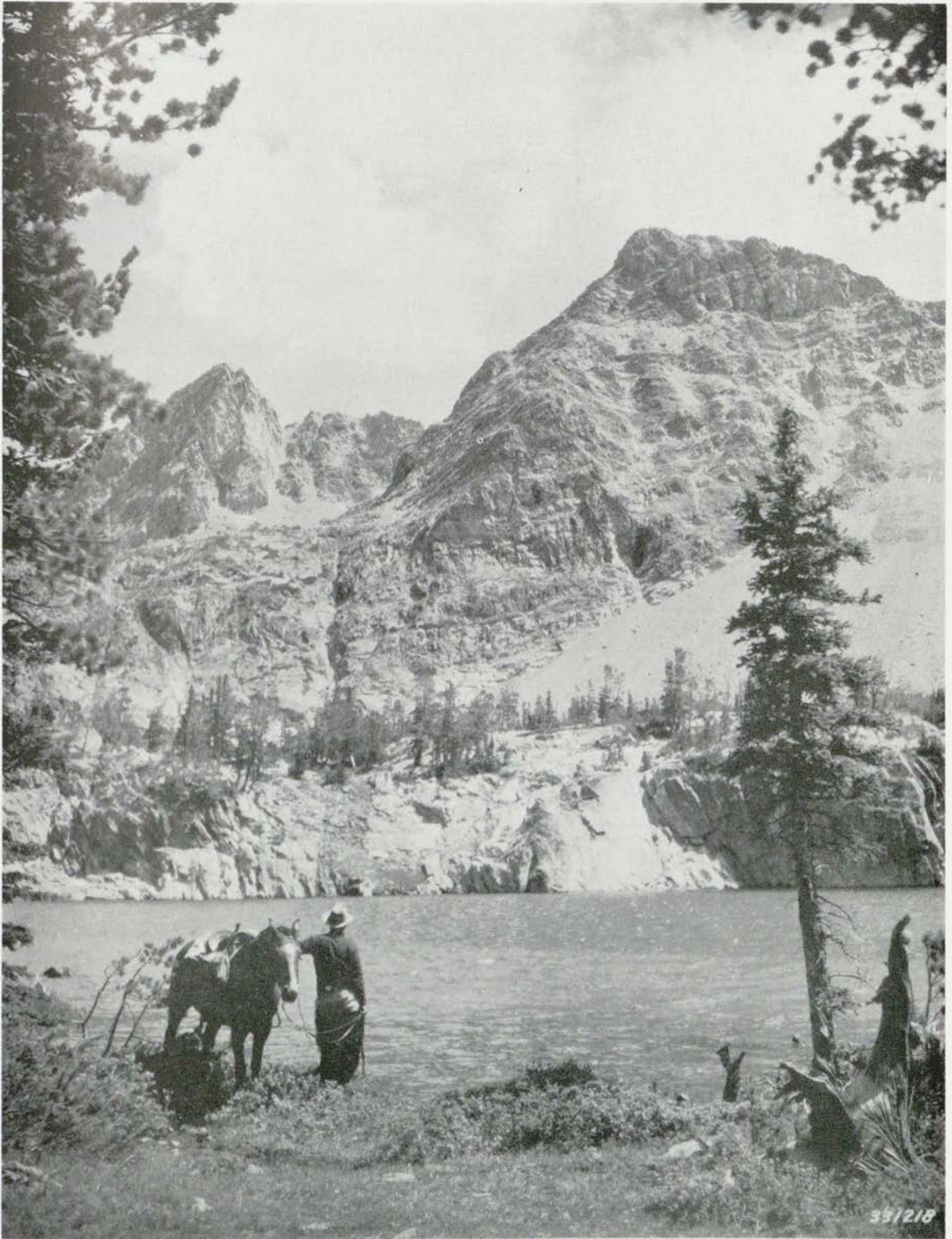
"The Montana Druids is an honor society whose primary function is service. Its objectives are to foster better understanding and relationships between the students and faculty, the school and the Forestry Club, and and the students and school alumni. The membership is composed of forestry upperclassmen who have proven their ability and desire to promote these interests. New members are selected by the active members each autumn and winter quarter."

Top to Bottom: Dave Kauffman, Joe Meuchel, Dick Faurot, Jerry Wright, Jack Chamberlin, Bob Greenan, Frank Kirsten, Fay Clark, Fay Kiser, John Lowell, Bill Overdorff, Phil Hanson, Dick Joy, Mel Morris.



Springtime . . .

...1953



— U. S. Forest Service Photo

Field Trip Time for Foresters and Range Men at MSU

Spring Range Trip...

The 1953 Spring Range Management Trip started out from Missoula at 7:30 a.m. Wednesday, April 29, with Professor Mel Morris leading a pack of seven seniors. The work of cooking, dishwashing and the writing of the journal, daily log, and all technical write-ups was divided among the fellows and Mel.

A few stops were made the first day consisting mostly of taking in the vegetative types. The boys "free-loaded" that night at the expense of Jack (Pancho) Royle's father-in-law.

Through Nevada studying Halogeton and its control and other salt desert types; across the Great Basin country and through the Mojave Desert, with stops made to key out and study the various desert plants.

Into Arizona, Mexico, and then back to the U.S.A., observing range types, water control and use, and range management.

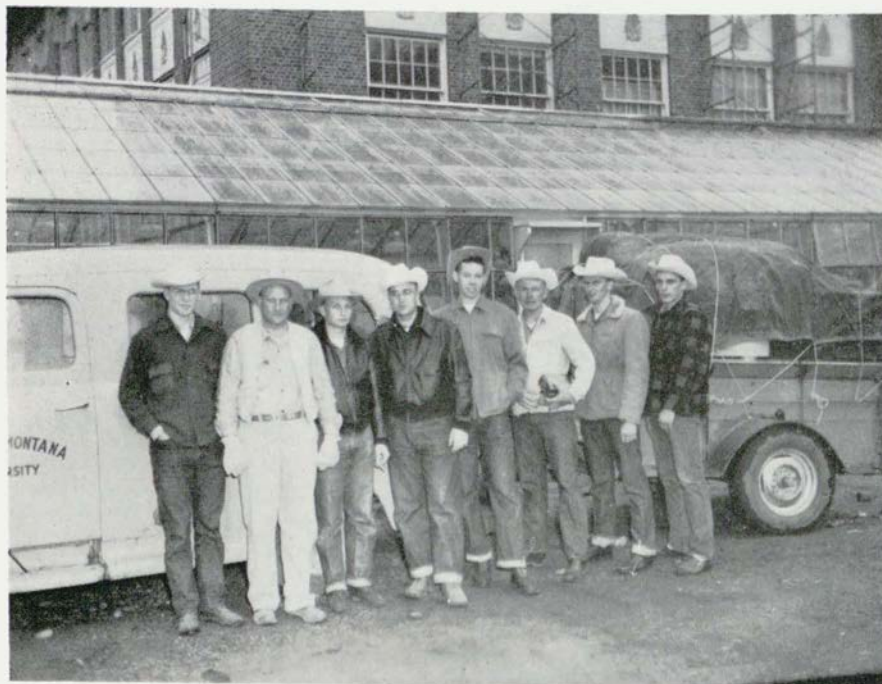
At the Sierra Ancha Experiment Station the crew studied watershed management and observed dif-

ferent soil types and their erosion potential. At the Fort Valley Experiment Station the boys observed both forest and range management.

Into Grand Canyon and through Zion National Park for two days of relaxation. Not much to do but lots of scenery.

Back again on the road and last major stop was made at the United States Sheep Station, Dubois, Idaho. Here they were lectured about and studied sheep breeding and management, and sagebrush range management.

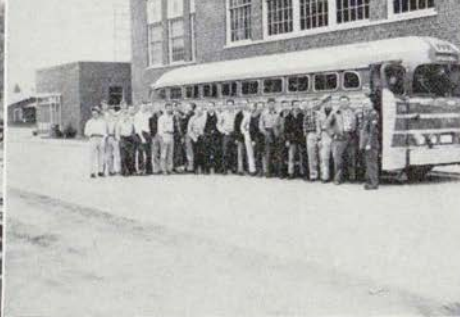
After traveling for 31 days and over 4,600 miles, the "bucket-o-bolts" came chugging into Missoula with the entire crew intact. The seniors' only comment upon emerging from the truck was that they hoped they would be able to remember all they had seen. For truly it had been an enlightening, memorable, and enjoyable trek.



Left or right:
Don Lantz, Mel Morris, Bob
Lake, Jack Royle, Jerry Stern,
Doyne Tank, Clarence Almen
and Ed Burroughs.



Gypo tie mill near Rexford, Montana



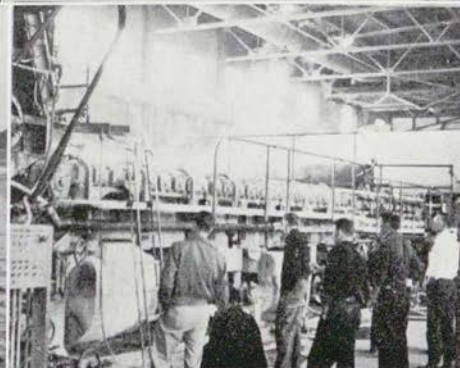
Embarking on the 1953 coast trip,
March 23 to April 5



Loading at Potlatch Forests Camp 44,
Avery, Idaho



Landlubbers find the Pacific Ocean
near Otis, Oregon



In Crown Zellerbach Pulp Mill,
Camas, Washington



Charles Knutson, Dick Hansen, Allen
Hearst and Arne Jacobson in a
snowbank at Avery, Idaho

Spring Silviculture Trip...

The '53 Spring Silviculture trip began by the seniors attending the fifteenth annual Intermountain Logging Conference held in Spokane, Washington, March 24.

The two questions discussed that day were: How can the timber industry and public agencies work most cooperatively to solve their mutual problem in securing the development and use of public timber lands?; and, can the logger construct, design, and maintain private roads and bridges to recognized standards at minimum costs? The seniors gained much valuable knowledge in this one-day meeting, but at 6:00 p.m. were glad to adjourn to the mezzanine and enjoy the cocktail hour.

In Avery, Idaho, the boys observed road construction and then on to the Potlatch mill of Lewiston. Here the pulp and veneer plants were inspected and Pres-to-log operations were observed, among other things.

The next major stop made by the crew was at the Columbia Tree Farm of the Crown Zellerbach Corp., near Veronia, Oregon. A short talk was given on the history of the tree farm, and then they were shown a planting area, thinning operations, log rafting, and a restocking area.

Lastly, at King Creek Experiment Station they watched a demonstration of pruning, using pruning saws with extension handles, and the Whitmore Chisel.

After a very eventful and enlightening trip, the "wandering minstrels" came home.

Some Sampling Techniques

(Continued from Page 14)

To be an absolutely random selection the squares marked on the map should be the size of the plot used, but this is not practical. The field men are instructed to go to some point which is identifiable both on the photos and map near the square in which the plot is to be taken, and then scale the distance into the square and pace the required distance. It is felt that this is sufficiently random for all practical purposes.

In order to eliminate bias as much as possible the field men are instructed to make all decisions concerning the taking of the plot before they get on actual plot location. A better sample is gotten if plot strips are run at right angles to the drainages and ridges than if they are run parallel to them. In flat country the direction of the plot should be decided before reaching the plot.

3. METHODS OF RECORDING THE SAMPLE DATA

It is proposed to inventory an imaginary area. The area has been photographically covered, photos interpreted and stratified, and a base map constructed showing the variations in the forest stands. Management specifies a plus or minus 10% accuracy or sampling error and a 95% probability or two standard deviations. What procedure should be used to inventory this area? What is the proper sample size? What and how should information be collected in the field and how should it be analyzed and evaluated? The system described in the following paragraphs can be used effectively on any area. It should be remembered, however, that as the area decreases the number of samples will increase for any given Stand Volume Variation (see Table I).

a. Tabulation and Analysis

Many methods of field tabulation have been tried, and it would indeed be difficult to attempt to design a plot card for any inventory procedure. The objectives of the inventory will no doubt determine what information is needed. Basically management is concerned with volume; both present day and future volume. Inventory procedure for immature or growing forest stands requires additional data such as growth, more accurate estimates of site, perhaps soil samples, etc.

Whether the information is for detailed management of immature lands or for management and harvesting the mature forests the method of tabulation of the basic information should be in its simplest and complete practical form. The human element of time con-

sumed in computing, tabulating and analysis is an important phase of the economy of inventory. The element of human error in transferring and handling data is always a complex problem, and because of these factors use of the International Business Machines is deemed necessary to best efficiency and economy. The I.B.M. have their services available by means of service bureaus and therefore it is not necessary to have their machines on hand to handle the project. By contacting the managers of these bureaus and presenting the problem they will devise a system of handling the data to best advantage. It can be assumed that what one can do by hand computation the I.B.M. can do it faster and more economically. Furthermore, the time involved in hand computation detracts from field observation time if the field men are employed at such work. The I.B.M. machine checks that can be made on its own computation renders the results without error. I.B.M. can by wiring special boards for the particular problem, extend the field observations of DBH, species, log heights and form class to volume. Defect and breakage can be automatically extracted. The I.B.M. will sort and collect any information from the source data and tabulate in whatever form specified. Last of all it can compute the reliability of the estimate and do all the mathematical statistical computations set forth in the analysis to follow. There are many other possibilities of employment of the I.B.M. services, but these few are noted to better explain methods of gathering field data.

b. Tabulation of Information (Plot Cards)

Example "A" shown below is a waterproof plot card showing items of information collected for I.B.M. analysis. All information is recorded in the card in number form. The owner (own) has a number assigned for each division of ownership. One space in the I.B.M. card will keep as many as ten divisions of ownership separated. Two spaces will accommodate 100 divisions of ownership. Most items of information are actual numbers such as DBH, log height, age, total height, site index, form class. Decimal points are taken for granted, i.e., 20 = 2.0 logs, 25 = 2.5 logs). The limiting factor controlling the code to be used is the total spaces of 80 allocated on the I.B.M. card. The field card is made in loose leaf form so as to be easily sorted if done by hand. In the event that I.B.M. is not used the code is still a fast way of recording and subsequent analysis. The field men readily learn to handle the few actually coded items.

(Continued on Page 25)



Summer Work . . .

- (1) Lookout Johnson. (2) Smokejumper training. (3) Surveying in Idaho. (4) '39 Chevrolet? (5) What — no escalator? (6) Leaving Rooster Creek in the Payette N. F. (7) One way of getting up in the world! (8) (9) Zane Smith to Betty . . . OVER! (10) At the far end of the transit.

Sports . . .

— Helwig's Corner

The Foresters made a determined effort for the intramural sports trophy this year. Coach Helwig worked hard and long hours with his many teams, which participated in every intramural sport. Although the Foresters did not come out on top in the race, they did take second place, with a first place in both swimming and skiing, second place in volleyball, and third place in track.

Foresters Swim to Victory; Score Five New Records

The Foresters stroked to victory yesterday and set five new records in six events in the intramural swimming finals.

Ken Knoll, Milwaukee, Wis., set new records in the 40 and 80 yard free style events. Old time for the 40 was 19.8 seconds set by Fred Carl, Sigma Chi, in 1952. Gene Kuhns set a record of 46.5 seconds for Forestry last year. Knoll's new record is 44.9 seconds. Kuhns also broke the record in the 40 yard free style with the time of 19.6 seconds.

Dallard Johnson set two new records, one in the 80 yard back stroke, 54.9 seconds. Old record set by John Rounds in 1950 for the

ATO was 59. flat. The 80 yard breast stroke is now set at 55.4 seconds. It was 58.6 seconds, set by Tom Ritter, Forestry, in 1952.

The Forestry broke their old record of 1:29.4 for the 160 yard, making it 1:23.9. The 80 yard breast stroke was won by Dallard Johnson, Forestry, time 55.4; second was Tom Ritter, third, Wallace, SX.

40 yard free style was won by Knoll, Forestry, 20 seconds. He scored the new record in the preliminaries. Second was Kuhns, Forestry; third, Hansen, SAE.

Johnson, Forestry, won the 80 yard back stroke in 54.9 seconds. Rounds, ATO, was second, and Tom Ritter, PSK, took third.

Forestry's Knoll won the 80 yard free style in 44.9 seconds. Dawson, Pingtoppers, was second; Daniels, Forestry, was third.

The 60 yard medley relay was won by the Forestry in 32.5. Second was SX. Phi Deltis was third.

The Forestry won the 160 yard free style in 1:23.9 for their sixth win in six starts.

This is the first time a team has won all the events and set a new record in five of them.



This is MSU's best intramural swimming team. These boys have set records which are going to be hard to beat.

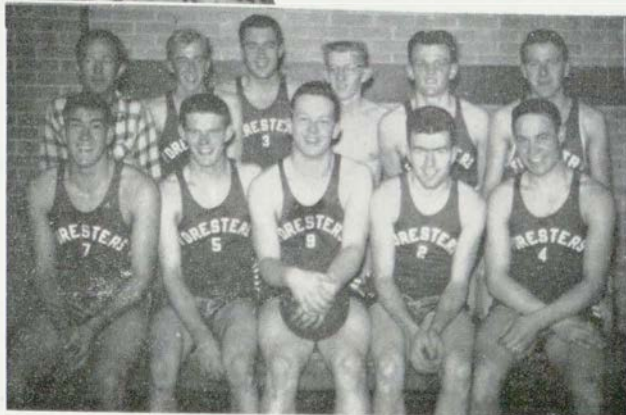
Left to right: Dan Daniels, Jim Pfusch, Gene Kuhns, Dal Johnson, Pete Dring, Coach Helwig (with trophy), and Ken Knoll.



The Pine Toppers placed fourth in the intramural swimming meet.

Doug Dawson, Greg Eilerman, Al Kelley, Ken Cardwell and Jim Pfusch.

Competition was too keen in basketball — the team managed to get only ninth place.



Back row, left to right: Coach Larry Helwig, Ted Nyquist, Ed Bloedel, Gene Ramey, Glenn Beckman and Marv Nelson.

Front row, left to right: Arnie Royce, Frank Fowler, Dick Johnson, Pat Ryan and Ted Reiger.