The School of Forestry

It is the aim of this school to train men to do the work that needs doing in the protection, improvement, proper utilization and administration of American forests. Thorough technical and scientific education in the theories and principles of American Forestry is combined with practical training in Forestry in the forest under forest conditions.

The headquarters of District One of the United States Forest Service, governing the administration of 26 National Forests, are located near the Forestry School and special locations detailed by the District Forester co-operate in the training which is given. The boundaries of 17 National Forests, three other government timber reservations, and a National Park are within the limits of the School. A Forest Service lookout station on a high mountain point is on the campus of the University, and within a mile of the Forestry School building. The faculty of the Forestry School are men of high technical training, long experience in National Forest work, and established reputations in their profession.

THE FACULTY

EDWARD G. BECKETT, Ph. D. (Columbia), Chancellor of the University of Montana.

FREDERICK C. SCHRECK, M. E. A. C. (Purdue University), Acting President of the State University.

DORR SKEELER, B. S. E. (Michigan Agricultural College), Dean. Formerly Forest Supervisor, U. S. Service; now Longing Engineer, w. s. r. S. Forestry Service.

JAMES H. DONNER, B. S. E. (Montana), Professor of Forest Engineering, Formerly county engineer, Missoula County, U. S. Mineral Surveyor; Special Editor; U. S. Forest Service; Engineer C. M. & St. P. Ry.

T. C. SPAULDING, M. S. E. (Missouri), Professor of Forest Engineering, Formerly Forest Engineer, Pacific Lumber Co.; U. S. Forest Service; Formerly Forest Supervisor, W. S. Forest Service.

WILLARD M. DRAKE, M. S. E. (Michigan), Professor of Forestry, Formerly Forest Supervisor, U. S. Forest Service.

CHARLES F. FARMER, B. S. E. (Montana), Assistant Professor of Forest Engineering.

ASSOCIATED FACULTIES.

MATHEMATICS—N. J. Lennes, Ph. D. (Chicago), professor. Eugene F. A. Cusay, M. S. (California), Assistant Professor.

ENGLISH—George R. Cofman, Ph. D. (Chicago), Professor. Carl Hadley, M. A. (Tennessee), Professor.

GEODESY—Joseph L. Howes, Ph. D. (Nebraska), Professor.

HISTORY—Morton J. Eyres, B. D. (Illinois Wesleyan), Professor and Director of Biology Station. A. W. L. Bray, B. S. (Cambridge), Assistant Professor.

PHYSICS—Robert N. Tammen, B. S. (Nashville), Assistant Professor.

PHYSICAL EDUCATION—W. W. H. Massie, B. S. (Course College of Kentucky), Professor-Director.

LAW—Albert N. Whitlock, L. L. B. (Harvard), Dean and Professor (Mining Law, Forest Law). Charles M. Nutt, Ph. B. (Rochester) LL. B. (Columbia), Professor (Irrigation Law).

The Faculty consists of men who have had technical training in the Universities of Wisconsin, Michigan, Illinois, Colorado, etc., and have practical experience in the field.

Summer School Session
University of Montana, State University, Missoula
June 18 to July 27, 1917

The Summer School at the State University is intended to meet the needs of school superintendents, principals, and teachers connected with either grade or high schools; college students who wish to shorten their University courses, and those preparing for state and county examinations. During the summer session courses in the following departments will be offered.

Courses in which five or more students are not enrolled may be omitted.

Registration fee is $10; room and board for the six weeks at Craig Hall, the Women's Dormitory, $40. This hall will accommodate 80 women.

The summer session lecture courses, among others, will have the following: Chancellor Edward G. Elliott, Chancellor; University of Montana; Mrs. C. W. Hetherington, University of Wisconsin; Professor W. L. Raper, State College, Pennsylvania; Professor G. D. Stover, College of New York; Dr. E. A. Wise, Journal of Education, Boston; Professor Carl Emil Sennehoff, University of Iowa; Professor John H. F. Bosman, Montana; President Joseph E. Monroe, Montana State Normal College; Superintendent May Trump, Superintendent of Public Instruction of Montana; and Professor R. S. Smith, University of Washington.

Missoula is ideally located in the heart of the mountains. The summers are cool and the location inspirational. For a bulletin describing courses or for particulars concerning the summer session, write to T. F. Rohn, Director, Summer Session, State University, Missoula, Montana.
I AM the day's work of the weakest man, and the largest dream of the most daring. I am the Constitution and the courts, statutes and statute makers, soldier and dreadnought, drayman and street sweep, cook, counselor, and clerk. I am the battle of yesterday and the mistake of tomorrow. I am the mystery of the men who do without knowing why. I am no more than what you believe me to be, and I am all that you believe I can be. My stars and my stripes are your dreams and your labors.

—FRANKLIN K. LANE.

I pledge allegiance to my flag and the republic for which it stands, one nation, indivisible, with liberty and justice for all.

THE FORESTRY KAIMIN

A JOURNAL OF WESTERN FORESTRY PRACTICE PUBLISHED AS A UNIVERSITY BULLETIN BY THE FORESTRY CLUB IN THE SCHOOL OF FORESTRY OF THE STATE UNIVERSITY AT MISSOULA, MONTANA.

VOL. 3
1917

TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial Comment</td>
<td>2</td>
</tr>
<tr>
<td>The State University of Montana</td>
<td>4</td>
</tr>
<tr>
<td>The School of Forestry</td>
<td>6</td>
</tr>
<tr>
<td>Ranger School</td>
<td>8</td>
</tr>
<tr>
<td>Forestry Club</td>
<td>10</td>
</tr>
<tr>
<td>Summer Work</td>
<td>12</td>
</tr>
<tr>
<td>Silvicultural Management of the National Forests</td>
<td>14</td>
</tr>
<tr>
<td>Silvicultural Research Work in District One</td>
<td>15</td>
</tr>
<tr>
<td>The Wagon Wheel Gap Experiment Station</td>
<td>17</td>
</tr>
<tr>
<td>The Office of Operation in District One of the Forest Service</td>
<td>18</td>
</tr>
<tr>
<td>The Supervisors' Meeting</td>
<td>21</td>
</tr>
<tr>
<td>The Supervisors' Banquet</td>
<td>22</td>
</tr>
<tr>
<td>The Indoor Field Meet</td>
<td>23</td>
</tr>
<tr>
<td>The Ranger's Week—a Poem</td>
<td>23</td>
</tr>
<tr>
<td>Paul Bunyan</td>
<td>24</td>
</tr>
<tr>
<td>Around the Campfire— A Poem</td>
<td>26</td>
</tr>
<tr>
<td>Exchanges from the Forest Papers</td>
<td>32</td>
</tr>
<tr>
<td>The Night Trail—Jefferson National Forest</td>
<td></td>
</tr>
<tr>
<td>To the Supervisor of the Jefferson</td>
<td></td>
</tr>
<tr>
<td>A Ranger to His Brother at the “U”—Missoula Forest</td>
<td></td>
</tr>
<tr>
<td>The Fire-Bug and the East Wind—Cleveland National Forest</td>
<td></td>
</tr>
<tr>
<td>The Chaparral Poet—Cleveland National Forest</td>
<td></td>
</tr>
<tr>
<td>The Reconstruction of the Lumber Industry</td>
<td>34</td>
</tr>
<tr>
<td>Western Larch</td>
<td>36</td>
</tr>
<tr>
<td>Donkey Logging in the Durango National Forest</td>
<td></td>
</tr>
<tr>
<td>Emergency Mess Kit for Fire Fighters</td>
<td>40</td>
</tr>
<tr>
<td>A Simple Instrument for Measuring Heights</td>
<td>44</td>
</tr>
<tr>
<td>A Handy Chart for Road Location</td>
<td>46</td>
</tr>
<tr>
<td>A Simple Method for Trail Location</td>
<td>48</td>
</tr>
<tr>
<td>The Elk Refuge on the Gallatin National Forest</td>
<td>50</td>
</tr>
<tr>
<td>Excerpts from a Circular Letter to the Men of the Forest Service</td>
<td>52</td>
</tr>
<tr>
<td>First Wireless Telegraphy on the National Forests</td>
<td></td>
</tr>
<tr>
<td>Ranger Sullivan's Augerplane</td>
<td>54</td>
</tr>
<tr>
<td>Stringing Wire from a Horse's Back</td>
<td>55</td>
</tr>
<tr>
<td>Game Preservation in the Eastern Forests; The Colville Auto Reel</td>
<td>59</td>
</tr>
<tr>
<td>Economical Seed Collection on the Sevier National Forest; A Water Afforjas Devised in District Four</td>
<td>60</td>
</tr>
<tr>
<td>A New Emergency Telephone</td>
<td>61</td>
</tr>
<tr>
<td>Foresters to France</td>
<td>62</td>
</tr>
</tbody>
</table>
A YEAR OF CONSOLIDATION.

For a year Montana has been the object of interested observation in the educational circles of America. This state is conducting an experiment in higher education which will prove instructive and helpful to nearly thirty other states, whose institutions for higher education are segregated—an experiment in consolidation of administration of separated physical plants. While the period of a single year is too brief a span upon which to base final judgment as to the outcome of the Montana plan, it is possible, after twelve months of practical test of the chancellorship system, to say that it has been productive of great benefit.

The Montana situation is familiar to the educators of the country. The four institutions which comprise the University of Montana—the State University, the State College of Agriculture and Mechanic Arts, the State School of Mines and the State Normal College—are located, in extreme measurement, about three hundred miles apart. To bring these institutions under a single administrative control and to make that control effective and efficient has been the problem upon which Chancellor Edward C. Elliott has worked for the year and a half that he has been at the head of the consolidation.

Briefly, it may be said that the chancellorship has resulted, in one year, in establishing the co-ordination which was essential to the operation of the general scheme of consolidated management. There exists now a spirit of harmony and co-operation among the four separated institutions of the University. The segregation is now only a physical segregation. Each institution has become a part of a smoothly working whole.

There has been a material reduction in the cost of maintenance, but the greatest benefit which has come is found in the increased efficiency, the cooperative spirit and the more healthful feeling which pervades the Montana campus over which Chancellor Elliott presides—the largest university campus in the world, when measured from extreme to extreme.

It is not, then, a long stretch of imagination to forecast, at this time, the ultimate success of the Montana plan. The task was tremendous, but the hardest part of the work has been done. Those who have shared, as subordinates, in the labors of Chancellor Elliott look forward with confidence to the final verdict as to the success of the plan in which they are factors. At the end of the first year, these men and women regard the Montana experiment as certain of success.

—A. L. S.

AN ACADEMIC VIEW.

As the Forestry Kaimin goes to print there is much discussion in the press and in such magazines of authoritative editorial opinion as The Literary Digest, Outlook and Current Opinion regarding measures of federal food control.

No definition of what measures will be adopted is yet available and comment is at the stage only of conjecture and proposal. Editorial suggestion and opinion runs the gamut from regulation of food monopolies and prevention of speculation in food-stuffs, always hitherto ineffective, to stern measures of rationing and limitation of individual consumption.

Crop reports are not encouraging. The outlook for the yield both of winter and spring wheat is particularly poor and foresees little more than the 600,000,000 bushels required for the year’s home use and next year’s seed. Our Allies need half of this.

The substitution of other cereals and other food-stuffs for wheat in our domestic uses, the careful elimination of all forms of food waste, increase of production of all food products, the encouragement of home gardens—all these are effective measures to make available more wheat and other specially needed food supplies for our brothers-in-arms; and these are measures which may be brought about more effectively by an aroused sentiment and sense of public duty than by legislation.

There is one form of food waste, however, that occurs principally with the cereals, and which is outright and far-reaching and insidious in its poverty-bringing, home-breaking, crime-producing ramifications. The peculiarity of the waste of grain foods used in the manufacture of alcoholics is that it can be easily and effectively prevented by federal action and that it can be effectively controlled only by such action.

We confess to no liking for a patchwork of state prohibition laws. In normal times we would personally prefer a federal law to confine the manufacture of alcoholics to light beers and wines rather than an act of absolute national prohibition.

These are not normal times. Men are fighting our battles abroad. People are starving there where our battles are fought. One of our duties, and the one we can most quickly perform, is to send to them
as much food as we can as fast as we can.

Prohibition of alcoholic manufactures will spare more grain for the Allies than mild measures of federal food control, and will result in much less inconvenience, discomfort and difficulty of enforcement, than the sterner, restrictive measures of food control which may become necessary before we are through.

As a first decisive step in supporting our Allies, we would be proud to have our government show its purposeful intent by doing this obvious thing.

Of course, with prohibition of alcoholic manufactures, there is loss of revenue to be considered. This fact of political economy has been the happy cry of the whiskey makers in many a campaign of state prohibition, and one which has not fallen unheeded on the ears of the cautious taxpayer at the polls. And if we were a prohibitionist we would retort, "wine is a mocker and strong drink wrecks homes, promotes crime and destroys the usefulness of men." Anyway, we can settle that later. Meanwhile we would prefer to have the grain diverted from our booze fighters to our gun fighters.

**BETTER GAME PROTECTION.**

There is a need for better protection of game on the National Forests.

It is the duty of both Government Forest Rangers and State Game Wardens to enforce the State Game laws on National Forests where, unlike our National Parks and Indian Reservations, there are no Federal laws for game protection. In most western states the rangers are deputized as deputy state game wardens that they may more readily co-operate with the game wardens. They report violations to the Game Warden and it is the policy of the Forest Service that they shall make arrests only to prevent damage to the Forest.

It is the intent of all this that Game Wardens and Forest Rangers shall co-operate. As well expect oil and water to mix. Forest Rangers are appointed to office for their merits and after passing civil service examination. They are specially trained for their work, both before entering the Service and by their work in the Service. They are advanced and promoted by the merit system and are, we believe, actuated by splendid motives of public service.

In western states the appointment of Game Wardens, more perhaps than of any other officers of the state, is dictated by political expediency, and the offices are bestowed as spoils of the political campaign. The Game Warden's job depends upon his efficiency as a politician or upon the influence of his friends who are efficient as politicians. These in turn depend upon his personal popularity among the residents of his district.

Now, enforcement of the State's game laws does not promote the warden's popularity in western communities. The Forest Ranger who reports violations, especially minor ones by local people, to the Game Warden, is received usually with indifference or a soon-to-be-forgotten promise to "look into the matter sometime when I'm up that way." In few cases does effectual co-operation exist. Often this duplication of duties antagonizes the Game Warden, who feels that the Ranger's activities reflect upon his own lack of action. The duties of Deputy State Game Warden are unpopular with many Forest Rangers because the work is co-operative with a State official who does not co-operate.

Unfortunately, because of the enabling acts under which the Territories became States, and the terms of the Acts under which the National Forests were created, it is not possible to have a uniform federal law for game protection which shall apply to all National Forests.

We believe there are two remedies for this.

The Secretary of Agriculture may establish regulations for the protection of National Forests, and, by authority delegated by Congress, these regulations are of the effect of federal statutes. It would be no farther cry from forest protection than some of the regulations which are now in effect if the Secretary would establish regulations for the groups of Forests in the various States, each of which would embody the laws of that state for the protection of fish and game. The Forest Ranger would then find his authority in Federal Law and it would be his duty as a Government officer to prevent violations and no one would blame him for doing it.

If the establishment of these regulations by the Secretary strains a fine point of law, there is another means by which almost as much good may be accomplished. It should be publicly announced to users of the National Forests, and to residents in or near them, that the State's laws will be rigidly enforced by the Forest Rangers for the protection of game in the Forests, and enforced alike with high and low, rich and poor. The Rangers should take their own cases into court. A rigid absolute enforcement of the law to the last detail in even the most trivial cases would soon bring about an understanding that would remove much of the unpopularity that now attends the Forest Ranger in this work.

Free the Ranger from an impossible co-operation with the uncertain, shifty policy of the States' Game Wardens and charge him with a strict, even-handed, direct enforcement that will win respect. Let him do this as a Forest Ranger and not as a deputy officer of the State. Let him do it in enforcement of the will of the Government, and independent of the wishy-washy laxity of game warden politicians.

—D.S.
The State University of Montana
What Montana State University Offers to Its Young Men and Women.

Ralph D. Casey

UNIVERSITY HALL—One of the Principal Buildings.

THE State University of Montana, established by act of the Legislature in 1893, offers every opportunity to the young men and women of the state who desire a liberal education and training for the professions. It consists of the College of Arts and Sciences, the School of Forestry, the School of Law, the School of Journalism, the School of Pharmacy, the School of Music, the Summer Session, the Biological Station (Flathead Lake), the Extension Service and the Graduate Department.

The University of Montana was created by act of the Legislature in February, 1893, and by this act the State University was located in Missoula. The State University was formally opened in temporary quarters in Missoula in 1895 with Oscar J. Craig as the first president. In 1897, the Legislature authorized the issue of bonds, in amount $100,000, for the construction of two buildings. The campus site was donated to the state by Edward L. Bonner and Francis G. Higgins of Missoula. In 1899, the University occupied its permanent home.

Since the establishment of the State University it has made a steady growth until now it has an enrollment of 1,000, including students in summer school and the extension departments.

The City of Missoula, the home of the State University, is situated on the Pacific Slope of the Rocky Mountains, at the lower end of the Bitter Root Valley. On this site Captain Lewis and his companions encamped on their return from the Pacific coast in 1805, and a half century later it was a point on the famous Mullan road. Now it is connected with other parts of the state by the main lines of the Northern Pacific and the Chicago, Milwaukee & St. Paul railroads. Here, on the slope and at the foot of Mount Sentinel, which rises 2,000 feet above the valley, is a tract of 520 acres comprising the University campus. The 40 acres of campus in the valley have been developed into lawns and groves, making one of the most attractive spots in the state. This development, combined with the natural beauty of the site, has given the campus the reputation of being one of the most beautiful in the Northwest.

The first building on the campus, University Hall, was erected in 1897. Others have been added, Sci-
ence Hall, Craig Hall, the Gymnasium and Library. The Forestry and Journalism buildings are frame structures for temporary use only.

The following indicates the character of the work of some of the special schools at the State University:

**FORESTRY.**

The School of Forestry at the State University offers splendid opportunity to students who are preparing for service in lumbering or in scientific forestry.

At Missoula is the headquarters of the largest of the Federal Forestry districts, and the records and equipment of the district offices are at the disposal of the students. Within a short distance of the University there are several important national forests and some of the largest lumber-manufacturing plants in the northwest. There is no other forestry school in the world which has such remarkable laboratory facilities as these.

The work of the School of Forestry is in the hands of men who have had practical experience in forestry and in lumbering. They are men with national reputation in their work. The training of students in this school is thoroughly practical. The graduates of the school are in demand; their services are sought by the federal department and by lumber manufacturers.

**JOURNALISM.**

Thoroughly practical, too, is the training which is given in the School of Journalism. The Montana School of Journalism, immediately upon its establishment, adopted a plan which has since attracted the favorable attention of newspaper men in many parts of the country. The work is based entirely upon the practice which prevails in newspaper offices, and the methods of practical work are followed throughout the course.

The School of Journalism has the support of the Montana State Press Association. Its students have made good records in the newspaper offices of the state. The instruction of this school is in the hands of men who have had practical newspaper experience. The atmosphere of the school is that of the newspaper office as far as it is possible to make it so.

**LAW.**

There is no other law school in the Northwest which equals the Montana School of Law in the thoroughness of its work. In fact, there are few similar institutions in the whole country which give the complete training that the law student receives at the State University. The institution is a member of the American Association of Law Schools, and this membership vouches for its standing in the country at large.

Practice is combined with theory in the School of Law. Two years of preparation in the college of arts and sciences are required of students who are candidates for the degree of bachelor of laws. Following this preparation, three years of special study in the school itself are demanded.

The Montana School of Law is original in many of its methods, and these methods have been studied by leading teachers of law in the East with the result that favorable comment has been made by some of the best-known lawyers and teachers of the country. The diploma of the Montana School of Law admits the holder to the practice of law in the courts of the state.

**PHARMACY.**

No better indication could be given of the work which is done in the Montana School of Pharmacy than the fact that its students are so much in demand by the commercial pharmacists of Montana that the dean of the school was not able last summer to furnish all the men and women for whom

(Continued on Page Sixty-Three.)
The School

The work of the Montana School of Forestry is along two distinct lines—an undergraduate course of four years which provides liberally for specialization in all the various branches of Forestry and Forest Engineering, and a Short Course of 14 weeks for Forest Rangers.

The undergraduate courses are arranged to train men for the various branches of scientific and administrative work in the Government Forest Service and for work with lumber companies and timber owning corporations involving the administration, protection and utilization of forests. The work of the third and fourth years is arranged to allow for specializations in Forest Administration, Lumbering, Logging Engineering, Forest Engineering and Scientific Forestry.

The Ranger School is organized for the special purpose of training men already in woods work to do better service in forestry and particularly to improve the training of forestry officers. Distinctly, it is not a course for inexperienced men.

A Forestry Club with a student and faculty membership of 70 meets fortnightly for the discussion of forestry problems, the consideration of technical and professional papers and the promotion of a social spirit.

The Missoula section of the American Foresters holds regular fortnightly meetings. This is a national organization of professional foresters of the United States, with headquarters in Washington, D. C. There is a branch section in each of the seven districts of the National Forest Service. The meetings are open sessions to which students of the school are admitted. Professional papers, dealing with subjects of technical forestry, are read and discussed.

ADVANTAGEOUS LOCATION.

The Montana School of Forestry possesses marked advantages in the matter of location. Every forest type of the inland northwest is found within a few miles of the school. Two transcontinental railroads, three branch railroads and two interurban electric lines place the school within easy reach of extensive logging, lumbering and lumber manufacturing operations.

The headquarters of District 1 of the United States Forest Service and the offices of three forest supervisors are located in Missoula. The boundaries of the Lolo National Forest, the Bitter Root National Forest and the Missoula National Forest are closely adjacent to the school and include over 3,000,000 acres of government timber lands, under forestry management. Within 50 miles of the school are the boundaries of nine national forests and two other government timber reservations. Within 100 miles are the boundaries of seventeen national forests, three other government timber reservations and a national park.

The school is located at the foot of the steep slope of Mount Sentinel, which is a part of the University campus. On the top of the mountain, reached by two and a half miles of trail from the School of Forestry, is a lookout station maintained by the school in cooperation with the Forest Service for the protection of national forests from fire. This station is used as a laboratory in the study of fire protection methods and during the summer is used by forest officers in the actual fire protection work of the Federal Service.

Specialists from the staff of the Forest Service assist in the training of students for national forest work. A considerable part of the study in lumbering and forest engineering is carried on in the nearby forests and on the properties of adjacent lumbering companies.

REQUIREMENTS FOR ADMISSION.

The completion of a four years' preparatory or high school course is the standard for regular entrance to the School of Forestry, as in the other regular courses of the University.

Students in high schools and preparatory schools who plan to enter the Forestry School should preferably include elementary Biology, Botany and Zoology, English and Mathematics in their training. Students intending to elect the course leading to the degree of Forest Engineer, should preferably include English, Physics, Chemistry and four years of Mathematics in their preparation. Candidates for the degree of Bachelor of Science in Forestry, will be required to make up any deficiency in their preparatory training in English or Mathematics.

Any person over 20 years of age, of good character, who gives sufficient evidence of his ability to pursue the studies may enter as a special student.

The course of study extends over a period of four college years. A total of 68 credit hours of specified work is required in the first two years. Courses are offered in the last two years leading to specialization in the various branches of forestry and the student may elect, with the approval of the faculty, such courses as will best train him for the particular branch of forestry work which he chooses.
Of Forestry

A total of 124 credits is required for graduation with the degree Bachelor of Science in Forestry. Of these, 128 credits must be earned in school and 6 credits may be earned by summer field work and the preparation of a thesis.

**Courses in Forestry.**

### First Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Forestry</td>
<td>2</td>
<td>Forest Economics</td>
<td>2</td>
</tr>
<tr>
<td>Sealing &amp; Cruising</td>
<td>1</td>
<td>Sealing &amp; Cruising</td>
<td>1</td>
</tr>
<tr>
<td>Surveying 41b</td>
<td>2</td>
<td>Surveying 42b</td>
<td>2</td>
</tr>
<tr>
<td>Mapping 41b</td>
<td>2</td>
<td>Mapping 42b</td>
<td>2</td>
</tr>
<tr>
<td>English</td>
<td>3</td>
<td>English</td>
<td>3</td>
</tr>
<tr>
<td>Geology</td>
<td>3</td>
<td>Geology</td>
<td>3</td>
</tr>
<tr>
<td>Shop Work 41c</td>
<td>1</td>
<td>Shop Work 42c</td>
<td>1</td>
</tr>
</tbody>
</table>

### Second Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumbering 61.</td>
<td>2</td>
<td>Lumbering 62.</td>
<td>2</td>
</tr>
<tr>
<td>Topographic Surveying 43a.</td>
<td>2</td>
<td>Timber Surveys 44a.</td>
<td>2</td>
</tr>
<tr>
<td>Topographic Mapping 45b.</td>
<td>2</td>
<td>Forest Mapping 44b.</td>
<td>2</td>
</tr>
<tr>
<td>English</td>
<td>3</td>
<td>English</td>
<td>2</td>
</tr>
<tr>
<td>Higher Algebra</td>
<td>3</td>
<td>Analytic Geometry</td>
<td>3</td>
</tr>
<tr>
<td>Botany</td>
<td>3</td>
<td>Botany</td>
<td>3</td>
</tr>
<tr>
<td>Physics</td>
<td>3</td>
<td>Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silviculture 21</td>
<td>3</td>
<td>Silviculture 22</td>
<td>3</td>
</tr>
<tr>
<td>Forest Measurements 53</td>
<td>3</td>
<td>Fire Protection 26</td>
<td>2</td>
</tr>
<tr>
<td>Logging 65</td>
<td>2</td>
<td>Logging Economics 64</td>
<td>2</td>
</tr>
<tr>
<td>Grazing 71</td>
<td>3</td>
<td>Grazing 72</td>
<td>3</td>
</tr>
<tr>
<td>*Logging Railroads 45.</td>
<td>3</td>
<td>**Highways and Bridges 46.</td>
<td>3</td>
</tr>
<tr>
<td>Strength of Materials 47</td>
<td>2</td>
<td>Stream Measurements 48</td>
<td>2</td>
</tr>
<tr>
<td>Slide Rule 43</td>
<td>3</td>
<td>Graphic Statics 50</td>
<td>3</td>
</tr>
<tr>
<td>Differential Calculus</td>
<td>3</td>
<td>Integral Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Physics</td>
<td>3</td>
<td>Physics</td>
<td>3</td>
</tr>
<tr>
<td>Botany</td>
<td>3</td>
<td>Botany</td>
<td>3</td>
</tr>
<tr>
<td>Geology</td>
<td>3</td>
<td>Geology</td>
<td>3</td>
</tr>
<tr>
<td>Biology</td>
<td>2</td>
<td>Biology</td>
<td>3</td>
</tr>
<tr>
<td>Descriptive Geometry</td>
<td>2</td>
<td>Descriptive Geometry</td>
<td>3</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silviculture 23</td>
<td>3</td>
<td>Silviculture 24</td>
<td>3</td>
</tr>
<tr>
<td>Forest Management 54</td>
<td>3</td>
<td>Forest Management 54</td>
<td>3</td>
</tr>
<tr>
<td>Forest Policy 15.</td>
<td>3</td>
<td>Forest Management 54</td>
<td>3</td>
</tr>
<tr>
<td>Forest Administration 14</td>
<td>3</td>
<td>Forest Management 54</td>
<td>3</td>
</tr>
<tr>
<td>Grazing 73</td>
<td>2</td>
<td>Grazing 74</td>
<td>2</td>
</tr>
<tr>
<td>Forest Engineering 51</td>
<td>2</td>
<td>Forest Engineering 52</td>
<td>2</td>
</tr>
<tr>
<td>Improvement Construction 53</td>
<td>2</td>
<td>Improvement Construction 54</td>
<td>2</td>
</tr>
<tr>
<td>*Water Powers 55</td>
<td>2</td>
<td>**Forest Engineering 52</td>
<td>2</td>
</tr>
<tr>
<td>Differential Equations</td>
<td>3</td>
<td>*Contracts and Specifications 50</td>
<td>2</td>
</tr>
<tr>
<td>Ignition Law</td>
<td>3</td>
<td>Least Squares</td>
<td>3</td>
</tr>
<tr>
<td>Botany</td>
<td>3</td>
<td>Land and Mining Law</td>
<td>3</td>
</tr>
<tr>
<td>Geology</td>
<td>3</td>
<td>Botany</td>
<td>3</td>
</tr>
<tr>
<td>Biology</td>
<td>3</td>
<td>Geology</td>
<td>3</td>
</tr>
<tr>
<td>Biology</td>
<td>3</td>
<td>Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses marked ** given school year 1916-17, alternating successive years with courses marked *.

No tuition fee is required of students in the University, and there is no charge for instruction. Matriculation and incidental fees amount to $20 annually. In some laboratory courses deposits are required to cover the cost of breakage and of materials supplied to the students. Board and room in Missoula costs from $25 to $30 per month. Books and other school supplies cost students in forestry about $20 for each school year. Including all ordinary living expenses, the cost of attendance in the School of Forestry to the economical student need not exceed $400 for the year.

A large number of the forestry students are entirely self-supporting. Many of them earn all of their expenses while in college. Forestry students are required to engage in field work during the summer vacation and many of them earn enough at forestry work in the Government Forest Service and with lumber companies to defray a large part of their school expenses.
The first warm spring days in April marked the close of the most successful session of the Ranger School yet held. Students from all parts of the west enrolled for the courses offered. Nearly every state west of the Mississippi in which national forests are located was represented.

The outline of courses this year presented a greater opportunity for specialization than heretofore. The schedule was so arranged that the rangers from the grazing forests east of the Continental Divide might take the major portion of their work in those subjects for which they will have immediate need, such as botany, grazing and range reconnaissance. Special courses in scaling, cruising and topographic surveying were arranged as major studies for those coming from the western forests who are concerned with timber sale work.

Of special interest to the rangers was the week long session of the supervisors of District One. The ranger school students were invited to attend the meetings and other classes were suspended for a time so that all might attend in a body. The talks, always lively and full of discussions directly related to the work of a ranger in the field, were keenly appreciated by the men.

Every hour of every day of the fourteen-week session was crowded full of lectures, laboratory and field work. In fact, the only complaint heard was that the amount of information of educational value passed out was more than the average ranger could assimilate in three months. The schedule was so crowded that special lectures were given at night by Mr. Larson of the Priest River Experiment Station, who talked on planting, Dr. James R. Weir, forest pathologist, on the diseases of trees, and Fay Clarke on trail construction. Of particular interest to the men from the field was the practical demonstration given by Tom Layfield on the cutting of the carcasses of animals. Dr. Butler, state veterinarian, had previously given a series of lectures on the diseases, breeding and feeding of range stock. Dr. Butler has the reputation of being a national authority on the subject as well as being a most eloquent lecturer, and announcement of the dates for his lectures are always greeted with delight by both regular students and rangers. An innovation was introduced this year when Professor Arnett of the State Agricultural College was requisitioned for a series of lectures on stock feeding and range management.

The corps of special lecturers from the Forest Service was especially strong this term. Ralph Adams, inventor of the portable telephone now used by the government, gave a series of lectures on the building of tree and pole lines that demonstrated to the rangers the simplicity of telephone installation when higher mathematics are left out. Fay Clark, who has made a special study of trail construction in District One, had charge of the class in Improvement Construction and gave the rangers the benefit of his many years of experience in this work. Eilers Koch, supervisor of the Lolo Forest, gave the work in Fire Protection from the point of view of an expert. James Girard, logging engineer, and E. F. Kramer, hydroelectric engineer, both of the Forest Service, assisted in the classes in cruising and forest engineering.

The regular Forestry School faculty was strengthened this year by the addition to its force of Charles F. Farner, former engineer in charge of topographic surveys and mapping for the Forest Service in District One. The faculty now consists of five men who have had years of experience in forestry and forest engineering: three are former supervisors of national forests, and one was logging engineer in District One.
A number of other departments of the University assisted in the training of the Ranger School students this year, as has been the custom in the past. Dr. N. J. Lennes, head of the Department of Mathematics, personally directed a practical course that taught the ranger the mathematics used in surveying.

A number of the students were interested in a short course in geology. All studied English, realizing that an important asset to the ranger is his ability to write a clear and concise report. Nearly all studied botany, this fundamental science being very necessary to one who expects to advance in forestry. Some took advantage of the chance to learn the art of blacksmithing in the University shops.

Professor W. H. Mustaine, director of Physical Education, arranged a special course in first aid and camp surgery and medicine that was highly appreciated by the men.

Of particular interest this year were the field trips. All were anxious to put into actual practice the theory gained in the classroom. The classes in surveying and mapping made weekly excursions to various locations where varying features of topography could be surveyed and mapped; the scaling and cruising classes explored every nook and corner of the mills of the Western Montana Lumber company and the Anaconda Copper Mining company. The latter mill cuts half a million feet a day. As one ranger remarked as he heard the figures, "this mill cuts more in a day than the biggest mill in my forest cuts in a year."

Nor was the social life neglected. The ranger is a sociable animal at heart and delights in the little pleasures of life. Early in the course, the Indoor Field Meet was arranged by the regular students to test the mettle of the new material. This contest was closely followed by the society event of the season, the Forest Rangers' Ball. Through the circle of acquaintances thus formed the rangers were well able to paddle their own canoes about the campus, and the names of the rangers were often seen thenceforth in the society columns. The Rangers' Seminar also has its social side, these weekly meetings being equally divided between serious discussion and plain fun.

It is the hope of the school that the men wearing the pine tree emblem of the 1917 session have departed better fitted for positions of trust in the Service and better equipped to render such service as their nation may require in the present crisis. Four of the rangers and one professor, Thomas C. Spaulding, have already responded to the call to the colors; Ray Kingsley joined the Mounted Scouts, Douglas Roberts and E. R. Knopf enlisted in the Coast Artillery, while Roy Greenup entered the Signal Division of the Aviation Corps. Professor Spaulding is first lieutenant and acting captain of Company K of the Second Montana infantry.

Ten rangers returned this year for a second year course; one ranger from the Gallatin was back for the third year. Such testimonials as this prove that the instruction given is of practical value to the field men and is the sign of appreciation that inspires the instructor to give the man from the woods his best efforts.

A tremendous asset to the Ranger School is the hearty co-operation extended by the Forest Service through the headquarters of the District Forester in Missoula. More than twenty specialists in all branches of forestry and forest engineering assisted in the instruction and training that was given at the school.

Counting the specialists assigned to us by the Forest Service, and the lectures given by the state veterinarian, prominent lumbermen, professors from other departments of the University and the director of the Department of Animal Husbandry in the Agricultural College, the Ranger School students received instruction and training from more than fifty teachers.
The Forestry Club is, without a doubt, the liveliest organization on the campus. We do not claim this, we admit it. Our activities are many, and due to the enthusiasm with which every member gets behind and pushes, they have always been successfully carried out.

The Club meets every other Monday night, alternating with the meetings of the Society of American Foresters which also come every other Monday night and are open to students of the Forest School. The value of the Forestry Club meetings to the student can hardly be overestimated and the interest shown by the majority of those in the school is evidence that they appreciate this.

We are exceptionally fortunate in the class of lecturers we are able to secure for our meetings. The United States Forest Service maintains a large force of scientific and administrative experts at the headquarters of the District Forester of District 1, in Missoula, and we have always found these men very willing to prepare and deliver lectures on their individual specialties. In addition to the valuable information acquired from these men, it is of benefit to the students to come in direct contact with men actively engaged in practical forestry, as they are thus enabled to get the "point of view" of the American forester.

The social feature of these meetings is very important in bringing the fellows together and strengthening the lasting friendships formed while in school. After the serious part of the meeting has been carried through, delicacies, such as doughnuts, coffee and pie, are set out by the Club's most efficient culinary experts. The official pianist punishes a sad-looking Klunker which occupies one corner of the meeting room. As soon as he gets the melody coming his way the rest of those present attempt, in the interest of harmony, to help him along with their vocal efforts. And on special occasions, Dean Skeels is induced to do his famous dog dance to the tune of "Wearin' of the Green."

The Annual Forest Ranger Dance and the Foresters' Indoor Athletic Meet are described in other articles in this issue. The Forestry Kaimin is the official organ of the Club and needs no further comment here. The Forest School has a float each year in the University May Fete Parade, and furnishes an act for the annual University Vaudeville Show given at a Missoula theatre.

The Montana Forestry Club is affiliated with the Intercollegiate Association of Forestry Clubs, an organization which meets annually to discuss Forestry Club affairs and problems. This year the convention was held at the University of Washington Forestry School. The schools represented by delegates were Montana, California, Idaho, Yale, Syracuse, Washington, Missouri, Michigan, Pennsylvania State College, Mont Alto Forest Academy (Pennsylvania), and Oregon Agriculture College. The next convention is to be held at the Yale Forest School, New Haven, Connecticut.

The program of Forestry Club meetings this year follows:

- Election of officers, Nov. 13, 1916.
- Short talks by students and visitors from the Forest Service, Nov. 27, 1916.
- The Mexican situation as seen from the border, (Prof. T. C. Spaulding, Thomas Carney), Nov. 27, 1916.
- Early days in the Forest Service, (Major F. A. Feen, Assistant District Forester, District 1), Dec. 11, 1916.
- Trail location on the Clearwater, (W. G. Kane, Claude McQuarrie, Forest School students),
- Priest River Experiment Station, (J. A. Larsen, in charge of Experiment Station), Feb. 5, 1917.
- Wagon Wheel Gap (Colorado) Experiment Station, (H. A. Flint, Forest School student, formerly in charge of work at Experiment Station).
- Forest Pathology, (Dr. J. R. Weir, Consulting Pathologist, Bureau of Plant Industry), Feb. 19, 1917.
- Topographic Maps, (Jan. B. Yule, in charge of Topographic Mapping in District 1), March 5, 1917.

Botany as part of the Forester's Training, (Dr. J. E. Kirkwood, Montana State University), March 19, 1917.


The Forest Service in the War, (F. A. Silcox, District Forester, District 1), April 17, 1917.

The officers of the club are: J. F. Brooks, President; Ed. Simpkins, Vice-President; F. K. Stewart, Secretary; W. G. Kane, Treasurer.

LUMBERJACK DANCE.

A vivid picture of timberland gayety was presented at the annual Forest Rangers' dance, given by the Forestry Club on the 15th of February. A riot of color, fantastic costumes, a genial woodman's welcome, set off by the continuous banging of six-guns, combined with a sensational hold-up scene in the dark to give a collective impression of Christmas, New Years and the Fourth of July; Christmas because of the hold-up staged, Fourth of July on account of the artillery practice and New Years because the next morning every one resolved never again to try to enjoy so much at one sitting.

The dance started out peacefully and quietly at 8:30 p.m., when the sourdoughs appeared garbed in the familiar buckskin jackets, multi-colored shirts, top boots and gorgeous neckwear. The tenderfeet ran more to the neater effects of the "pro" gambler, or to the careless picturesqueness of the lumberjack.

No admission was charged, as the etiquette of the old west forbids such when invitations are issued. However, the financial end did not suffer as several expert hold-up men were engaged to relieve all men present of one cartwheel per head. This was done in an efficient manner despite the strenuous objections of the sheriff and his crew of deputies. A realistic six-gun battle in the darkened hall furnished the thrilling climax of the entertainment. The hold-up came unexpectedly in the middle of the evening. To the uninitiated the event had all the appearance of the real. In fact, it was real. Every one of the men present were forced to con-
tribute one dollar to the stout canvas bag held by a vicious highway-man, who glanced at his victims over the top of the official red bandana, while his companion supplied the needed enthusiasm for the donators by the careless handling of a very businesslike cannon. When the lights were put out by the first volley of shots, the sheriff and his deputies bravely opened fire and the battle continued upward of five minutes. The splitting flare of the forty-fives, the staccato bark of the automatics, caused joy to the heart of the old timers, and palpitation of the heart to a number of tenderfeet. On completing the subjection of the forces of law and order, the lights were turned on and the guest properly, expertly and politely robbed. The getaway was accomplished in the same manner as the entrance. The lights were turned out and amid the darkness a pitched battle lasting about six minutes was maintained with the officers. The rear guard of the road agents, concluding that their comrades had a fair start, took to their horses and escaped. The lights were turned on and the dance continued. From statistics gathered at the time it was estimated that enough powder went into the display to supply a German U-boat for six years.

The old west once more reigned supreme. Once again the souls of the old pioneers walked on earth and whooped and yelled with all the fire and spirit of the good old days; and although grape juice mixed with mineral water served in lieu of the usual poison, there was no need of stronger nose paint to exhilarate those who attended. Indeed, if quantities of the old 100-proof elixir of life had been served, pandemonium surpassing the burning of Rome would certainly have reigned.

The etiquette of the old west and of its descendants, the gallant rangers of the forest, was in vogue. The customary look-outs were placed at the entrance of the hall. Each arrival was searched and relieved of his weapons. At the proper time the guns were returned and each individual proceeded to make the night hilarious with all the noise, smoke and racket that a forty-five and an excellent pair of leather lungs were capable of. If there were any present who were not familiar with the smell of powder smoke and the tumult and shouting of an old time hoe-down, their education was brought up-to-date before the evening ended. In fact, several of the more prominent sourdoughs huskily emitted distant sounds of approbation from their powder-hoarsened throats to the effect that there might be something in a college education after all.

The musical program of the evening was full of vigor. From the start to the finish no one stopped dancing, and at 1 o'clock everybody wanted more, even those who were unaccustomed to the strenuous demands of a Forest Rangers' ball. One of the features of the musical entertainment was a Ranger quartet which sang the latest song hits. Those present showed their appreciation by outbursts of more than usual vocal intensity and a wild fusillade of six-guns. The quartet sang until overcome by gas and powder smoke, when the crowd returned with renewed pep and violence to the revels on the floor.

The supper hour was designated on the dance programs for the convenience of his lordship, the cook, and his retinue. The guests were divided into three groups, each group being given a running start at their respective time for supper in the forestry building. A ranger stationed at the door prevented repeaters. Full justice was done to the supply of beans, sandwiches, pickles, java, potato salad and other trimmings. Despite the lack of domestic science facilities the cuisine of the ranger culinary artists was of the finest. Several of the young ladies thought seriously of proposing and acquiring one of those big, fine-looking, but rather bashful, men of the woods.

A clever joke was perpetrated on the young ladies present by Ranger Berglund of the Beaverhead Forest, who announced that during his leisure time in the hills he amused himself by making rings. These he had brought with him to give the young ladies as souvenirs. The young ladies were requested to come forth if they wished to secure one of these novelties. Nearly everyone did so, desirous of possessing one of the big woodsmen's talons. Instructing them to hold up their hands in order to fit their fingers more readily, he opened his suit case and smilingly removed a large and ancient cow bell. Every young lady present was accommodated by the lusty sounds of the bovine detector.

As usual, the dance was an immense social success. The entertainment was out of the ordinary, the management efficient, and the forest atmosphere created by the decorations gave exactly the right impression and needed impetus for a jolly evening. A small forest had been reconditioned and the fragrance of the fir and pine, coupled with the huge bonfire at the entrance to the hall, supplied the free and easy camaderie of the hills. The burlesque costumes created a contrast to the usual University dance. The practical etiquette of the woodsmen, however, served as well as the more dainty brand of the formal dress suit variety.

I'm proof against the word "failure"; I've seen behind it. The only failure a man ought to fear is the failure in cleaving to the purposes he sees to be right.—George Elliot.
"I love the man that loves the wood, Whate'er his creed, whate'er his blood. I may not know his native land; His creed I may not understand; But when we meet within the wood, There each is silent—understood."

"I can't get work in the Forest Service until I've had practical experience, but how can I get the practical experience unless they give me work?" This, in effect, was the question the graduates of the College of Forestry of the old days often asked themselves. The alumni of the few institutions teaching forestry in those times, took the first train for the west after commencement and prepared to practice their profession on the unsuspecting scenery.

"I long for the land of the pinus palustris Where the liriodendron is bursting to bloom."

The song of their undergraduate days did not meet with a willing response on the part of the hard-headed, practical woodsmen—engineers whose courses in the theory of handling the products of the forest have been supplemented by practical experience in various lines of woods work. The Forest Service is directly responsible for the change, though the larger lumber and logging companies now cooperate to a considerable extent in the furnishing of employment to the students of forest schools during the summer months.

After the first rush of organization was over and the Forest Service was placed on a solid foundation, they very naturally decided as their next step, incidental to administration, to take an inventory, not only of the wealth of the forest, but of the men already on hand and those who were preparing for this branch of the service. Their trail naturally led to the forest schools. The shortcomings of the graduates then in the service were noted and the courses of study rearranged to meet the demands. Most of the men coming from the colleges were long on botany and short on experience; they could outline a comprehensive plan for the reforestation of a large area, but could not distinguish between ground skidding and a crown fire.

Then it was that the Forest Service outlined a broad, liberal policy of employing students of the forest schools. The plan is new even yet, but is working out very satisfactorily. If the student gets his practical experience while in school and the Forest Service has the advantage of being able to draw on the schools for trained men, each graduate is capital and represents a man who had had four years of highly technical training and three seasons field experience.

The Montana Forestry School, located in the heart of the great inland empire timber region and within ten minutes walk of the headquarters of the largest district of the Forest Service, presents a number of advantages as to location for practical training. A circle drawn with Missoula as a center and a one-hundred-mile radius, would include all or a portion of the areas of seventeen national forests, two Indian and one military timber reservations, and Glacier National Park.

The officers of District One, aside from the instruction they give in the school during the year, take a personal interest in the students and assist in placing them in positions during vacations where they will secure valuable experience. The freshmen are usually appointed forest guards, where they have an opportunity to study fire protection, trail building, and forest improvements. A careful record is made of their work, and they are assigned the following season to work best suited to their talents. This work, aside from the training, is highly profitable and makes it possible for a student to earn all of his expenses through college after the first year.

Two of the students of last year's freshman class were assigned to a trail location crew which made a survey through a wild, rugged region of the Clearwater Forest. As no transportation highways had hitherto been attempted in this area, it was necessary for the crew to move their camp equipment during the summer in a boat whipsawed from a tree for the occasion. Claude McQuarrie and Bill Kane, the two students mentioned, both agreed upon their return that they would not have missed the experience if they had to work for the government free. Their tales of shooting the treacherous rapids of the Clearwater River in their frail craft were oft repeated around the indoor campfire this winter.

While Hugh Kent's and Bill Richardson's tales were not so hair-raising, they admitted having surveyed several miles of highway through the Coeur d'Alene and Bitter Root Forests. After the close of the field season, Richardson reported to the Priest River experiment station, where he nursed several million white pine seedlings through a four months illness.

Paul Bischoff held down a ranger district in the Beartooth Forest and gained experience in timber sale work that made it possible for him to secure a position as
logging superintendent for a company in Nicaragua. He, editor of the “Summer Work” department, in his haste to leave for the equator last week, wished the job of writing “Summer Work” on us, for which we wish that he were in a climate somewhat warmer than he will find in Nicaragua.

James Brooks, “Red” Stewart and “Peg” Lansing camped during the summer on the Flathead Forest. They claim that they mapped and estimated timber over most of Montana and all of Canada. C. V. Wingett and “Hank” Ade classified soil on the Cabinet Forest, while K. Wolfe and “Sandy” Sanderson likewise pulverized the sod of the Coeur d’Alene Forest.

Every day was Arbor Day to W. White, Webb Jones and Lyle Hudson, who spread themselves over the Cabinet, Pend O’Reille, Lo Lo, Coeur d’Alene and St. Joe forests, on planting reconnaissance.

“Up the mountain and through the burn, They climbed and ‘mogset the brush and fern, An ole man drove his mattock home, An’ slapped a tree in the gapin’ loam. ‘Mornin’ Father, what’s the game?’ ‘Plantin’ trees,’ the answer came. ‘You don’t ‘spect to live to see The standin’ timber, do ye, say?’ He looked, reflectin’ down the hill; ‘Wal, no; but thuder, some us will.”

Sam Cook demonstrated to the Forest Service that he could handle a road crew as well as back up a football line; he started the season as roadman on the Neihart project and finished as engineer in charge of construction. Sam withdrew from school on March 15, having been given the Georgetown Lake Ranger District on the Missoula Forest.

The Carlson twins spent the summer on entry surveys. Grundy and Butler sunned themselves on the grading table at the Anaconda Copper Mining Company’s mill at Bonner. Grant Higgins amused himself with his mandolin in a lookout station on the Missoula Forest, while Edwards gamboled over the Pend O’Reille Forest with a compass. Alvin Lister and Floyd Eahart confined themselves to lower altitudes, the former working as instrument man for the division engineer of the Northern Pacific Railway and the latter laying out sidings for the Milwaukee.

If we had the complete list that now reposes in Bischoff’s trunk in the hold of one of the United Fruit Company’s steamers, we might be able to tell you whether Vance cruised timber for the Northern Pacific or the Milwaukee; also advise you that Al Nelson purveyed section lines in Idaho—but it may have been Dakota for all we know. The summer whereabouts of the rest of the boys is likewise a mystery to us, but we do know that they all returned to school last fall looking hale and hearty and as hard as nails, and with a roll in their jeans that was the envy of every law student who had spent his summer seeking shade and mooching sodas.

Forestry School Briefs.

W. R. Richardson, ’17, has passed the preliminary examination and departed for the Officers’ Training Camp at the Presidio, California. He will be given his diploma this spring under an order issued by the Chancellor, which provides that any student enlisting for service will be given credit for the entire semester’s work.

Lawson Sanderson, junior, and captain of the Varsity baseball team, recently turned down an offer to sign with the Spokane Indians of the Northwestern League. “Sandy” will play compassman in the Forest Service league this summer on timber surveys.

Webb Jones, senior, and holder of the state record for the half-mile, created a new record last week when he was married, enlisted and sent to the training quarters of the Coast Artillery all within two hours. He was rejected by the examining board at Spokane, however, by reason of a sore toe that had been injured by running spikes. He returned to his war-bride and to his old job in the Land Department of the Forest Service. The war has cost Jones a diploma and given him a wife.

Harley Hartsen and H. R. Flint left early in May to go out on timber surveys. They will be located on the Sioux National Forest.

James F. Brooks, who graduates from the Forestry School this spring, will have charge of an extensive reconnaissance project on the Blackfoot and Flathead Forests. He has selected C. V. Wingett, a third year student, as one of his assistants.

Ed. Simpkins, senior in the Forestry School and guard on the Varsity football team for three years, will take the examination on June 25, for a commission as lieutenant in the Engineering Corps of the regular army.

W. I. White and Marcus Cook have been assigned by the Forest Service to Planting Reconnaissance work.

Alden Jones and Floyd Eahart, guards on the Varsity basketball team last winter, were the first Forestry School students to enlist in the army following the declaration of war. They are now wearing the uniform of the Coast Artillery at Fort Worden, Washington.

John Brocken, William Zeh and Louis Dennie of this year’s freshman class, left early in May for the Kootenai Forest, where they will spend the summer on entry surveys. Edward Hirst will be engaged in similar work on the Pend O’Reille Forest.

Roy Edwards and William Kane expect to classify land for the Forest Service this season.
Silvicultural Management of the National Forests
By John F. Preston, Assistant District Forester, District One.

WHAT I shall say on this subject applies to the national forests of Montana and Idaho, but the same statements would perhaps be as applicable to national forests in any other part of the United States.

The problem of forest-management in the western United States is very different from that already solved in Europe. The significance of the European lessons is just beginning to be recognized in this country. We thought, at first, that the same plan—very small units, high development, and intensive markets, are characteristic of American national forests. Exactly the opposite is, of course, true of European forests—very small units, high development, and intensive markets. American Foresters recognized the difference in a way—they knew that our conditions were crude, that our markets were limited, and that our forests were undeveloped. But the extent of the gap between American and European forest conditions was not only fully appreciated. We at first failed to realize that silvicultural management is a matter of slow growth and that the refined systems of forest management in use in Europe are largely the result of necessity.

In other words, I think we have now learned the lesson that we cannot force plans or systems of management,—it must be a natural development along with the communities in which the forests are located. The best we can do is to anticipate the needs of the communities by a few years. Forest management is not something which can be worked out theoretically and applied arbitrarily. There must be first a real need for stability in the forest industry,—a need which is so apparent that it can not be avoided. Forest management is developed through the commercial life of the people, and the rules, the methods, the systems of forest management can be carried out only so far as they are supported by the sentiment of the people.

A silvicultural working plan for a million-acre National Forest in America is impossible! I mean a system of management drawn up along the same lines as those in effect for small areas in Europe. At first we thought that this was possible and the outlines for working plans were drawn on this theory. As long as conditions remain so crude that a unit no smaller than a million acres is considered, any control which could be dignified by the name of working plan is not needed. In fact in most cases no forest management in silviculture, as the term is generally understood, is needed. The practice of silviculture is essential but the cutting of timber will proceed at so slow a rate that the control will be automatic. No paper plan can be made to work.

The amount of detail needed in a working plan varies inversely as the area of the unit under consideration. The first timber-survey crews were charged with the collection of a mass of "silvical data" which, because of the very extensive nature of the management could never be used. As the result of experience, the amount of such data collected has steadily decreased. The unit of forest management is known as a working-circle, i.e., an area of forest land so located with reference to markets and demand that it is susceptible of management on a sustained or periodic yield basis. In only a few cases has the demand for timber prompted the division of a forest into working circles. Some theoretical units have been designated but in every case they always remain purely a matter of theory or sentiment until the demand for timber makes their use, as part of the control machinery imperative. It is doubtful whether or not it will be possible to prophesy very long in advance of actual need just what the boundaries or areas of the working circles will be.

The question naturally arises as to what is being done or what can be done at the present time in accomplishing or at least looking forward to silvicultural management of the National Forests. Three kinds of data are needed and must be available when industrial conditions force the preparation of a detailed working plan:

(a) Knowledge of markets.
(b) Knowledge of silvical life history of tree species.
(c) Tabulations and maps of the forest concerned, giving estimates, age classes, rate of growth, etc.

The cumulation of data concerning the first two is progressing slowly but surely. These classes of knowledge can be made applicable to whole regions and it has been proposed to work it up in the form or regional working plans. The detailed data for individual forests is being collected slowly and in spots but not always with any definite plan of using it directly in the formation of a working plan,—it is needed rather to enable the service to intelligently sell large bodies of timber. Except for the detailed topographic map, most of the other data ob-

(Continued on Page Fifty-Eight.)
“Facts are facts,” in forestry as in everything else, and early attempts at the practice of forestry on the National Forests soon demonstrated, by their indifferent and unsatisfactory results, that we didn’t have the facts. European experience, based as it was on entirely different species and conditions, didn’t seem to fit, and it soon became apparent that if silviculture and forest management in this country, and on the National Forests particularly, was to be put on a satisfactory basis, steps must be taken to build up an adequate fund of facts, obtained by careful scientific investigation.

It was quickly proven that the needed facts could not be obtained by administrative officers as an incident to their regular work, since they had neither the time nor the facilities to go to the bottom of the complicated problems involved. The work of gathering this information was, therefore, turned over to specialists who could devote their entire time to the work. These special investigators have during the past two years been grouped into a separate division of the service, known as the Branch of Research, for the purpose of securing co-ordination and systematization of the work and concentration of energies upon the most important problems. An outline of the way in which studies of silvicultural problems are being carried on in District One will serve to illustrate in a general way the organization of the work and method of attack adopted in all the National Forest Districts.

All investigators working on silvicultural studies are grouped into a unit section of the Office of Silviculture, known as the Section of Forest Investigations with central headquarters at the District Office in Missoula. To facilitate the work of carrying on intensive field investigations requiring special equipment and a permanent field force, a field experiment station is maintained on the Kaniksu Forest in Northern Idaho, near the town of Priest River. This station has been established 5½ years and it is planned to retain it as a permanent center of intensive experimental work for the western white pine region. It will also serve as a central base for the carrying on of seed testing, seed extraction, soil testing and analysis, and general laboratory work, to supplement the studies being carried on in other parts of the district.

The permanent staff in forest investigations will from now on consist of four men, each of whom will be held separately responsible for a certain division of the work, in which he will specialize as an individual investigator. Of the three men who will have their headquarters in Missoula, two will center their efforts on what are known as “management” problems, dealing with the securing of natural reproduction and maximum timber production on cutting areas. One of them will specialize on the white pine and larch—Douglas fir types, and the other on the spruce and lodgepole types. The third man will devote his entire attention to “forestation” problems, concerned with the collection and extraction of seed, the raising of stock in the nursery, and the sowing of seed or planting of nursery stock in the field. The fourth member of the staff will be permanently located at the Priest River field station. He will specialize on fundamental studies dealing with the relation of trees and forest types to the climate and physical conditions of their environment, and will also have charge of the seed work and special laboratory and field experiments, requiring close attention and frequent observations, which will be conducted at the station to supplement the management and forestation studies carried on by the other investigators. Examples of such field experiments are the study of the length of time seed will remain viable in the ground, the best season for girdling of undesirable hemlock and white fir on cutting areas, the factors which affect and control germination of seed and establishment of seedlings, the ef-
fect of density and competition on rate of growth, and the determination of climatic and cover conditions which indicate the approach of fire danger conditions.

Intelligent practice in appraising logging chances and in marking and cutting timber and disposing of brush must be based on at least an approximate knowledge of the number, size and distribution of seed trees that must be left to secure a good re- stocking, upon the extent to which the seed already in the ground may be relied upon for new growth, the light and soil conditions required for good germination and development of 100 seedlings, the liability of windfall of trees left standing, and the extent of the increased growth due to thinning that may be expected from trees left. The solving of these questions is the function of the management studies of methods of cutting, natural reproduction, thinnings and brush disposal.

To meet the urgent need for immediate information in connection with cutting operations, our present management studies are carried on largely by observational methods in which data is obtained from seedling counts and observations of what has happened in the past on whatever cuttings and burned areas may be available for study. Deductions from this data are used to answer as best they can the practical questions of timber sale practice. There are many gaps in evidence obtained in this way, however, and these can only be filled in by the periodic study of permanent sample plots on which the cutting has been so handled as to bring out the answers to certain disputed points. Cutting and thinning experiments, each including a series of such plots, will be established at different points as opportunity permits, and their examination and remeasurement will eventually absorb a large part of the attention of the men specializing on management work. These plots will answer not only the questions that have arisen in cutting operations, but will also furnish the most complete kind of information on the life history of trees and types and the rate of growth and amount of yield that may be expected under different conditions.

Closely related to and generally grouped with the management studies are studies of the life history and growth of the principal species of trees, known as "tree studies." Such studies are now under way for western white pine and western larch and will later be extended to include other species. Studies of volume, growth and yield of the particular species concerned are included under the tree studies. For other species, however, special projects covering these points and grouped together as "Mensuration" studies are being carried on with the object of obtaining data for yield and volume tables. While volume tables are now fairly well standardized, much work still remains before data on growth and yield will be sufficient to allow the accurate prediction of annual growth and yield on the different Forests in the District. Data now on hand will be strengthened from time to time by volume measurements and stem analysis of past growth on temporary plots of different ages and by the remeasurement of permanent sample plots, to be established either primarily for this purpose or in connection with the methods of cutting studies.

No silvicultural work is more dependent upon investigative work for its success than is reforestation. The most suitable sources of seed must be determined, in order to combine climatic adaptability with maximum growth, and methods of extraction worked out so that seed of high quality may be obtained. The relative merits of reforestation by direct sowing of seed in the field or planting of nursery grown stock must be determined as a basis for planning the nursery and seed collecting operations. A solution must be found for the numerous difficulties encountered in raising inexpensive nursery stock suitable for successful field planting. The relative suitability of different species and age-classes of stock for planting on different sites and in different seasons must be studied. The best methods of sowing seed in the field and of planting out nursery stock so as to secure good survival and growth with the least expense must be worked out, as well as the merits of wide and narrow spacing and planting in pure stands or mixtures. Answers to these questions require a large amount of exact experimental work which is conducted by the "forestation" specialist. The work has now been centered largely at the principal District Nursery—the Savenac—and at two specially designated experimental planting areas at Haugan on the Lolo Forest and Wallace on the Coeur d'Alene Forest in the midst of the territory which was so largely depopulated by the 1910 fires and where the principal reforestation work of the District is concentrated. While considerable work along all these lines has in the past been carried on at the Priest River field station, the experiments there have now been narrowed down to a few special studies of seed and classes of planting stock to supplement the work conducted elsewhere.

One of the principal lines of study at the Priest River station is the determination of the physical and climatic variations which are responsible for the distribution of different species and forest types. The first phase of this work has now been completed after five years of daily instrumental obser-

(Continued on Page Thirty-Four.)
The Wagon Wheel Gap Experiment Station

By Howard R. Flint, '18.

Out of a spirited and finally far-reaching controversy among foresters, meteorologists, engineers and others interested in the policy of the government towards forests and their relation to stream-flow, arose the experimental project which is known as the Wagon-Wheel Gap Stream-Flow Experiment, situated in the mountains of Southern Colorado.

It is the purpose of this experiment to determine the effect of forests and forest cover upon stream flow by close observation of two similar water sheds, and a comparison of their water run-offs and stream-flow after one of them has been denuded of forest cover.

Very little analysis will serve to show the difficulties involved in the carrying out of this experiment. It would perhaps not be difficult to select a small stream with timbered drainage area and, after measuring the stream-flow, precipitation and a few other climatic factors for several years until rough averages are made, to deduce the area and continue the measurements for an equal period, and thus finally reach the conclusion that any changes in the behavior of the stream were due to the denudation of its watershed. This might readily be the case if the changes in the stream-flow were great ones, and if climate was a fairly constant factor that could be determined by two or three criteria, but this, unfortunately, is not the case.

In the plan outlined above a series of several extremely wet or extremely dry seasons immediately preceding or following the denudation might wholly invalidate the results obtained, and in any cases there might be grave question as to whether the effects noticeable on the stream were wholly due to denudation, particularly if these effects proved to be not very marked.

A plan which would largely obviate this and other difficulties, and one which was put in effect in the Wagon Wheel Gap Experiment, involved the selection of two streams of about equal flow and having drainage areas with similar forest cover, altitude, slope, exposure, configuration and area.

In addition, so far as could be determined, there must be no flow of water reaching the areas from any outside source, or any sinks where water in appreciable amounts could leave the areas without flowing through their streams. At the lower ends of the areas, at least, there must be an impervious stratum along the streams in order that the water may be trapped and measured accurately.

While not wholly ideal, the areas at Wagon Wheel Gap, after several years study, appear in the main to fill the conditions outlined above. The chief objections to them are that they are not heavily forested areas, and that their altitude of from 9,300 to 10,500 feet is not sufficiently great to represent true alpine conditions of precipitation and snow-melting in their latitude. They are, however, representative of the conditions obtaining on vast areas of the Rocky Mountain forests.

The plan put in operation on the chosen areas involves the accurate and continual measurement on both areas for a period of years of stream flow, precipitation, temperature, snow melting phenomena, humidity, wind, sunshine, soil temperature, and soil erosion.

It is believed that when the above factors have been measured for a sufficient time, possibly ten years or more, it will be possible to establish ratios by which, given the flow of stream A for a short period of time it will be possible to compute the flow of stream B with a very small percentage of error for the same period.

Once these ratios are established it is planned to deduce one of the areas by means of the axe and fire and to continue the measurements on both by exactly the same methods as before, compute the flow of the denuded stream from that of the other, and compare the results with the actual flow for a sufficient length of time to show definitely what the effects of denudation have been.

In order to measure the flow and soil erosion of the streams, it was necessary to build a concrete dam, extending down into the impervious sub-stratas, across each stream and immediately above the dam to locate a concrete settling basin of sufficient size to insure the absence of appreciable current, thus causing the stream to drop its burden of silt.

A weir consisting of a metal plate with an accurately finished triangular notch is fitted in the face of each dam, and in a small still well within the large settling basin a hook gauge is adjusted with its zero point corresponding to the bottom of the weir notch. Thus it is possible to read the height of the water passing over the weir to the nearest .001 foot. Twice a year the zero point of the hook gauge with reference to the weir is tested to ascertain that the records have not been affected by heaving of the foundation or other mishap.

In the early stages of the work the weirs were carefully calibrated by actually measuring the flow at varying heights by means of tanks in order to determine coefficients for each weir which would give the flow in cubic feet per second at varying heads.

Since a continuous record of the stream flow at each hour of every day is essential, the hook gauge is used only as a check and is read but once a day. The continuous record is obtained by an automatic stage-register which is actuated by clock work and thru the action of a float in the still-well records a trace showing the height in thousands of a foot of water at all times.

This instrument is regulated and its record corrected by daily readings of the hook gauge and the stream heights indicated by its record are transposed to cubic feet per second for each hour of every twenty-four by the use of the coefficients previously mentioned.

Twice a year the stream is turned into a spillway, and the water is taken up from the smooth concrete floor, air dried, and the entire batch weighed in a dry state. Samples of the dry material are then taken and their mixture and humus contents determined, the latter by burning over a gas flame.

The station has now been in operation some seven years, and while considerable information is at hand, it is not yet sufficiently definite to warrant denudation of one of the areas.

Altho the work was planned and initiated by the Forest Service, the Weather Bureau, having been invited to cooperate, it is now handled almost exclusively by the field men of the Weather Bureau, subject to Forest Service inspection and criticism. The work at present is almost wholly meteorological in character, and except for determination of results, is practically all routine. Unnecessary duplication of the same line of work by two separate bureaus is given as the reason for transferring the work to the Weather Bureau.

A lamentable feature in connection with the Wagon Wheel Gap Experiment is the failure of an effort on the part of the Forest Officers in charge to extend the experiment to two additional areas at a higher altitude which bear a much heavier stand of timber and receive considerably more precipitation. Could an addition project similar to the one now in progress be carried on these upper areas, it seems probable that much more positive and more widely applicable results might be obtained with a relatively small increase in cost. Failure to extend the work came about thru the considerable expense attached to overcoming some adverse natural conditions on the upper areas, in which the lack of impermeable sub-stratas was the most important feature.

Take your hats off to the Past, but take your coats off to the Future.
The National Forests of the United States are divided into seven Districts, with headquarters at Auburn, Denver, Ogden, San Francisco, Portland, Missoula, and Washington. These Districts are in charge of District Foresters, who, in turn, are under the direction of the Forester, chief of the Forest Service. It will be seen, therefore, that, while the Forester's position is analogous to that of the president of a great railroad or commercial organization, that of the District Forester approximates that of the division superintendent.

The headquarters of the District Forester of District No. 1 are at Missoula. In the District are located 25 National Forests, covering 26 million acres, extending from Western South Dakota to Eastern Washington, and covering the mountainous forested regions throughout Montana and Northern Idaho. Each Forest is in charge of a Supervisor, who has under his immediate direction one or more assistants, either Deputy Supervisors or Forest Examiners, or both, who assist in the executive and technical work. On each forest are located from five to fifteen district rangers, who, with the summer protective force, constitute the field force. These men are widely scattered, many of them at considerable distance from railroads and towns, and their work, (upon which is founded the cordiality of the sentiment of the public and the efficiency of results), must be referred up through the Supervisor's office and the heads of branch offices in the District Office, to the District Forester.

The permanent field force of District One comprises nearly 400 men in year-long positions. All of these men have met the District Forester, many of them on their own ground. In addition to his other work, time has been found to come into personal contact with all of the rangers, with a mutual benefit resulting.

All the activities of the District are centered at the Chief's desk. Under his immediate direction are the Assistant District Foresters in charge of Silviculture, Operation, Grazing, and Lands, a District Engineer, and a District Fiscal Agent. Assigned to the District Office from the Department of Agriculture is an Assistant to the Solicitor, who is advisor to the District Forester in matters of law.

The organization of the District Office consists of from 75 to 100 members, depending upon the season, and the assignment of members to the field.

All matters of method, whether of practice or procedure, are referred to the District Forester for approval. The enormous amount of detail is usually handled in the branch offices, by members qualified by training and experience in the technical points involved, but final action is vested in the chief.

The organization in the District Office is Departmental, i. e., each Assistant District Forester is responsible for his own branch of the work.

In contradistinction to the functions of other administrative offices, those of Operation are non-technical in character.

The names—"Silviculture," "Grazing," "Lands," "Geography" and "Engineering" presuppose a detailed technical knowledge of the subjects indicated by the names, or the part of members of the office.

Operation, on the other hand, does not come into contact with the other administrative branches of the work, except in matters of organization, finances, handling the personnel, and relation of the technically treated matters to the protection of the forests from fire.

The work of the Assistant District Forester in charge of Operation covers in general—

Organization:—The relation of the man to the job, and the job to the public service.

Personnel:—The selection of men, their remuneration, and assignments, with reference to the interests of service and economy.

Finance:—The correlation of Congressional appropriations and the needs of the service.

Protection:—The detection and control of forest fires.

Improvements:—The construction and maintenance of living and office quarters for the field men, routes of transportation and communication within forests, primarily to facilitate their administration and protection, and other improvements which will make available the resources of the forests.

Property:—The acquisition and care of the necessary tools and equipment for the proper handling of the Forest Service work.

Organization of the Office of Operation.

The Chief of Operation has as assistants: An Executive Assistant, who handles the current work of the office, and in the absence of the chief, is responsible for the office.

The Executive Assistant is a sort of clearing house for the entire District. Across this desk passes the current business of Operation, with all its subordinate and related activities. The purpose of this position is to relieve the Chief of Operation of the matters of current moment, and...
enable him to devote the larger part of his time to the larger items of Organization, Personnel, or other matters of policy or procedure which may require study and investigation.

Since the presence of the Executive Assistant in the office is more or less constant, he is made responsible for the Office of Operation. All matters pass through his hands, and this requires, on his part, some knowledge of all the activities of the office.

An Assistant on Fire Detection and Control, who has charge of the office and field work of investigations, and compilation of data relating to more effective fire protection.

An Assistant on Improvements, who keeps his fingers on the improvement needs of the Forests, and the means of supplying them.

A Telephone Engineer, whose duty is to supervise all construction and maintenance of telephone lines, provide standards of equipment and installation, and assure compliance with them, and draw up agreements and contracts with companies handling public business.

A Chief of Maintenance, who is general assistant to everybody, trouble man for the entire District Office, and in general control of the clerical service in the headquarters. He is also charged with responsibility for the mechanical equipment and outfittings of the offices.

One Clerk, who attends to correspondence, files, and records of the various activities. She has one assistant, who is office stenographer and typist.

A Mail Clerk, who receives, distributes and sends out mail, express and freight shipments. He has two assistants.

During the fire season, a custodian is assigned to the fire emergency warehouse at Missoula, where are stored tools, tentage, cooking equipment and pack equipment necessary to equip a thousand fire fighters, for use in emergencies. Two other warehouses, at Spokane and Kettlefall, can equip 800 men each, under the same conditions.

Finance.

One of the most important functions of the Office of Operation is the handling of funds. A budget is prepared in the spring, for the following fiscal year, based upon Congressional appropriations, and sub-allotments made by the Forest Service to the different Districts. The plan of expenditures provided on this budget, while prepared for a year in advance, is based on the nearly constant factor of administrative and protective needs, together with the need for an organization, variable in nature, to handle the varying conditions resulting from economic demands for the timber, grazing, and other resources of the National Forests. The former can be approximated closely, but not the latter, fluctuating market conditions preventing a close analysis of the needs of the Forests. It is necessary, therefore, throughout the year, to so adjust the funds by increases to one Forest and decreases from another, to enable the Supervisors to carry on their work without delay or loss.

Men, also, must be transferred as the exigencies of the work require. This entails a constant interchange of men and funds, although the original budgets must not be exceeded.

One fund, however, is flexible in character. Congress appropriates, each year, the sum of $150,000 for “fighting and preventing forest fires, and for other unforeseen emergencies.” While the patrol and protection of the forests, ordinarily, are provided for in the regular appropriations, which are based upon a normal fire season, expected requirements of men or materials.

Fire.

The importance of protecting the Forest resources of the Nation from fire ravages has been realized a very short time, comparatively speaking. The conception of this necessity was first: given out when the plans were presented to Congress for withdrawal of all Government owned forested area into National Forest. Following this plan of 1891, Congress authorized the President to set aside forest reserves in order to protect the remaining timber on the public domain from destruction by fire and to insure a regular flow of water in the streams. After this date other forested areas have been set aside until the total acreage now reaches 162,000,000 acres of the aggregate of 544,000,000 acres, including Government and private holdings in the U. S. These reserves have been divided into seven Districts over the United States.

District One, with headquarters at Missoula, Montana, is one of the largest, having a total area of 235,500,000 acres, of which 12,000,000 acres are merchantable timber land.

While fire protection is only one of the various administrative duties of the Forest Service, it is by far the most important. It is obvious that, in order to continue timber sales, develop recreational sites, perpetuate the growth of timber by planting, maintain the water power, afford constant free use of the Forests to settlers and insure watershed protection, the Forests must first and always be protected from the fire menace. This becomes a particularly difficult problem as may be realized when considering the wilderness of mountainous area in comparison to a few human beings placed at strategic points over its area to keep fires down. The Forest Service began this work, however, in the face of all these obstacles with absolutely no foundation or previous experience with which to plan their defense. Not until the great fires of 1910 did administrative officers of the Forest Service realize the magnitude of the fire protection problem and the utter futility of human endeavor against the elements. But the determination and experience of the men in the field began to show possibilities of a victorious fight. Fire organizations began to form under individual effort of the various Forest Officers scattered over the area.

District One has 25 Forests and 25 Supervisors, each with a corps of from four to twelve Forest Rangers. During the summer months each Forest force is augmented by from twelve to forty Forest Guards, which forms the organization whose paramount duty during the fire season is to look
for, locate and put out fires. This force is aided by members of the District Office and particularly by the Fire Office, one of the departments of the District Office under Operation. The duty of the Chief of this Department is to act in the capacity of a collector of ideas and plans from the various field officers of the District and, where found of value, diffuse them over the remaining Forests so that an equal benefit may be derived from the progress of all Forests. In other words, the Office of Fire acts as a clearing house to the Forests or a centralized point in which plans are created, put into effect on the Forest and checked by inspection in the field. Aside from this paramount duty of the Fire Office in the development of the fire organization as a whole, the establishing of emergency warehouses for supplying large crews of men on short notice became evident. Accordingly in 1915 three warehouse schemes were erected. One in Missoula, Montana, and one in Spokane, Wash., each containing complete standard fire fighting equipment and all necessary kitchen and mess articles, tentage, etc., for 300, 500 and 700 men respectively. Out of this warehouse scheme developed the possibility of centralized purchasing of all fire fighting equipment used in the District. Two purchases were made for the Forests and a net saving in money of 25 per cent was made by this organization. The total investment of fire fighting equipment to date amounts to $82,000. To complete final plans, $25,000 worth of additional equipment is needed.

Aside from this duty, also, it is a part of the work of the Fire Office to standardize and develop the forms for the recording and accountability of all activities of the fire organization. Each winter the Fire Office makes a careful analysis of all the records of the fires which occurred during the summer together with a study as a whole of the entire season's work of the field organization. Plans are then made for the presentation to the Forests of the weaknesses found in their organizations and in this way an attempt is made to strengthen the various organizations.

From the above brief review it may be seen that to cope with the situation it is necessary to make a deep scientific study of the problem. To get a closer perspective of the situation the fire organization has therefore been separated into the three groups of Fire Prevention, Fire Detection and Fire Control.

Fire Prevention.

Under prevention comes the work of attempting to eliminate the cause or starting of fires. Fires are started in a great many ways and have been classified briefly into "Human Agency" and the "Elements." "Human Agency" constitutes 75 per cent of the cause of fires and includes: campers, railroads, brush burning, incendiary and lumbering operations.

The remaining 25 per cent of the cause of fires is from lightning striking trees which, of course, is an uncontrollable factor. It is regrettable that the 75 per cent of the fires caused by human agency cannot readily be stopped. This has, however, been found a very difficult problem and as long as the records have been kept, during the past eight years, no apparent improvement has been made.

To bring before the public the annual destruction by fire caused by themselves, a publicity campaign has been waged by the use of illustrations of carelessness and fire destruction in moving pictures, public posters, etc., in various public places, and even prosecutions of transgressors have been made.

Fire Detection.

Detection is the act of discovering, locating and reporting fires. This branch of the organization has in the eight years of its existence been developed to a comparatively high degree of efficiency. Men are stationed on the higher points, each covering the most of the valuable timber resources. With the aid of the telephone lines connected to the point, they are, from their vantage point, able to quickly discover fires as they occur and report them to what is known as a "Smoke Chaser," who is located where he can reach the fire within the shortest possible time. To aid in the discovery and location of fires the lookout men are quartered in lookout cabins which have a wall of glass all around the cabins with an alidade located on a map board for reading the direction of the fire from the North and South meridian.

If it is possible for another lookout to discover the same fire by his reading, the fire may be located readily on the map by cross-section. If it is impossible, however, for the second lookout to see the fire it may be located by taking the vertical angle from the lookout point and then by what is known as the "Koch Profile," actually locating it on the topographic map placed on a map board at each lookout point. Field glasses and amber glasses are also provided for searching the mountains for fires during the time when the atmosphere is smoky or hazy.

Fire Control.

Control is the major of the fire organization and is the getting and extinguishing of fire after it has been reported from the lookout point. The control
bermen or settlers in the immediate vicinity of the fire. If it is found that the second line of defense is unable to control the fire and the amount of resources at stake warrant it, crews of any size may be shipped in from nearby towns, lumber camps or any available source. It can be easily seen that it is particularly important to develop the first line of defense to a high degree of efficiency in order to put the fires out in their incipiency and avoid the great expenses of the second and third lines of defense as well as the enormous timber destruction resulting from large fires.

The equipping of the control organization is a particularly difficult problem. The emergency warehouses serve to particular advantage where large crews are equipped on short notice. The supplying of food has also been found a difficult problem. Nesting kitchen and mess outfits have been developed and serve from 5 to 50 men, each made flexible in any unit so that complete kitchen and mess equipment for 100 men can be carried on two pack horses. All equipment, including tools, nesting kitchen and mess outfits are kept in tool caches and the emergency warehouses, crated, labeled and ready for immediate shipment at an instant's notice. Tabulated data is in the hands of each Forest Officer showing all available men, equipment and supplies, the travel time to any point within his district and resources of all drainages which he is expected to protect. The Chief of the Fire Office has lately developed a plan known as the "Hour Control Fire Plan," which correlates and systematizes this entire organization and graphically illustrates on the best map available the tabulated data outlined above. With this plan the fire fighter has at his finger tips a working knowledge of the location of every man within his district boundaries, the available men, equipment and supplies, timber resources, the most hazardous part of his forest, location of trails, telephone lines, etc. This plan makes it possible to augment automatically the control organization gradually as the fire season becomes worse. By this plan it is believed that it will be possible, after all the organizations become perfected as outlined, to prevent large fires, such as that of 1910, from ever occurring again.

During the last eight years of the organization seven million dollars has been spent in fire protection in District 1, most of which occurred during the seasons of 1910 and 1914. Over 8,000 fires were met and extinguished during this time. The total area burned aggregated nearly one-third of the 12,000,000 acres of forested land in District 1, and the total damages amounted, to over $24,000,000. During the two years 1910 and 1914 of this eight year period, 22,000 men were employed to combat the fires. It does seem, therefore, that if it is at all possible for human endeavor to meet this fire situation no expense should be spared in developing initial forces in order to prevent fires from starting and extinguishing what fires do start before they reach magnitude beyond possibilities of extinguishment by human power.

Improvements.

Due to their very existence our National Forests are the roughest and most inaccessible regions of the country. Only in a few instances has industry led to the opening up of any of these regions and this may be exclusively confined to the mining and lumbering industries. The Forest Service has expended in the National Forests of Northern Idaho and Montana approximately $1,250,000 in the construction of buildings, trails, bridges, telephone lines, fences, etc.

The trail system constructed amounts to approximately 5,400 miles. In addition to this, 3,200 miles have been constructed by other interests. It is estimated that 3,000 miles additional trail will be needed before the large gaps in the present system will be closed. The greater portion of this mileage is located in Northern Idaho.

The telephone system has approximately 4,000 miles of lines and needs 2,000 miles more before the system will be fully completed. The construction work in Forest improvements is handled by the Forest.

The organization in the District Office consists of a Telephone Engineer who is a technician on construction and an adviser on all other matters pertaining to telephone work.

A Forest Examiner is in charge of all other lines of Forest improvements, especially trail and ranger station improvements. On large trail projects a locating engineer is assigned by the office to do the location work and to draft the specifications under which the work is to be done. After this has been accomplished, the estimates and specifications are turned over to the Supervisor, who is responsible for the proper carrying out of the work on the ground. At the present time plans are being made for the correlation of all important improvement projects throughout the District with the special object of arranging a definite plan for their construction in the order of their importance. Standardization requirements are being rapidly compiled in order that the same type of construction work may be had throughout the various Forests that are located in this force.

A number of the Freshmen will get their first experience in forestry this summer while working as guards on the forests of this vicinity. William Opalka has been appointed guard on the Flathead, Parker on the Absaroka, Valentine on the Nez Perce, Warren on the Lewis and Clarke, and Woodward on the Gallatin.

THE SUPERVISORS' MEETING.

The Annual Meeting of District One
By James F. Brooks, '97.

The Forest Supervisors of District 1 assembled in Missoula on January 29, 1917, for a five-day session to talk over their problems and find out how others were handling theirs. Mr. Silcox presided vociferously and efficiently and with the aid of Sergeant-at-Arms Porter was able to preserve a very fair semblance of order. Robert's Rules of Order were the standard of parliamentary procedure, but the men did not crucify themselves on a cross of formality in this regard.

A carefully planned program was arranged before the meeting convened and was followed occasionally for a few minutes. Leavitt objected to the program as prepared because he said that doing the very best he could with the time he was allotted would give him the floor only a little over half of the time. Warner is very fond of speaking in public himself, but he withdrew from the discussion in favor of Leavitt.

Supervisor Bodley delivered the invocation and Mr. Silcox gave the opening address, in which he urged the men to be prompt in getting to the meeting and, for the benefit of McGowan, Preston and Leavitt, said, "Don't hesitate to express yourselves or ask questions."

R. H. RUTLEDGE
Assistant District Forester in Charge of Operation. Specializes in personnel and fire protection.

After these preliminaries the Office of Operation was put in charge, the first topic being the classification of personnel. Mr. Rutledge expressed the belief that some new titles should be created because at present there are only about one hundred and thirty. The matter of dispensing with the Deputy Supervisors was put up and Bodley declared himself in favor of doing away with everyone but the Supervisors and possibly the District Forester, because he fig-
ured that a Supervisor should know his Forest so well that no one else would be needed. Just to show how familiar he was with his Forest he told the meeting that there was a spring in the NE 1/4 of the NE 1/4, section 37 and that he could tell how much stock it would water, and how much it would cost to improve it, but he didn’t want to.

When the subject of “Fire” was brought up, Dan Conner exhibited a most marvelous array of portable foods for fire-fighters, vest-pocket size meals for smoke-chasers, etc. The combination side-hill plough, canopener, mattock and tent pole, made a big hit with the men who have trouble with fires on their Forests.

The question of trail classification caused considerable discussion. Faye Clark held that it was so, while nearly everyone else argued that it wasn’t. Smith, of the Kootenai, said, “Why build trails when a Ford will go anywhere that a mountain goat well?”

Silviculture also took the boys on for a few rounds. Stevens led out by declaring that the present timber sale policy was all right, because Follower said it was. This was followed by a motion that Stevens be burned at the stake if he was found inflammable and if not he should be boiled in oil. The motion was carried by a large majority. Stockdale tried to get the floor a few minutes before adjournment, but he took so much time saying, “Mr. Ch-ch-ch-ch-chairman” that they thought he was starting a filibuster and applied the gag rule.

The feature of the next day was the discussion of sanitation in logging camps. Leavitt said lumberjacks should not be allowed to work in government timber without bathing at least once a month. McLaughlin said that was too often for anyone. Solicitor McGowan declared that any such regulation would be unconstitutional and when Shaw said it would make no difference to him, the matter was dropped.

Friday was turned over to the sheepherders’ delegation and the lumberjacks were invited not to come. Somers argued that the Beaverhead was the best Forest in the District and had everyone thinking so till Leavitt mentioned the Jefferson.

Saturday morning was given over to “Lands.” Major Fenn opened by singing the “Star Spangled Banner,” accompanied by Drum-Major Glen Smith. Then he tried to talk about June 11 claims, featuring fraudulent ones. “Gum-Shoe Haines” said he had had all he wanted of that business and as he wouldn’t let anyone talk on the subject they passed to recreational development of National Forests. Parker was in favor of a million dollar appropriation to develop Seeley Lake, but the sense of the meeting seemed to be that if the District ever got hold of that much money it should be divided among the Supervisors for personal use.

Saturday afternoon was a wild one. The Supervisors elected a chairman and ran the meeting themselves. The chairman insisted on doing all of the talking himself, so the police had to be called to quell the riot. Started by some of the others who wanted to talk a little.

Social activities occupied the evenings of the men. There was a banquet, a dance, a smoker and several small parties scattered along through the week.

**THE SUPERVISORS’ BANQUET**

“Hello! Yes! Yes, I will be right home. No, it is just five. No, I won’t forget it! Goodbye!”

“My wife wants some bread for dinner but I promised to tell you about the banquet in Missoula. I guess I’ll have time first,” said the Supervisor to his Deputy. The Supervisor had returned to his office from the annual Supervisors’ meeting that afternoon.

“Give me a match.”

“Well (smoke). Well, (smoke), you know all of us fellows were looking forward to that banquet. At the last meeting those District Office fellows showed us a good time and we all remembered it. Every last one of us went, even Warner, ‘Chief Absaraka,’ as they called him three years ago.

“I don’t know how many were there, but the table was set in a U shape, then a smaller U in the middle; about 150 maybe anyway, the tables were full.

“We started to eat, since that was what we came for. Then the Glee Club sort of lived things up a bit with a few songs just like the last banquet, and we all wondered if something new wasn’t going to be pulled. The program called for several stunts, but it was worse than the ‘fiscal regulations’; you couldn’t make anything out of ‘em.

“Here’s the program, neat as a two-year-old male, but I’ll bet you can’t tell what that dope means; there under ‘Treats’.

“By Gosh, I nearly forgot! The Glee Club was singing, and they sang as an encore ‘Yak a Hula,’ which made quite a hit and was encored again. The curtains parted showing a stage and as they sung the chorus again a Hawaiian maid dressed in a grass skirt danced forth. Say, it brought the house down.”

“A Hawaiian maid?” asked the Deputy.

“Well, they say not really, but I’ll bet she was. Some one tried to make me believe it was ‘Fat’ Maurer dressed up like one, but, gosh, they couldn’t fool me none.”

“It was about time for the pie, only it was ice cream, so the Major—of course, he officiated—began to call on one or two speakers. After a good talk or two, he announced that Knock & Company would entertain us for a few minutes. Give me another match, will you?”

“Well, the scene opened with ‘Sil,’ ‘R. H.’ and ‘C. H.’ and the Major and McGowan came in later. Amid cowbells, squeals and smiles Kramer rode in on a bicycle carrying some eggs packed in straw. Oh, yes, Conner was there and R. B. with his bowler.

“Sil called the meeting to order and each of the District Office chiefs made his report. Say, it was rich, wish I could remember all. Then we had some seen and unseen areas. I think they called it Simple and Easy, but how they did it I don’t see yet.”

“The Gym team performed, and two fellows taking off Glenn Smith and Whitman boxed two rounds, with Whitman declared winner after a knockout. Glenn weighed ringside 240 pounds Whitman 97 pounds.

“O, yes, and the mind reading stunt! One fellow went out in the crowd and touched different things, asking the blind-folded fellow on the stage what he was touching. I can’t figure it out, but they were always right—never missed once. Why, do you know, he laid his hand on Somers’ head and asked his team mate what he was touching. The answer, without hesitation a bit, came back ‘Solid Ivory.’ I don’t see how they did it.

“To finish up, they had a campfire scene and two fellows played on some kind of queer instruments which made fine music. Anything, it sounded good to me. The Major, of course, had to refer to Pinchot and Roosevelt.

“Say, there goes the six o’clock whistle, and I won’t get that bread.”

**INDOOR FIELD MEET.**

Old Man Probability suffered a severe set-back at the Annual Indoor Field Meet when the students of the Ranger School defeated the regular students in Forestry in the art of high jumping, usually considered exclusively a sport for college men. He had another relapse when the collegeians stepped over into the domain supposedly reserved to the Rangers and won the horse-packing contest.
FORESTRY KAIMIN

There were but two of the numbers on the program at this year's production of the annual stag classic. In the other events Probability batted an average more in keeping with his name.

The Meet was witnessed by the entire office force of District One and furnished the Supervisors in attendance at their annual meeting with an evening's entertainment.

The contest was tied until the basketball game, the last event on the program, was finished. This was won by the regulars, giving them the meet by a score of 30 to 25.

One of the features of the evening was "Carney's Army," which filled an intermission between athletic events. Captain Carney, in full dress, led his army, consisting of "Red" Stewart, some four feet and a half in height, and Schowe of the Gallatin Forest, who measures nearly seven feet, through some intricate drills and vaudeville stunts. The burlesque was one of the most original skits seen on the campus in many a day.

The Forestry Quartet, composed of Kent, Richardson, Kane and Jackson, appeared for the first time this season and sang several more or less high-brow selections. Their original songs and parodies composed for the occasion, made a special hit, being directed at some of the visiting supervisors.

The sawing contest was the most hotly contested event on the program. The sawing contest the year before had been won by the regulars and the rangers had therefore taken extra precautions this winter to insure the winning of the contest.

Toward the close of the evening a burlesque boxing bout was staged by "Shorty" Whisler and "Web" Jones. Their acrobatic stunts incidental to feinting and countering, qualified them for some of Pantages' time. At the middle of the third round, Jones broke through Whisler's guard before he recovered his balance from a back-flip-flip, and with a mighty wallop landed a haymaker on Whisler's mouth that broke up the bout. Whisler's front teeth were heard to rattle over the floor and were retrieved by Scott Lecavitt, Supervisor of the Jefferson Forest.

To the amusement of the audience Scott found the teeth to be white beans dropped for his special benefit.

That the other boxing bouts were genuine was not to be doubted for a moment by the fans; the two three-round goes scheduled were to decide a number of fire-side disputes. Stewart and Lansing worked on the same reconnaissances crew last summer and were hungering to punish each other for alleged insults incident to camp life. Lansing demonstrated, at least to the satisfaction of the audience, that Stewart had been in error most of the time.

The packing contest was won by default by Bischoff and Woodward, batting for the regulars. The horse used was a barrel mounted on legs for the occasion. Kingsley and Nelson, the ranger team, took one shant at the nag and threw up the sponge. As Kingsley remarked: "I can pack anything with hair on it, but I draw the line at throwing the diamond on Joel B. Praxiez."

Some two hundred and fifty men, including the supervisors, enjoyed the meet. "Coffee an—" was served at the conclusion of the entertainment by the freshmen of the Forest School.

The Contests.

The contests follow:

Boxing: Harold Lansing, ranger, won from "Red" Stewart, Earle Lockridge, for rangers, bested Nelson, student.

Wrestling: Edward Knight, ranger. Simpkins, student, defeated Woodward, student, defeated Whitmore, ranger.

Tug-of-War: Kingsley, Berglund and Whitmore, rangers, outpulled Sam Cook, Woodward and Ingebrightsen, students.

Packing Horse: Woodward and Bischoff, students, won by default, no rangers entering. Did the job in 1 min, 15 sec.

High Jump: Blake, ranger, won, with leap of 5 ft. 2 in., over Ingebrightsen.

Sawing 16-inch Log: Blake and Klehm, rangers, won, time 1 min, 3 sec. Sam Cook and Ingebrightsen, students, 1 min, 33 sec.

Basketball: Studen team of Kent, McQuarrie, Dennis, Ingebrightsen and Lockridge, with Nelson, substitute, won with score of 22 to 11 made by rangers and district office team, Lansing, Cool, Silva, Gray and Yeomans.

THE RANGER'S WEEK.

The Forest Ranger's life is joy,
His days are spent in play.
His weeks are fun without alloy,
And clean as a chimney sweep.

Monday sees a mile of trail,
Blocked by a landslide's fall,
He mends a couple of bridges frail,
But aside from putting the grade in shape,
He does no work at all.

Tuesday finds him full of sand,
Ranged as a chimney sweep,
He rides ten miles to the driveway stand,
And tallies ten thousand head of sheep.
But seeing this trifle duty done, he spends the day in sleep.

Wednesday morning some tourists came,
Loaded with ignorance, matches and all,
Well primed to set the Forests afame
And burn the timber straight and tall.

Trailing them till they were safe in bed,
But otherwise did no work at all.

Thursday a couple of thieves he caught filing fake claims to get the wood.
This day's work almost came to naught,
For they were friends of Senator Good.
But after the gang was safe in jail, he loosed as a Ranger should.

Friday he made a timber sale
With a certified check as security;
He figured the stand by the decimal scale,
And branded U. S. on every tree.

So while he might have done some work,
He passed the day in ecstasy.

And Saturday, like the rest of the week,
He played at tennis, and golf, and ball,
He shoed his pony, cleaned the creek,
Burned some litter and built a stall,
But generally speaking, the livelong day,
He wrote his reports—That's all.

The Forest Ranger's Mottoes:
"Stand, Create, Protect, Restore,"
To help home builders with the land
And bring comfort on every hand
Now and forever more.
Paul Bunyan

Being additional stories of the marvelous doings of the mythical hero of all lumber camps as gathered from tales around the campfire, the files of American Lumberman and other sources.

"Twas a Saturday night in the bunk house; pipes were lighted and the army of swampers, skinners and sawyers had drawn their benches up to the big stove prepared to engage in a little indoor skidding. The lone Forest Student, spending his second summer at the camp, was attempting to explain to a newcomer from Canada how Paul Bunyan had been able to serve warmed up lake water as a substitute for pea soup the preceding winter.

"You see," said the Stude, "his laterals leading from the lake were surveyed as to give a specific minus gradient; that is, considering the surface of the lake as datum, why—"

"Aw, cheese it," said the Old Logger.

"Let me tell him about the winter of the blue snow; what does a codfish eater know about pea soup, anyway?" Then shooting his quid of Peerless at the sawdust box, he wheezed as follows:

"Paul had his camp that winter a mile above where Cedar Brook flows into Old Green River. He had logged off every section 57 miles around, and had an unusually large crew of 5,000 men because he wanted to log all the good timber that winter so that he would be free to take a contract to cruise the National Forests of Kamias in the spring. Now you must admit that feeding a crew of this size would be some job to anybody but Paul. He laid the eating house out diamond shaped, forty rod long and twict as wide, with the table space set into three decks, old heads on top deck, etc., but they was trouble in gittin' things passed round. Ordinary common waiters couldn't cut the mustard, so Paul he figgered it out to speed table service a bit. He got hold of a couple hundred Shetland ponies for the waiters to ride. He puts little platforms onto um, for saddle, and the waiters they served standing on the platforms so they could reach the top decks to the tables.

The Old Logger discontinued his talk and subsided into the gathering, but at once an Old Timer got up from his bunk and appeared flushed—even angry.

"Why don't he tell it all and git it right?" he asked. "That's a fine place to leave off with them ponies." He lit his pipe and continued thusly:

"This is what happened," he rumbled. "The waiters don't git action enough and the fellers faint away on the top decks waitin' for their mulligan. Paul he can stand for that, so he sends out and gits roller skates for them ponies; that speeds service some.

"Fine," said the student, "but I'd think that on the curves, centrifugal force would—"

"That's right," said the Old Timer, "it was some mussey around the corners at first while them ponies was learnin' to take the curves. Shetland ponies is all trotters and it cum hard for um to learn to pace—like they had to in takin' a curve on their two inside legs. They done it tho."

A pause ensued. "Swiftwater Bill" bit off a quarter pound of Climax and elucidated further. "Howseover," he said, "the service was still insufficient, as it were; it was so slow that some of the fellers fartoast from the cook house had to wait so long that Paul had to furnish barbers to go round while they's waitin' for their dessert. If don't his whiskers grew so long they gets um all mixed up with the ice cream when it cum finally and lose so much time washin' off of um afterwards that Paul's stop watch studies shows he can't afford it; so he gits the barber.

"And did he finally git on the plan of pony service?" someone asked.

"Yes, he since give it up entire. Used the ponies afterwards to clean out the camp buildings. Used to hitch up teams to them whirling wire rollers they use on the streets now, and sweep out around the camp. Yeh see them Shetlands could git in under the wash bench an' store an' lower bunks an' places the bull cooks never teched—it saved nearly sixty hands around camp."

"Well, what did he substitute for the table service?" meekly inquired the Forest Stude.

"Say," said the Old Timer, "it's a wonder one of you highbrows with an education wouldn't write up some of them there happenings. I gits tired a-tellin' of um. Paul went and ribbed up a grub train, that's what he did."

"Man, oh Man! she was a go-getter, that grub train. Paul put in a set of Ys and switches, like in the coal yard, between the eatin' house and the cook shack. Then he runs a track in between all the tables and around so that every track has switch onto the next track. He has the cook load a train of grub cars and a Shay picks her up and makes a run for the eatin' house. Takes twenty-seven brake men to switch for it. Down comes the grub train flyin', the brakies pull the pins between the cars and each car makes a flyin' switch down between the tables, circles at the end, comes back to the Y, the brakies couple up, flyin', and back goes the train for another load.

"And she were, I'm tellin' you! First, came two soup cars. Tankers, they was. Round like untill only fixed up special. Onto each was a cupelo of compressed air and three beef cooks with their rubber boots and coats. Had a railing built around so's they could hold to and wouldn't be knocked off by the kick of the hoss."

"Oh! I see," said the Student. "Quite novel; they served soup through a hose."

"Not at all, not at all," said the Old Timer. "Handiest way they was. Three-inch hose they used and a pile of pressure. Y'see at first Paul tried runnin' the soup in a flume on the top deck. Thirty-six inch V flume it was on a 2 per cent grade with spillways ever hundert seats or so. Fellers on top helped theirselves and then leaned over a little sideways with their plate in the flume. The current is so strong that the soup goes down the spillways an' fills everybody's basin slick as a whistle. The trouble come, however, by reason of the other grub cars comin' so fast that a lot of the boys was losin' out on the pork an' spuds. O' course they got sore an' a lot of 'em went down the road. Paul, he couldn't stand for that, with labor scarce an' all, so he had to do some other desprit."

"He went to town an' got one o' these split second watches. It was ten foot acrost with a second split down to milliotes. He used to stand there by the door an' figger an' figger. Finally he git the idea. He takes out the flume entire an' shoots steam into them there coupleys. He got spry attachments for the nozzles and more pressure than ever, two thousand seven hundert pounds to the inch—and the ladches was measured small at that. When the pressure was turned on, the soup filled the eatin' house like a kind of fog and all the hands had to do was inhale it. Saved dishwashin' too.

"Right after the soup car came the bean car. Paul bought out an ol' paper mill an' run hot beans into it and they came out mashed flat like paper. It came in real handy that way when the hands were out in the woods with theirunches tied up in it. Saved bread."

"And then came the spud car—a gondola. The pie car was a sight all to itself. Nine bull cooks on a flat car with pitch forks, throwin' pie; one bull cook to each kind of pie, except two each to punkin and mince. They say it was real interestin' till them cooks got the range right."

"An' then there was the celery car. The celery come in on the bunks of a set of Russel cars. This celery was raised in Paul's own garden, and was so big that one stick to the bunk was all she would stand. A feller who broke into the woods as a tie hack, an' later got to be a top loader, he comes in ridin' the celery stick with 8-inch corks in his boots an' swingin' one of Paul's broad-axes. When he was learnin' he used to do his scorin' before he went to sleep. Later on, he fits a veneer machine knife onto each foot an' as he hews he stamps with his feet as he goes, an' backward, doin' his scorin' as he went. He got so he could throw them chips jest where..."
passes the wood pile I hears a funny noise—
kind of a smorin' an' a whinin'; I looks
close and there I sees Paul's bald head a-
shinin' in the moonlight. The saw is run-
nin' slick as lighting an' cuttin' nine cord
of wood to o'nt. Paul's so tickled with
the saw workin' smooth an' easy like that
he's there sawin' and sawin' with the
sawdust up to his ears an' raisin' every min-
ute. Yessir! only me, in two minutes
more Paul is drowne in sawdust!"

"Did Paul Bunyan ever work for the For-
est Service?" the Kid asked.

"I've heard tell that he did fer a spell," said
the old timer. "They tell me that he couldn't
stand up under the strain—got writer's cramp or something. Yusee he was
workin' fer the Guvment as Ranger
on Hudson Bay, an'—"

"That's right, ball it up," said the Com-
missary Clerk, "let a man tell it what
knows the facts. Paul never worked in
Mexico in his life. He was ranger out in
Montana, that's what he was.

Then he rambled as follows: "It seems,
after Paul got through cruisin' the buffalo
game in Kansas the bottom had kinda drop-
ded out of the loggin' business, contrac's
was scarce, and what work was bein' done
was bein' handled by steam, so Paul figh-
gers he's sorta outta luck, with only a horse
outfit; so he commences to look round fer
something. He saw an add in the Post
Office tellin' about a ranger examination
what's comin' off an' he allows he'll try
it. He shows up fer the exam and finds
three subject's covered—Surveying, Field
Tests, and Fire Protection. The surveyin'
questions is: 'Draw a township diagram,'
which Paul does, though he has a hard
time fixin' in Sec. 37. In the Field Tests
the applicant had to pack an 8-foot cross-
cut on an old roan hired from a livery stable
for the occasion. Paul fastens one handle
to the critter's ears an' the other to the
tail so o' course passes the Field Tests.
O. K. The questions in Fire Protection
was, 'How would you fight a crown fire?'
Paul answers, 'Run like hell an' pray for
rain.'"

"O' course, after passing such a search-
ing examination Paul felt sure o' appointment,
so he kinda sits around fer a couple o'
years, fer the Guvment to grade his
papers. One day he got a letter without
stamp on it sayin', 'Penalty fer private
use $300.' Paul was some scared, but took
a chance, and opened it privately anyhow.
It told him he was appointed ranger on
the LoLo Forest, and to report to Allars Cox,
Supervisor.

"So Paul puts on his snow shoes and
ropes his bed roll onto the pinto filly an'
starts West. He kinda hated to leave
Babe, the blue ox, behind but he knew the
spread of the critter's horns was too much
to go through the tunnel where the trail
goes under the Continental divide, so he
hada"

"Well, I kinda lost track o' Paul fer
awhile, but pretty soon I got a job keepin'
time for the Polleys outfit on Randolph
Creek an' come to find out they was log-
gin' some white pine on the Forest Paul
was workin' on. Paul was some busy that
summer, so I didn't git to see much of
him. It seems it had been a bad fire season
an' he had built the Mullen road an' cleared
the right o' way fer the Milwaukee rail-
rroad after hours, an' had writ a book, 'Pil-
grim's Progress,' I think they calls it.

"Well after a while, I gits tired o' my
job and allows I'll draw down my time and
spend a week or two with Paul. I knew
just about where I'd find him, fer, if I
remember right the date was the 20th of July.

"What had that to do about it?" someone
asked.

"Well, I figgared like this," he continu-
ed, "it being the 20th he would jest about
have finished filling in his report forms for
June, without time to git more than one
day's travel from headquarters. It was
pretty late that night before I see'd his
camp fire—I knew it was Paul's because
I cud see his pintler filly, whose nostrils
had nuzzled the post of every saloon from
Saltlake to Frenchtown. Paul was settin'
by the fire readin' his Use Book and fillin'
in his daily report.

"Paul was some glad to see me that night
an' we lit our corncobs and was talkin' 'bout
the loggin' days in Minnesota when all of a
sudden the telephone bell rang, Yusee
Paul always carried an Adam's portable
telephone for such occasions."

"Hello! is this the Ranger, District Ten?"

"Yep, it's me," says Paul.

"They's a Class A fire advancin' up
the canyon a mile a minute,' says the voice.
Investigate and write up a complete re-
port for the District Office. Don't start
to fight it till ye git authorization from
"Operation'."

"Paul entered the fact in nineteen card
records and dictated a report for the Su-
pervisor.

"This time the fire was all around
us, the flames shootin' two miles high. Paul
rang up the District Office, but jest then
the lines melted in two. Paul, o' course,
filled in form 944 about this an' mailed six
duplicates for the Office of Operation.

"The fire was so hot by now it had
burned the clothes from our backs. Paul
fired his six-shooter to 'tract attention, but
the intense heat melted the bullets and
silenced the report. We was plum' out
an' no chance fer escape."

"Paul was jest tellin' me that the place
we was goin' to couldn't be any hotter
than this when a telegram was handed
him orderin' him to report to the District
Office to become familiar with routine.
O' course, orders is orders, an' Paul couldn't
stop on account of no fire. He set on a
log an' made out his expense account on
Forty Four an' we started immediate. Yess-
ire! that telegram saved our lives."
By ED SIMPKINS.

When the Season's work is over
And the fire is burning bright,
When the pipes are burning freely,
Lighting up the forest night,
Then do men, their fanatics spoken,
Spoken from the heart each time,
Tell their hopes, their fears, ambitions,
Each his judge with every line.
Life is all a great big project,
With your heart give all you can,
With your heart give all you can,
Each his judge with every line.

As the old campfire begins to warm up,
so do the fellows, as grouped about the big stove in "Supervisor's Bonner's" district they anxiously await further developments in their life training. The old timer, having spent from three to four years getting this development, takes a bite of morsels in their life training. The old "eyeing" the awe-stricken Freshman in the background.

"Member the old days in nineteen forty-four. "Say, did'ju hear that one about the lumberjack down to the hospital? He was lying there in bed with a broken leg when the Mother Superior came by and offered him a few words of comfort, ending with an inquiry as to how the accident happened."

"Wal," said the timber-willie, "we was deckin' fer the A. C. M. outfit. I was sky-hookin' and I told the ground monkey to sog her a little. As 't was, he bunted instead, an' the stick gummed and busted one o' my pins. That's just how it all happened." The good Sister, of course, was much enlightened and sorry."

And so on—

This is characteristic of the meetings about the big stove in the drawing room. It's a great old stove, but it is being whispered around that the old heater is to be taken out this summer and the school heated by steam. This will be hard on the fellows who daily congregate about its cheerful circle to plan big careers and recount big adventures. And the old stove has been somewhat of a benefactor during its three years in college. It has caused no few holidays on cold mornings by refusing to heat up the room that the earnest students might pursue their studies; and it has allowed its chimney to be blocked or bullets to be put into its hot insides just to try out some one's idea of a joke. And so "Old Faithful" is going to be missed. Doubtless if it would stay the full four years, it could, at the end of that time, go out and finish its career in the Forestry Service at some ranger's station.

But even with the old stove gone, the sessions of the campfire league will live. These sessions are the natural result of a group of men banded together in an earnest effort to master a difficult work. Although for the most part, the discussions tend toward the humorous, reflecting the good times that have gone by, still there is generally an underlying current of seriousness. Some of these meetings have been wholly debates regarding the work of the Service and seem to forecast for the students of this school an interest in their life-work that cannot fail to receive its reward in the coming years.

It was bright and early on Monday, January eighth, that a great change seemed to have come over the campfire league. The old fire seemed to be drawing as usual but the room seemed to be more smoky. A blue haze had settled over everything. The regulars, drifting in, found their accustomed seats after some search, but unsurpassed by professionals. Without doubt, this would have precipitated trouble had Sandy not had an "eight-thirty" that morning and therefore could not be expected until nine o'clock. Anyway Rangers Berglund, Showe and Kingsley seemed to have charge of the meeting. So the civilized regulars, showing the culture derived from going to college, quietly gave up their rights until some time in April. That is, all except Red Stewart. Red had been mistaken for a ranger and was getting away with a lot of last year's dope from his high stool with the ladder on it. In fact, Red climbs on his high stool and starts to relate, one is struck by the resemblance to the regular meetings of the rangers with all of their picturesque local color. But just at this time the bell rang and that broke up the party, as, of course, the rangers had not got the hang of things yet and went to classes on time.

Not long after this, one of the boys who had been at the Forestry Club meeting the night before was telling the others who had missed the food, what had happened. It seems that Jim Brooks, the president, took occasion to welcome the "shorthorns" to the school. It is highly probable, too, that the large crowd was rather difficult to face after the regular meetings that had been in order so far during the year; but it seems that he got the message over anyway. According to the data at hand, we reproduce—

"Meeting will please come to order. Have you got the minutes, Red? Well, then, I guess the first thing on the program is an address of welcome by the president. We're glad you shorthorns are with us and we want you to feel that you are at home. The dues are thirty-five cents per month and Mr. Kane will be glad to talk it over with you. Last year the rangers were part of the club and I think they got a lot of good out of it. So we want you to feel at home here and see Mr. Kane, as he will help you. We always have some of the best talent in the Northwest to address us at these meetings and I'm sure you'll get your thirty-five cents' worth, as we generally
have a feed afterward and try and make
you fellows feel at home. We are going
to have our annual Forest Rangers’ Ball
the sixteenth of February, and I want to
tell you fellows to begin to scout around
for a woman because last year all that some
of the boys had was a name and address
and we want to be more careful this year
whom we bring. Also we will have our
annual Indoor Athletic Meet soon and you
follows want to talk it over in your meeting
and get your athletes in training be-
cause last year we clean-d up on you. Well.
I guess that this is enough of a president’s
address of welcome. Is there any new
business?"

IN RECONNAISSANCE CAMP.
By A. G. Jackson.
The ranger sat on his office chair,
It was only a bench in a cabin old,
Whose roof of shakes let in the air
And whose side logs grey were deep with
mould.
A cob-webbed window let in the light.
And more came in through the open door.
The looks of the place were a perfect fright
For dirt and paper wads strewn the floor.
A rusty stove in the corner sat,
A chain and transit were near at hand.
The ranger's desk was of cedar shaks;
Whose roof of shakes let in the air
And whose side logs grey were deep with
mould.
In the face of danger he seems quite calm.

Porter, of the District
OFFICE, GOES A-HUNTING

Here is Porter, the hunter bold;
He tracked the elk through the snow so cold.
Here is the cannon that the hunter bore,
’Till his-back was lame, and his spirit sore.
Here is the elk, all safe from harm;
In the face of danger he seems quite calm.

Here see Porter raising his Krag:
How eager he seems the game to bag!
With heart in his mouth, he pulls the
trigger—
But something goes wrong with the con-
founded jigger.

This shows the elk fast disappearing.
The language of Porter to put out of
hearing.
Here Porter is having a series of fits,
And the Krag will soon be in millions of
bits.

K. D. S.

R. W. Richardson has accepted a posi-
tion with the Mt. Fleecer Lumber Com-
pany. He will work under the direction
of John Taylor, a graduate of the Uni-
versity and woods superintendent of the
company.

The Prodigal.
By Jack Welch.
I was tired of the silence and grandeur,
Of the solemn, unchanging hills,
Where the only echo of music
Was the splashing of mountain rills.
I heard in my dreams in the cabin,
Lonely, and lonesome, alone,
The hum of the far-away cities
Insistently calling me home.

I dreamed of the restaurants and dancing,
The avenues' pomp and display,
The whirl of six-cylinder auto-
The lights on the lighted way,
The stillness; the gloom of the fir trees,
Obsessed and oppressed me the more
As I thought of waste years in the back-
woods
Which the future could never restore.

Then I threw up my job in the Service,
Pulled stak.es and trekked back to the
towns;
Turned in my badge and my transit;
Turned my back on my daily rounds.
The restless go-fever was on me,
I wanted a change—which I found,
For I landed a place in an office
With a shaky typewriter to pound.

Now I dream in a twenty-tier building
Of the men and the days back there;
The work that was always man's work—
The tang of the mountain air.
These are pretty good fellows
As men in the cities go;
But those clear-eyed, weather-bronzed
rangers
A.e the sort I'd rather know.

My muscles are loose and lazy;
Tobacco tastes bitter and stale,
Lord, it was good on the lazy,
Damp days on the Darrington trail!
The fire glows again by the river,
The mandolin tinkles at night,
The packer comes up with the mail sack—
(Which weighs altogether too light!)

I've learned as naught else could have
taught me
The depth and the breadth of it all;
That a ‘snap’ isn't just what I thought it;
That the payment is petty and small.
Not in money, perhaps, but in pleasure,
Satisfaction in work well done;
The thought that you've given full measure
Counts more than cash easily won.

So I think I'll go back to the Service;
I'm sick of this routine work.
The monotony's driving me loco;
I wasn't cut out for a clerk.
Out there where the Rangers are waiting;
Out there where life's really worth while;
Out there in the limitless open
There's a job that is more to my style.
WHAT DOES SANDY SEE?

FOR THE JOB HUNTER.

Apropos of the value of a neat business-like letter, written in proper spirit and straight to the point, when applying in writing for a position, a ranger from Colorado offers the Kaim in the following page from the experience of a logging superintendent as a suggestion as how not to get a job.

In going through the weekly mail at the camp office one morning, the superintendent could not fail to note a type-written letter of striking appearance which is here reproduced:

**Boss of Timber Camp.**

**Dear Sir:**

I write to find out when you will put the Tie-Makers to work, tie-making, give all Perversians, how you expect to have the work Conducted, tell your prices either Way, if you have more than 1 offer to make To Tie-Makers, also tell us how much you Pay for saw-Logs either so much a piece Or so much per Oneast Scale by Board-Rule Tell us how much you are paying for 7 inch Ties also, for 6 inch & for culs, there is 3 of us around here which is all very good Real Tie-Makers who are looking forwards To this work very faithfully, but in the Past it has looked like a Crooked Coer-Gomerated Mass of Business, that is why we did not venture before to work for Some rail Road Company for nothing, because We are poor althow Oonest is no reason why We should be roped by the Money Powers of A Great Corpulation which is most always The case, we have herd on party 1st class Authority that Oonest men have been cheeted Out of there pay in your camp, if so we Don't want it, if we come to your Camp can

**THE FIRE FIGHTERS.**

"Where's Smith and Hennessy, Edwards, Stowe—Where's Casey and Link and Small?"
The Ranger listened, and mumbled low: "They're missing, Chief, that's all.

"Where the smoke rolls high, I saw them ride—They waved good-bye to me;

Good God! they might as well have tried To put back the rolling sea.

"I rode for aid till my horse fell dead,
Then waded the mountain stream:
The pools I swam were red, blood red, And covered with choking steam.

There was never a comrade to shout "hello" Though I flung back many a call:
The brave boys knew what it meant to go—They're missing, Chief—that's all."

—ARTHUR CHAPMAN.

you send us money to pay our fair and trust Us for a few close and Tools 'and grab stake To start work with, hoping to hear from you Soon because we are a little Hard Up We Remain Respectfully yours for any Way to Make some Money.

Sined **THOMAS GILMER.**

Appreciating the situation and having in his mind's eye a very clear image of the kind of employee Mr. Gilmer would probably make, the busy woods Superintendent punched off the following reply on his dusty typewriter:

**Mr. Thomas Gilmer:**

**Dear Sir,**

I have your letter of recent date. In reply will say that your idea of this outfit is probably correct. This company is a rip-roaring, peel-heeled son-of-a-gun. A real Tie-Maker came up here in an auto-mobile last week with a good suit, a fat turkey, an Ingersoll watch, and a roll of greenbacks that would choke Paul Bunyan's ox. He escaped next day in his underwear and one sock with the shreds of his reputation and a few crumbs.

To the wise man two words should be plenty,—STAY AWAY.

Yours for Easy Money and the Big Steal, Signed. **WOODS, SUPERINTENDANT.**

**THE GYPSY TRAIL.**

The wind and the sky and the sun, The open trail—and free. A staff and a pack—and One To take to the road with me. Over the hills that lure Under the trees that sway, Laughing, and strong, and poor. Out on the wander-way.

The sun and the wind and the sky, The star-strown vault at night, And two hearts beating high A thrill with an old delight. Out from the fret of the town Free from the ties that gall, Venturing up and down Under the wander-thrall.

The sky and the sun and the wind, And One on the road I fare Slender and gypsy-skinned, My gypsy ways to share. Life that is void of stress Love that's real and true—The Road and the wind's caress, Sun and sky and You!

Every man is a consumer, and ought to be a producer. He fails to make his place good in the world unless he not only pays his debt, but also adds something to the common wealth.—Emerson.
RIDERS OF THE STARS.

By HENRY HERBERT KNIBBS, in The American.

Twenty abreast down the Golden Street ten thousand riders marched—
Bow-legged boys in their swinging chaps, all clumsily keeping time;
And the Angel Host, to the lone, last ghost, their delicate eyebrows arched
As the swaggering sons of the open range drew up to the Throne Sublime.

Gaunt and grizzled a Texas man from out of the concourse strode;
He doffed his hat with a rude, rough grace, then lifted his eagle head
As the sunlit air on his silvered hair and the bronze of his visage glowed;
“Master, the boys have a talk to make on the things up here,” he said.

Then a hush ran over the waiting throng as the Cherubim replied:
“He that weigheth the hearts of men, He deemeth your challenge strange,
Though He long hath known that ye crave your own; that ye would not walk, but ride.
O restless sons of the ancient earth, ye men of the open range!”

Then warily spake the Texas man: “A petition and no complaint
We here present if the Law allows and the Master He thinks it fit;
We all agree to the things that be, but we’re longing for things that ain’t,
So we took a vote and we made a plan and here is the plan we writ:

“Give us a range, our horses and ropes; open the Pearly Gate;
Turn us loose in the unfenced blue, riding the sunset rounds,
Hunting each stray in the Milky Way and running the rancho straight.
Not crowding the dogie stars too much on their way to the bedding grounds.

“Maverick comets that’s running wild, we’ll rope ’em and brand ’em fair,
So they’ll quit stampeding the starry herd; no rustling or blotting brands;
And we’ll save ’em prime for the round-up time, and us riders will all be there,
Ready and willing to do our work as we did in the mesa lands.

“Long we’ve studied the landmarks, Sir; Taurus, the Bear and Mars,
Venus a-smiling across the west as bright as a burning coal;
Plain to guide as we punchers ride, night-herding the milling stars,
With Saturn’s rings for a home corral and the Dipper our water hole.

“Here we have nothing to do but yarn of the times that have long gone by;
And our singing, it don’t fit in up here, though we’ve tried it for old time’s sake;
Our hands are itching to swing a rope; our legs are stiff: that’s why
We ask you, Master, to turn us loose; just give us an even break.”

Then the Lord He spake to the Cherubim, and this was His kindly word:
“He that keepeth the threefold keys shall open and let them go;
Turn those men to their work again to ride the starry herd;
My glory sings in the toil they crave; ‘tis theirs... I would have it so.”

Have you heard in the starlit dusk of eve, when the lean coyotes roam,
The Yip! Yip! Yip! of their hunting cry and the echo that shrilled afar,
While you listened still on a desert hill and gazed at the twinkling dome
As a visionary rider swept the sky on the trail of a shooting star?

---

THE SPELL OF THE FIRE.

By The Cave Scout.

Strange are the murmurings in the trees,
Secret the whisperings on the breeze—
Deep in the heart of the wilderness.

Darkness creeps near with its velvet pall,
Silent, relentless, covering all—
Awesome the heart of the wilderness!

Mystery lurks in the trees and sky,
Wild is the sound of the night beast’s cry—
Fearsome the heart of the wilderness!

Then—in the darkness, a flash of light:
Grows to a campfire, cheery and bright—
Home in the heart of the wilderness!

ON THE RANGE.

Take me back into God’s country,
Turn me loose upon the range,
Give me chaps and spurs and saddle
And a trail across the plains,
Where the coyote barks the loudest
In the foothills of the plains.

Let me guard the herd at midnight
‘Neath the silent, starry sky,
An’ I’ll sing away their fears
Of the shadows passing by,
Where the mesa meets the foothills
And the waterhole is dry.

Give me horses for the roundup
An’ a rope that’ll hold a steer,
“Cause I want to feel the leather
And to gallop without fear
Across the Buck Horn country
And the plains I love so dear.

’Tis a land of God’s own making
Where the herds are scattered wide,
And the friendship of the prairie
Goes with you as you ride
Out across this dark green sea
With the foothills on each side.

—PATTON GROSS.
By Hugh Peyton and Helmuth Bay.

(Nota: The Rangers during their fourteen weeks stay at the University are known to the regular students as "Short-horns." A social meeting of the Rangers is held every Wednesday evening, and a weekly newspaper, edited by Bay and Peyton, is a regular feature of the program.—Ed.)

Finding that the literary departments in such leading papers as the War Cry and Old Sleuth, are too conservative for our form of administration, we have decided to put to the public an appeal in this Little Short Horn Bull. Believing as we do in free speech, free use, and capital punishment, we wish to state that anyone suing us for libel will find it to their advantage to "talk it over" first, as we are working under the Blanket System. Laboring, as we are, under great mental stress, being intellectually lazy and baldheaded, we ask you to overlook any personal quips and to remember that Rangers and would-be Rangers as the foundation of the Forest Service, must necessarily face some mud when it rains.

Hubbard, our famed Ford wrangler, fears that the price of gasoline this summer will make it impossible for him to teach the young Hubbardites the intricacies of the Tin Lizzie.

We are sorry indeed that the Rangers do not take more interest in church work. It's true that some of them do, and the manner in which they pick their religion is unique in itself. They stand on the corner and when a bunch of feathery, fluffy ones go by, their choice is made. Then there is the Salvation Army bunch. They stand in the snow for an hour or two listening to the yarn of some redeemed brother and then trot off to the Bijou to see Mlle. Zuzu do her famous dance. It's a great life.

Perino, our godly man, made a break in his last sermon by cursing. In his defense we can only say that you can't make a man forget his mule-skinning days after only twenty years of following the Lord. "It's easy to tell a Forest Ranger," a Co-Ed informed us lately, "You know," she said, "Whenever I see a bunch of rough-looking men reading a sign, I know they are Short-horns."

Anyone desiring to make a big stake during the summer, see Whitmore about his new method of extracting gold from goldfish. He claims he has found the latest process and that it is very technical.

---

THE QUESTION.

By Hugh Peyton, Ranger School '17.

As we're campin' here tonight, Bill,
And there's only me and you,
And supper's done and our pipes are lit,
And the long, hard day is thru;

It makes me think of the good old days
When the Service was young and now,
When they turned us loose in half a world,
Where the trails were far and few.

Where we marked our way by streams unnamed
To lakes, still and asleep;
Rode in the shadows of peaks unknown,
Thru canyons silent and deep.

Remember, Bill, when the Dry Creek Fire
Sprang up near Lake La Belle,
And the smokin' slopes o' Lochso Gulch
Was a fair Imitation of Hell?

And how we were caught on Dead Man's Flat
And had to take to the Stream,
And lay there, 'till the fire burned out,
In the heat and smoke and steam?

And remember, too, that Christmas Day
That we found Clearwater Bill
In his old Quartz mine with his leg blown off
Was a fair imitation of Hell?

And how we made that toboggan affair
And hauled him out thru the snow,
And the lodgepoles creaked and swayed in the wind
And it must 'a been thirty below?

We've sure had our ups and also our downs,
And a few little samples o' wo'
A-fightin' the fire thru the summers,
In winter the cold and the snow.

The things we done back in those days
Never have half been told,
But we've stayed in the game and never complained
And now we are grizzled and old.

We blazed the trails that let in the dudes
And the technical men galore,
And bein' not up on "technic" stuff,
It seems we've wanted no more.

Our ways and our days are plumb out o' date
Yet I ain't makin' no fuss;
But Bill,—I would sure like to know
Just what's goin' t' happen to us?

Do not be discouraged at your faults; bear with yourself in correcting them, as you would with your neighbor.—Fenelon.
Said Clarke: "Now what shall I do With this hungry trail building crew The high cost of grub Is a terrible rub, So I'll feed them on Clearwater Stew."

Oh, here comes the Bitter Root Speeder, With Conner on top for the leader; The machine left the trail Was broke all to Hail And Conner's now riding a seeder.

Oh, here is our old friend, R. Bee, Who said to himself, said he, "If I get to Hell I hope that the Bell Will put in a wire for me."

We can stand our full portioxn of Worry, But the state of xxx our mind is a frick? when we're grinding xxxut stuff in a hurry And the won't type right.

At six o'clock I have a shock— A Baby Ben alarm. I cut it short—the ringing sport— And set it back from harm.

Again I wake, it's past daybreak— I lose a yawn to heaven. The Ranger's read! "What, you in bed?— Get up—it's after seven!"

The sour-dough hot's fill up the spots Where I felt gone and hollow. "I'm going to Paul's," the Ranger bawls, "Clean up the place and follow."

I try to fix the chimney bricks, Or saw wood till I'm dizzy. A timber sale—the trip for mail, They sure do keep me busy.

All day I ride and bruise my hide, And make my pony tired; But, "Look up stock," and "Watch that flock," For just that I was hired.

And when it's dark we reach a park, And cook a little feed. And hit the hay and snore away In rest we sorely need.

It sure gets me, then, when I see One day just brings another. It makes me sigh and wish that I Were back to home and Mother.

But I won't kick like some poor Mick Who must be sour and scrappy; But do my bit—the whole of it— Just that will make me happy.

The man who has not learned to say "no" will be a weak if not a wretched man as long as he lives.—Ian Maclaren.
The officers of a number of Western Forests publish from time to time little journals containing news of interest to the men engaged in forestry work—handy hints, jokes and poems. Some of the latter are classics in their way and seldom wander beyond the boundaries of the Forest on which they are written. A few of these poems are reproduced on these pages. "The Night Trail," written by Scott Leavitt, the poet laureate of District One, has become famous, as has its clever answer, here reproduced as written by an unknown ranger.—Editor.

A RANGER TO HIS BROTHER AT THE "U."

After Robert Service

"You ask me, Old Pal, of the Forest,
The mountain, the stream and the pine,
Of a Ranger's life as I see it
So I'll try to drop you a line.
Of course you are wrapped in your studies,
(Which I note from your card are few),
But I'll try to teach you a lesson;
One you won't learn at the U.

"Have you gazed on big dizzy mountains,
With deep, dark valleys below?
Have you spent the night in the forest
So still you could hear it grow?
Have you climbed to the tops of the foothills,
Where the vision ranges free
And seen the pines and the hemlocks
As far as the eye could see?

"Have you broken the trail on snowshoes,
Staggering blind through the snow
And heard the great white silence,
You've got to have grub—so you go.
Have you seen the stars as a background
For the mountains and peaks at rest,
And watched that fire in the west?

"Have you run out any firelines
And gone days and nights without sleep.
Glued with the red rage of battle
And steeled in the furnace heat?
Have you gazed on the bleak desolation
And the blackened trunks as they sway,
Nature's work for millions of years
All destroyed in a day?

"Have you followed the trail in the summer,
Sang a rag-time song on the hill,
The smell of the pines all about you
The sunny woods all a thrill?
You see a big buck on the mountains and
hear the wild birds call,
And you notice the bigness; the beauty;
Haven't you wondered what's back of it all?

"Well, son, have I taught you a lesson,
Can you read it between the lines?
I have read you God's own sermon
As I see it in the pines.
The simple text of nature,
Not heard in any pew;
Be sure to write and tell me—
Do they teach this at the U?"
—Bonner, '07.

THE CHAPARRAL POET.

A cigarette,
A careless bloke,
A thousand acres
Turned to smoke.

A city crowd,
A big camp fire,
A puff of wind,
More men to hire.

A careless hunter,
Stops and smokes,
Hope he chokes.

A puff of smoke,
A Guard alert,
It's soon put out
By throwing dirt

He lit his pipe,
Threw down the match,
From tricks like this
Big fires hatch.

The Lookout man
With glass and map
Just sits and looks.
His job's a snap.

A virgin stand,
Free from slashes,
A careless traveler;
Now it's ashes.

—J. M. D.
Cleveland National Forest.
I rode on a lonely trail when night
From the depths of the canyons drew
A dusky veil over crag and height
For we follow a way unseen.
And it seemed that the wild things voiced a dread
Of the gloom and the mystery,
Of a Sense of Fate that with silent tread
Rode on a lonely trail when night.

Why did you ride on that trail by night?
And why all alone, Old Sport?
Is the lady’s home so far out of sight
That you ride more miles than you ought?
And, honest, Old Man, did you pass by that bar
As you tell in that tale that you weave?

And you’ve spoken no word in all of your rhyne
Of the sour you left and arrived;
So how can we figure the amount of per diem
That may from your trip be derived?
Was the light you discovered at the end of the trail
The end of your ride, foxy youth?
Or the store where you went to look for your mail?
Or the place where you “called” till the night grew pale?
Oh! Come now, and give us the truth.

As you rode along in that thick solitude
That covered the trail like a pall,
Did never a thought of the game laws intrude?
When you heard the elk’s loving call?
Now, surely that cry, that coyote yell
Was bound your true nature to find;
And those things you were planning the public to tell,
Condemning the Game Warden to innermost hell,
Were certainly clear in your mind.

—A RANGER.
THE RECONSTRUCTION OF THE LUMBER INDUSTRY

By H. S. Sackett, Forester.
National Lumber Manufacturers Ass’n., Chicago, Ill.

The two most prominent features of the lumber industry that have made themselves manifest in the past two or three years are the awakening of the lumber manufacturers to the necessity of advertising and assisting in the disposal of their products, and the realization on the part of the lumber retailers of the necessity of becoming real merchants in their business.

It was about two years ago that the lumber manufacturers of the United States finally came to the conclusion that it was just as necessary for them to advertise their products as it was for the cement manufacturers, the brick manufacturers or patent roofing manufacturers to advertise theirs.

For nearly half a century lumber had no competition and there were no competitive materials that made it fight for a living. About 15 years ago, however, certain competitive materials entered into the market for lumber. Cement, steel, brick and fibre products were the principal offenders against the time honored wood. With vigorous advertising campaigns and effective organizations it was not long before these products began to eat into the vitals of the lumber business and in about 10 years time they had reduced the consumption of lumber about 25 per cent. It was shortly after this that the lumber manufacturers awoke to the necessity of advertising their products and they then began to plan their campaign of publicity. This campaign is now being conducted by the Trade Extension Department of the National Lumber Manufacturers Association and has been characterized by a definite policy of advocating only "Wood where Best." The publicity campaign has met with wonderful success and if the next generation does not know more about the use of wood than the present generation does, it will certainly not be the fault of the lumber manufacturers.

The other big feature of the industry has been the awakening of the retail lumber dealer to the necessity of becoming a real merchant in his business. This feature is of very recent origin and is "growing by leaps and bounds. At the present time the retailer who formerly advertised that he had a lumber yard at which might be found lumber and shingles is most decidedly a back number. The progressive retailers are talking service and better still are giving service. They are setting aside parts of their office for the use and convenience of their customers. In this part of the office, which is called a "Service Room" may be found the latest information on woods, house plans, barn plans, poultry house plans, information on how to properly season and finish lumber, prices of materials and all other information that any prospective builder might ask for. If but only a few of the retailers were inaugurating this new idea of merchandising, it could not be considered as a distinctive feature of the industry, but when hundreds and thousands of them are adopting these methods, it is not only worthy of mention but worthy of being given a big place in the annals of the industry.

The lumber manufacturers and the dealers are now working hand in hand for the benefit of the public. They are anxious that wood shall make good in every use to which it is put, but they are careful to see that wood is only put in the place where it can give service. Both the manufacturer and the dealer are working for satisfied customers and economical service to them, and as the whole idea is a moral and economical one, it cannot fail of success.

SILVICAL RESEARCH WORK IN DISTRICT ONE

(Continued from Page Sixteen.)

I  his tract includes two complete watersheds which are accessible to a driving stream and nearby mills and which are unusually well stocked with timber of different age-classes, types and mixtures characteristic of most of the important variations in forest cover found on the Forests of the North Idaho region. The fact that most of the timber is immature and only about half grown will permit the placing of the area under systematic forest management in a comparatively short time by arranging for a regular distribution of age-classes and cutting cycles. Thinnings and improvement cuttings in these young stands will also make it possible to raise production to a high point within a minimum length.
of time, when coupled with the close utilization which will be possible because of accessibility and nearby markets. This tract will provide an excellent working laboratory for investigative work where many different silvicultural experiments can eventually be installed in connection with its management and development. This experimental work will be planned by the different members of the investigative staff in accordance with their particular specialties and will be carried out under the administrative direction of the Supervisor of the Kaniksu Forest through a Ranger on the ground especially assigned to the work of protecting and developing the experimental forest. A similar area is planned at Bernice on the Deerlodge Forest for the lodgepole region, and a policy of concentrating field experiments at other points in the district will be followed as far as climatic and cover conditions will permit.

New investigative projects may be proposed by any Forest Officer in the District. They are then passed upon by the District Investigative Committee, composed of administrative and investigative men, and are subject to final approval by the Branch in Washington. If approved, a project is placed on the investigative program of the service, and work is started after the preparation and approval of a working plan. In this way correlation and constructive criticism is secured and the work is limited to that which can be carried on to advantage by the force available.

While silvical research has become a specialized line of work, yet there are many opportunities for Supervisors, Rangers and other administrative officers to check and supplement the findings of the investigative force by observations and experiments which can be made in connection with their regular work. The amount of ground that can be covered by a small number of specialists is very limited at best. It stands to reason that the hundreds of men in the administrative force will run across numerous interesting conditions and facts which the special investigators will never encounter. It is hoped that as the work progresses, general interest in our various silvicultural problems may grow to the point where the whole District organization is thinking in terms of research, bringing out new facts at an ever increasing rate and applying them to an ever growing extent to the improvement of silvicultural practice in the District.

"Men fear thought as they fear nothing else on earth—more than ruin, more even than death. Thought is subversive and revolutionary, destructive and terrible; thought is merciless to privileges, established institutions, and comfortable habits; thought is amoral and lawless, indifferent to authority, careless of the well-tried wisdom of the ages. Thought looks into the pit of hell and is not afraid. It sees man, a feeble speck, surrounded by unfathomable depths of silence; yet it bears itself proudly, as unmoved as if it were lord of the universe. Thought is great and swift and free, the light of the world, and the chief glory of man."—Bertrand Russell, in the New Republic.

Outdoor garments are the ideal outer covering for workers in the open because they offer the

**Best Weather Protection**

Patrick—Duluth garments are made only of the famous Patrick Northern grown wool, which, because of its long fibre and the peculiar loose weave of the PATRICK cloth, makes it the greatest all round weather insulator yet devised for protecting active men from outdoor cold and moisture.

**Mackinaws, Stag Shirts and Pants**
*(for extreme weather)*

**Outing or Sport Jackets**
*(for moderate temperature)*

Have become celebrated from coast to coast because of their unusual weather and rain resisting qualities.

Their moderate weight, loose woven fabric, splendid designing and tailoring, generous roominess, warmth without weight, and long, hard wear make them the truly ideal garment for all outdoor workers and especially those who must face all kinds of weather.

In addition to the above.

**Sweaters, Blankets, Wool Sox, Robes, Caps and Steamer Rugs**

Are also made from this wonderful PATRICK long fibre, Northern wool and carry this nationally known label.

Ask your dealer for a PATRICK-DULUTH all-wool product and you will receive absolutely the best manufactured.

**F. A. Patrick & Co.**

Spinners and Manufacturers.

**DULUTH. - - - MINNESOTA**
Western larch (larix occidentalis) grows principally in northwestern United States and southwest British Columbia. In the United States the distribution ranges from northwestern Montana, northern Idaho and Washington, southward into northern Oregon. The altitudinal range of growth varies from 2,000 to 7,000 feet. The best development and the greatest commercial importance of the species is attained in the Flathead Valley of Montana and in northern Idaho.

The tree is large and symmetrical, with a straight evenly tapering trunk. In regions of its best development it occasionally attains a height of 170 to 180 feet and a diameter of over four feet. In the Flathead Valley and in northern Idaho, trees in the best mature stands will average 125 to 150 feet in height and 15 inches to 2 feet in diameter. The butt is often swelled, shaky, and very heavy, and for those reasons the tree often long butted in the woods. In logging 26 million board feet of larch at Seeley Lake, Montana, there was a loss of eight per cent from long butting. Western larch is the only western evergreen which loses its leaves in winter.

Forest Service estimates place the total stand of western larch in the Inland Empire (western Montana, northern Idaho, eastern Washington and northeastern Oregon) at 25 billion feet. Twelve billion feet, or 48 per cent of the total stand is in Montana.

The total cut of western larch in the Inland Empire in 1915 was 231 million feet. One hundred and sixteen million feet, or 50 per cent of the total cut, was produced in Montana. In 1915 the total cut of larch on Montana formed 35 per cent of the total cut of all species in the state.

The wood is good growth, straight grained, firm and hard and rather heavy. Forest Service tests of Montana larch show an oven dry weight per cubic foot of 31.0 lbs., and a green weight of 51.5 lbs. The heartwood is reddish brown in color and the sapwood yellowish white. The sapwood varies in width from 1/2 to 1 1/2 inches in logs of average size. The wood contains resin ducts which usually occur in the summer wood. Plate 1 is a transverse section of the wood magnified 50 times.

Sufficient conclusive data from actual service tests are not at hand to warrant a definite statement of the average length of life of the more important commercial Montana woods when placed in conditions favorable to decay. From the data at hand, however, it is safe to say that larch ranks well with the other Montana woods as to durability.

Inflammaplability tests on larch show that it ranks well with other woods in ability to resist fire.

Mechanical Properties.

Forest Service strength tests of western larch show that it ranks high with other American woods as a structural material. The following table gives average strength values of several important woods, both for green structural timbers and for small pieces without defects:

<table>
<thead>
<tr>
<th>(See Table on Page 38.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Service strength tests of western larch from Missoula County, Montana, give the following strength values for small clear pieces tested green:</td>
</tr>
<tr>
<td>Rings per inch</td>
</tr>
<tr>
<td>Moisture content</td>
</tr>
<tr>
<td>Specific gravity oven dry, based on volume when tested</td>
</tr>
<tr>
<td>Specific gravity oven dry, based on volume when oven dry</td>
</tr>
<tr>
<td>Volume shrinkage from green to oven dry condition</td>
</tr>
<tr>
<td>Radial shrinkage from green to oven dry condition</td>
</tr>
<tr>
<td>Tangential shrinkage from green to oven dry condition</td>
</tr>
<tr>
<td>Fiber stress at elastic limit (static bending), per sq. in</td>
</tr>
<tr>
<td>Modulus of rupture (static bending), per sq. in</td>
</tr>
<tr>
<td>Modulus of elasticity (static bending) per sq. in</td>
</tr>
<tr>
<td>Crushing strength (compression parallel to grain), per sq. in</td>
</tr>
<tr>
<td>Fiber stress at elastic limit (compression perpendicular to grain) per sq. in</td>
</tr>
<tr>
<td>End hardness</td>
</tr>
<tr>
<td>Side hardness</td>
</tr>
<tr>
<td>Shearing strength parallel to grain, per sq. in</td>
</tr>
</tbody>
</table>

§ Percentage of dry weight.
| Percentage of dimensions when green.
| Load required to imbed a .444 inch ball to one-half its diameter.

Manufacture.

In the Inland Empire western larch and Douglas fir are usually graded and sold together, inasmuch as the larger percentage of both species goes into common lumber and dimension stock. Larch cuts out on the average only about 10 per cent of select lumber. This is due in part to the natural characteristics of the wood, in part to the long butting, and in part to degrading in seasoning.

In both air drying and kiln drying a high percentage is reduced in grade. In air drying select, only about one-third of the stock remains in the select grades. One large Montana mill holds some of its select larch close piled in the yard from two to four years before shipping. Fairly good stock is secured at this plant, but the carrying charges on material held for this length of time are necessarily very high.

In kiln drying not much difficulty is ex-
For a Smooth, Quick Cut

DISSTON SAWs

Built of the finest materials along lines scientifical­ly correct for the intended service.

Result—Run Easiest, Cut Fastest, Last Longest.

Write for Cross Cut Booklet

Henry Disston & Sons, Inc.

Philadelphia
U. S. A.

Philadelphia
U. S. A.
### Average strength values for different species; green structural timbers and small pieces without defects.

<table>
<thead>
<tr>
<th>Species</th>
<th>Weight per cubic foot oven dry</th>
<th>Rings per inch</th>
<th>Number of tests</th>
<th>Fiber stress at elastic limit</th>
<th>Modulus of elasticity</th>
<th>Modulus of rupture</th>
<th>Bending Moment</th>
<th>Horizontal shear</th>
<th>Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longleaf pine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>35</td>
<td>13.8</td>
<td>17</td>
<td>3,734 (s)</td>
<td>8,140</td>
<td>1,463</td>
<td>333</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>8.7 (s)</td>
<td>1.9 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Douglas fir</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>28</td>
<td>11.0</td>
<td>101</td>
<td>3,968 (s)</td>
<td>8,250</td>
<td>1,507</td>
<td>106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.6 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shortleaf pine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>30</td>
<td>12.1</td>
<td>48</td>
<td>3,237 (s)</td>
<td>7,170</td>
<td>1,385</td>
<td>332</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.4 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Western larch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>28</td>
<td>24.3</td>
<td>62</td>
<td>3,255 (s)</td>
<td>7,255</td>
<td>1,310</td>
<td>288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.8 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balsam</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>31</td>
<td>5.9</td>
<td>111</td>
<td>3,040 (s)</td>
<td>7,870</td>
<td>1,440</td>
<td>335</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.4 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Arborvitae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>30</td>
<td>14.0</td>
<td>20</td>
<td>2,833 (s)</td>
<td>6,890</td>
<td>1,414</td>
<td>294</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.3 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Western hemlock</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>27</td>
<td>15.5</td>
<td>33</td>
<td>3,310 (s)</td>
<td>7,310</td>
<td>1,445</td>
<td>288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.8 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Redwood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>22</td>
<td>18.8</td>
<td>28</td>
<td>3,760 (s)</td>
<td>8,760</td>
<td>1,621</td>
<td>302</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.9 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Norway pine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural sizes</td>
<td>25</td>
<td>13.7</td>
<td>49</td>
<td>2,492 (s)</td>
<td>6,540</td>
<td>1,385</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small specimens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio</td>
<td></td>
<td></td>
<td></td>
<td>7.8 (s)</td>
<td>1.7 (c)</td>
<td>1.5 (c)</td>
<td>1.5 (c)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Only those pieces which failed first by horizontal shear are included in this column.

---

**The Polleys Lumber Co.**

Manufacturers of
**Western White Pine and Larch**

General Office and Mills
MISSOULA, MONTANA

Shipments via:
N. P. and Milwaukee Railroads

---

**Engineers’ Field Books**

EITHER BOUND OR LOOSE LEAF
OUR STOCK IS ALWAYS COMPLETE IN ALL RULINGS

**Level, Transit, Field, Cross Section**

A complete line of Draftman’s Supplies, drawing papers, detail papers, profile and cross section papers, drawing instruments, and inks.

A complete line of Lumberman’s office supplies, Bound and Loose-leaf accounting books and forms.

We carry the largest and most complete stock of general office appliances in Western Montana, and solicit your patronage. Mail orders receive prompt attention. Complete catalog gladly mailed on request.

---

**The Office Supply Co.**

“EVERYTHING FOR THE OFFICE”
MISSOULA - - MONTANA
The Logger's Electric Steam Signal Whistle

Patent Applied for

The Log Scoots

A Steam Whistle—not a bell.

Type E known as

"TOOTS-E" Toots!

Plate III.—Western Larch.

The official view of the Forest Products Laboratory that if larch is properly dried in the Forest Service type of kiln, the loss in checking, flaking of rings, and raising of grain in straight grained, clear lumber should be reduced to less than one per cent.

The chief advantages of successful kiln drying over air seasoning lie in the better grades secured and in the great reduction in the time required for drying.

If the wood has a greater moisture content that the atmosphere in the locality in which it is used, it will lose moisture and shrink until an equilibrium is established between the moisture content of the atmosphere and that of the wood. Conversely, if the wood is drier than the surrounding atmosphere, it will gain moisture and swell until an equilibrium is established. The humidity of the Rocky Mountain states is generally less than the humidity of the Mississippi Valley states and eastern states; consequently, larch finish used in the Rocky Mountain states should be more thoroughly seasoned than that used elsewhere. The average moisture condition of well kiln dried material is about 8 per cent, based on the dry weight, and if all larch were seasoned to this degree before manufacture into interior finish products, the objectionable feature of shrinkage when in place would probably be largely eliminated. Where possible, the holding of material in the locality of use as long as possible would undoubtedly be of value in enabling the wood to become acclimated to the prevailing atmospheric conditions. Forest Service tests show that the volumetric shrinkage of larch is somewhat greater than that of most other western woods, which fact emphasizes the importance of careful attention to matters of seasoning.

For Logging Efficiency

Logging economy does not depend upon the first cost of the equipment, but it results from using such equipment as will handle the greatest amount of lumber in proportion to its cost.

Is economical because of its unusual durability. It is wear-resistant at every point, and its uniformity is assured by rigid tests on its every wire.

The Red-Strand in Hercules Wire Rope is our guarantee, for the quality goes in before the Red-Strand goes on.

ESTABLISHED 1857

A. LESCHEN & SONS ROPE COMPANY

ST. LOUIS
New York, Chicago, Denver, Salt Lake City, San Francisco

By-Products.

Market information on western larch alone is not available, since in the Inland Empire this species is marketed together with Douglas fir. However, shipment data are at hand for over 100 million feet of fir and larch produced in and shipped from the Inland Empire in 1916. According to this data Montana and Idaho together consumed over 41 per cent of the total production of these two species, and the two coast states, Oregon and Washington, consumed a little over 3 per cent. The Rocky Mountain states, Utah, Colorado and Wyoming, consumed nearly 11 per cent. The prairie states, North Dakota, South Dakota, Nebraska, Kansas and Oklahoma, consumed...
Large amounts of larch timbers are used annually in the Butte mines. In 1916 the Butte mines consumed over 100 million feet of lumber and it is estimated that at least 60 per cent of this amount was Montana pine, fir, and larch.

Larch is one of the best cross tie woods in Montana and large numbers are used annually. In 1916 about half a million sawed and hewed larch ties were taken from the National forests in District I. (Montana, northern Idaho, and northeastern Washington). The wood withstands rail wear well and takes treatment well. Two-thirds of the larch ties used in Montana are given a preservative treatment with either creosote or zinc chloride.

Larch is also being used considerably for paving blocks. One wood block preserving company in Spokane uses larch exclusively, and the city of Spokane has several blocks of larch pavement.

The demand for Douglas fir for ties has been heavy and steady since the beginning of the construction of the Denver & Rio Grande Railroad. He could abandon worry over the high cost of living. The proverbial hot cakes never sold any better than Douglas fir in the South half of Colorado, all because the Denver & Rio Grande seeks it largely for ties. Unfortunately, nature didn't use enough Douglas fir in foresting Colorado, and quite a little she did put there was burned up in the early days, and so the remaining stands are small individually, and pretty well scattered. Some of them lie in exceedingly rough country, too, and far from the railroad, but by paying more for fir ties than for those of other species, the Denver & Rio Grande encourages the loggers to seek out even the smallest patches of timber and to make them into ties.

A demand for Douglas fir for ties has been heavy and steady since the beginning of the construction of the Denver & Rio Grande Railroad in the seventies, and a great many of the stands have already been cut over once. In some cases only the hewed tie trees were taken, leaving the large saw-log trees, while elsewhere both hewed ties and sawlogs were cut. A demand for tie stands in the more inaccessible places is still in virgin condition, but for the most part the cuttings are now of a second cut.

The small and scattered character of the stands means covering a large area to get any great number of ties, and these conditions preclude large-scale operations. Therefore, the very small logger comes into his own, and there are large numbers of little "haling-wire" outfits seeking out the little patches of fir, no matter how inaccessible, and making them into ties. Most of the Douglas fir is on the National Forests, so these small operators buy the stumpage from the government, and their outfit usually consists of only a few tools, a team or two, with wagons, and, where the stand contains both hewing trees and those of sawlog size, a little portable sawmill. Often the mills are run by a traction or gasoline engine. In most cases these small loggers do not sell their ties direct to the railroad, but to a middleman, who has a contract with the railroad to deliver a stated number of ties annually. This contractor lends financial assistance to his sub-contractors, often supplying them with money for the complete logging outfit; and to secure his profit he pays about five cents less a tie than the railroad gives him. This arrangement makes it possible for the railroad to deal with one responsible party, thus giving authority and regularity to the time deliveries. In some cases

the loggers themselves buy the stumpage from the Government; in others the contractor makes the purchase and then assigns the contract to one of his sub-contractors. Under this very mobile form of organization it is possible to exploit all the little, isolated patches of fir which a large single-unit organization would have to skip.

Not only is the green fir in demand, but fire-killed timber is largely sought, and areas of fir burned over fifty and sixty years ago, or longer, are being worked over for ties. Where the trees have remained standing on the old burns deterioration has been slow, and there is often a good cut of ties. The fallen timber becomes worthless in a much shorter time.

The rough country frequently encountered means plenty of logging problems. Often the slopes are so steep, or the ground so rough, or encountered with down timber that horse skidding is out of the question, and
Every member of the Forestry Service, past, present, or future, should be familiar with Saws of the various kinds.

Cross-Cut Saws

There is a degree of skill required in felling trees, and bucking logs, which, when Cross-Cut Saws, properly manufactured, are used, can produce greatly increased results. These increased results come in the form of time and labor saved. Simonds Crescent Ground Cross-Cut Saws, now well-known and sold throughout the entire civilized world, are saws of this kind.

The special reason why they enable a sawyer to do better work is because of the quality of the steel and of our own exclusive method of Crescent Grinding which causes the saw to have teeth of exactly the same gauge all along the cutting edge and gives the blade a gradual and true taper from the edge to the thin back.

We would like to furnish you illustrations and more complete particulars regarding these saws.

Simonds Manufacturing Company

Fitchburg, Mass.

The Simonds Catalog lists and describes all kinds of Circular, Band, Inserted Tooth, and Crescent Ground Cross-Cut Saws, as well as Hand Saws, Docking Saws and Planer Knives. Any Forestry Service man can get one by applying to our nearest office.
the ties are hand-skidded or carried considerable distances to skid trails or roads. There is no other tree in the central Rocky Mountains that is take out of a rough, isolated places as Douglas fir. An operation on the Durango National Forest in southwestern Colorado involves such unusual measures as to be of general interest. Here there is a big area of Douglas fir burned over thirty-nine years ago. Probably seventy-five per cent of the dead fir has decayed either down or standing. The remainder is still wholly or partially sound, but it is scattered over several square miles of as steep, rocky country as event had assisted of timber. Between this timber and the railroad lies three miles of the narrow, rock canyon of Cascade Creek, impassable and undrivable. Nevertheless, a logger of more than ordinary resourcefulness and energy decided he wanted that timber, and he bought it from the Forest Service. Then he built a trail through the three miles of canyon, cut and skidded the ties off the steep mountain slopes, and packed them down to the railroad on the backs of burros and mules. Thirty head of mules and forty burros were used, and two trips made each day. The larger, standard-gauge ties were packed on the mules, while the smaller, narrow-gauges were carried by the burros, two ties on each animal. Special pack saddle rigging devised by the logger, who formerly packed burro trains of supplies to the mines above Silverton, held one end of the tie against the saddle, allowing the other end to drag on the ground, thus putting much less burden on the animal than if the tie were wholly suspended.

TIMBER SALES ON THE EASTERN FORESTS.

The purchase of land under the Weeks Law for the protection of navigable streams in the Southern Appalachians and the White Mountains of New Hampshire commenced early in 1911. On July 1, 1916, the Government had acquired approximately 707,000 acres. By January 31, 1917, this total had grown to 821,000 acres. The greater part of this acreage consists of cut-over land which the owners, after the removal of as much of the timber products as they could see a profit in, have turned over to the United States at comparatively low prices. Consequently, the opportunities for logging operations in virgin forest on these lands are comparatively limited and it might be assumed that the carrying cost of them will be great in comparison with the possible revenues which would be confined mainly to receipts from grazing permits, or from special use permits for small agricultural patches, or camp sites. As a matter of fact, however, the revenue from timber sales gives promise of reaching very satisfactory proportions before many more years have passed.

The total receipts from timber sales during the fiscal year ending July 1, 1916 was $6,028.41. The total receipts for the first seven months of the present fiscal year are $5,704.38, with a large number of new sales of various sizes and kinds in sight. The total value of the stumpage in each of these sales varies from $5 or $10 up to $2,000 or $3,000, and the greater part of them have been made on cut-over land. They have been in the nature of improvement cutting whereby, over-mature, diseased and undesirable trees have been removed and room has been made for the growth and reproduction of the more valuable species of the region. In a good many instances the previous owners have sold to the Government in the belief that they had first removed from the tract all stuff that was worth handling and in taking possession the Government has found in many cases that the timber still standing has a material market value and that its removal from the Forest at the same time would be a positive silvicultural benefit in addition to the revenue obtainable. On one or two instances sales have been consummated which will bring in a larger gross return to the Government than it paid in the first place for the land with the timber on it.

EMERGENCY MESS-KITS FOR FIRE FIGHTERS.

The mess and kitchen equipment for fire-fighters in District 1 has attracted considerable attention because of the completeness and compactness of the outfits. The lower picture shows, from left to right, nested 2-man, 1-man, 10-man and 5-man outfits, weighing 55 lbs., 2 lbs., 25 lbs., and 14 lbs. respectively.

The upper picture is of the 10-man outfit, which contains cups, mush-bowls, frying pans, etc. The 1-man outfit is seen in the picture below. This was designed particularly for smoke-chasers and moving patrolmen. The picture below this one shows the 5-man outfit in detail. The boiler in the lower picture, as indicated before, is the container for the 25-man equipment. This includes bread pans, nested pails, plates, etc. It is very complete, having even a bread-pin and an egg-beater.

The knives, forks and spoons are all heavily tinned and practically everything else except the frying pans is of aluminum, making for sanitation and lightness.

ANOTHER PUBLIC SERVICE.

The Sevier Ranger (Sevier National Forest) of July, 1915, contains this interesting item, which demonstrates again the innumerable variety of forest service activities and usefulness: "Ranger DeLong reported that nine head of cattle had been found dead in the vicinity of the larkspur area at the head of Cottonwood Canyon. For the purpose of ascertaining the cost of grubbing larkspur the Service employed a man to assist Mr. DeLong in grubbing the larkspur found in this particular locality. The larkspur on this area has caused the death of at least $450.00 worth of live stock during the present season and many times that amount in the past years, while the total cost of grubbing it the first time was $21.25. It is likely that the service of one man for two or three days will be all the expense necessary another season to finish cleaning up this area."

THE NEW ABNEY HAND LEVEL.

The Topographic Abney which was designed about a year ago by the engineering force of District 1 of the Forest Service, and manufactured by Keuffel & Esser Company, Hoboken, N. J., has met with the decided approval of field men.

It is designed primarily for topographic work where more accuracy is needed that is possible with the ordinary level. This Topographic Abney is slightly larger in all dimensions than the old level. A better bubble is substituted and in order to make it clearer and more sensitive, a prismatic reflector is used instead of the German silver plate and a lens is placed in the tube to enlarge the image of the bubble. The graduations on the plate are made on a larger scale, therefore being more easily read and giving a higher degree of accuracy. The friction nut which controls the tension of the arm is another improvement, as are the arrangement and adjusting nuts of the bubble tube.

The graduations on the plate are in "Difference in feet per chain," but per cent and degree graduations are also made for this instrument. The new instrument is a decided forward step in the work of preparing better maps of rough wooded areas.
RAPID LOGGING MACHINE

A compact and self-contained loading or yarding machine mounted upon broad steel runners to enable it to be moved readily either over the tops of cars or over the ground. The swinging-boom insures against broken car-sills and knocked-out Queenposts, by lifting all logs well clear of the car.

SIMPLE—EFFICIENT—MODERATE IN PRICE—WRITE FOR DETAILS.

Clyde Iron Works
PORTLAND BRANCH
395 N. 18th St. Portland, Oregon
A handy instrument for measuring heights and for determining the number of log lengths that can be cut from trees can be manufactured easily at practically no cost. Take a piece of pine board 5 by 8 inches, planed true and smooth; measure the divisions carefully, as shown on the drawing, marking first in pencil, then permanently with India ink.

Take a strip of galvanized metal or iron, \( \frac{3}{4} \) inch wide and 7 inches long, and fasten to the board with a \( \frac{1}{2} \) inch screw as shown. If you are in camp, melt the solder from a tin can and fold the tin into a strip of this size. The strip should fit loosely about the screw in order that it may swing freely as a pendulum. The zero mark of the scale should, of course, be placed at the edge of the strip when the top of the board is exactly level. A leather loop should also be attached to the reverse side of the board to serve as a handle.

To use the instrument, pace off a distance of 100 feet from the base of the tree and sight along the top edge of the board, holding it in such a position that the pendulum will swing freely close to the divisions; clamp with the fingers when tilted to the proper elevation, and read from the scale the height of the tree.

It is often desirable to measure the height to the point where the diameter of the tree reduces to either six or eight inches, the top of the last saw log. The point 100 feet from the tree should then be selected so that a level line of sight would intersect the tree at the top of the stump, and the upper reading taken at a point where the tree is estimated to run out to the minimum diameter. Owing to brush or irregularities of the ground surface, it is not always possible to find a point so that the eye will be level with the reading by 2.

The work of the Ranger School is carried on in close co-operation with the United States Forest Service. Experts in various branches of Forest Service work are detailed under authorization of the Secretary of Agriculture as special lecturers in the school. Other state and government officials and experts in the employ of lumber companies assist in the training. Special lectures in grazing are given by the director of the State Agricultural College and by the State Veterinarian.

Students in the Ranger School who are just beginning their forestry training usually pursue the following courses of training:

- Surveying and Mapping, 4 cr.; Scaling and Cruising, 3 cr.; Fire Protection, 3 cr.; Forest Protection, 3 cr.; Forest Improvement, 3 cr.; Forest Administration, 2 cr.; Logging Engineering, 2 cr.; Botany and Silviculture, 3 cr.; Grazing, 3 cr.; Seminar of General Forestry, 1 cr.
- More advanced students and most Forest Rangers who attend the school elect short courses of training from the following schedule:
  - Advanced Topographic Surveying and Mapping, 2 cr.; Hydraulics, 1 cr.; Logging Engineering, 3 cr.; Geology, 3 cr.; Insect Control, 3 cr.; Tree Diseases, 3 cr.; Forest Appraisals, 3 cr.; Grazing, Breeds and Breeding, Diseases, 2 cr.; Physics, 3 cr.; First Aid, Camp Surgery and Medicines, 1 cr.

Expenses of the Ranger School

Expenses for Ranger School students have been made as little as possible. Entrants who own drawing instruments should bring them. Forest Officers who attend the school should correspond with the Dean of the School about certain book and forest equipment which may be brought from their forests.

The cost to the average Ranger School student is about as follows:

- Matriculation, Laboratory and Incidental Fees $10.00
- Books and Notebooks 10.00
- Board and Room, 14 weeks 95.00
- Forestry Club dues and entertainments 5.00
- Add for drawing instruments if purchased 12.50

Total Cost $129.00

The Ranger School has been held each winter for eight years. It is attended each year by from 30 to 50 short course students, most of whom are forest rangers and forest guards, and by some men who are qualified either by education or practical experience to benefit by short course training.
Dixon's Eldorado in the softer leads is responsive and even in tone. It is free from grit and does not crumble. The shading is even and uniform.

Dixon's Eldorado in the harder grades holds a fine point. Does not tear the paper or necessitate frequent sharpening. Fine line drawings may be cleaned without destroying the lines. The figures do not blur.

Dixon's Eldorado in the intermediate grades is made with a relative balance of the above qualities, and is the ideal pencil for general work.

Dixon's Eldorado in the 17 grades is uniformly and regularly graded throughout the entire length of the lead.

These are the specifications that make Dixon's Eldorado "the master drawing pencil." Full-size samples sent on request on your letter head. Please specify degrees chiefly used.

JOSEPH DIXON CRUCIBLE CO.
Dept. 1110-J, Jersey City, N. J.

DIXON'S BEST WHITE NO. 352
Write white on blueprints
When locating a road running through mountainous country where uniform transverse slopes are encountered, an economy of time may be effected through the use of tables calculated to satisfy the following variable requirements: (a) width of road bed, (b) transverse slope, (c) center cut or fill, (d) uphill slope cut of section, and (e) length of prism. Tables calculated to satisfy all of these variables must, of necessity be bulky and would not admit of ready reference in the field.

The accompanying nomographic chart has been prepared to meet this need, and while it was with this view in mind—of furnishing the locating engineer in the field a handy chart from which quantities might be taken from inspection—it may also be used for calculating reconnaissance and location quantities.

The chart in its present shape consists of two drawings, each 6"x4", and will fit conveniently two pages of most any standard field note book. With an 8" pocket scale or straight edge, the cubic yardage of any prism having a triangular section, may be obtained by inspection in a few moments.

For example: Assume W (width of road) equals 16 feet, S (transverse slope of ground) equals 70 per cent, C (center cut) equals 2 feet, and SC (slope cut) equals 1:1. Required cu. yds. in a 100-foot section:

Process: As all per cents of slope are plotted around the intersection of the center line for a 16-foot road, with "Grade" line, place the scale on the chart, so as to pass through this point, and at the same time through the given slope "70" on Per Cent of Slope line. Note where the scale intersects the vertical "A-B", Now select a point 2 feet above this intersection, and a point 2 feet above "Grade" line on center line for 16-foot road, and observe that the scale intersects Grade line at 14.8, which is the width or base of the triangle, and intersects "slope 1:1" at 34.7, which is the height or altitude of the triangle.

With these figures in mind, turn to the straight line chart, and lay the scale through 100, in "length" line, and 14.8, in "Height and Width" line. Observe where this isopleth intersects the neutral, and with a pencil hold this point of intersection and swing the scale around it, so as to run through it and the point 34.7 in "Height and Width" line. Note the intersection of the scale with "cu. yds." line at 950, which is the yardage required, the error not being greater than one-half of one per cent, in a 100 foot section.

Additional center lines for various road beds may be plotted, as well as different slope cuts. Those given are those most generally used. To plot a center line for a 30 foot road, having a ditch of 4 feet, in addition: Let X distance from "0" to left along Grade line.

Substituting X=30 plus 4=34

Then, X=W plus D

"Degree of Slope" may be substituted for "Per cent of Slope" on the chart without changing the results.

Quantities of excavation in ditch are calculated separately and added to the readings from the chart.
WHEN YOU CUT AWAY FROM CIVILIZATION

A TAYLOR COMPASS IS A SAFE GUIDE

YOU NEVER UNDERESTIMATE THE IMPORTANCE OF A SAFE AND RELIABLE GUIDE, THEREFORE, YOU WILL APPRECIATE THE TAYLOR COMPASSES WHEN IN THE WOODS OR UNFAMILIAR COUNTRY. YOU CAN DEPEND UPON THEM.

Leedawl Dollar Compass

The Only Guaranteed Jeweled Needle Compass at $1. In Canada $1.25

Untarnishable silver dial, tempered steel point, and screw top that keeps out all dirt and moisture.

Untarnishable white metal case, snap in bevelled crystal glass—exclusive features that cannot be found in any other compass selling at $1.00.

Ceebynite Compass

Is a Trusty Companion in the Dark

You don’t have to strike a match to use the Ceebynite. It shows you the way plainly on the darkest night.

Hunting case, full jewelled floating aluminum dial. Cap automatically lifted off point when case is closed, eliminating unnecessary wear.

Price $3.00. Gold Filled $5.00

Other Taylor Quality Compasses

Magnapole, $1.50; Flodial, $1.50; Gydawl, $2.00; Aurapole, $2.50; Meradial, $8.50.

All jeweled centers. All needles fitted with stops.

Ask your dealer (Optician, Druggist, Sporting Goods, Hardware), to show you the Taylor made in America line compasses. If your dealer cannot supply or will not order for you remit direct to us.

Ask for folder, or send 10 cents for book, “The Compass the Sign Post of the World.”

ROCHESTER NEW YORK Taylor Instrument Companies

ROCHESTER NEW YORK
A SIMPLE METHOD FOR TRAIL LOCATION

"Trail location must be in the hands of competent men. He (the trail locator) must be able to read contour maps, understand the use of instruments, and sketch a sufficiently accurate map of the territory to convince himself and his superior officers that he has chosen the best route, after analyzing all the factors bearing on the problem."—(From Forest Service Trail Manual.)

It is the purpose of this article to show the method of “analyzing all the factors” which will necessarily control the location, grade, and cost of any piece of trail.

The general location, provided that the locator has the choice of several routes, is determined by a careful examination of each line. Familiarity with the country should never be considered adequate. One may be ever so familiar with the country and still not be in a position to make an intelligent choice without a careful study of the advantages and disadvantages of each route.

With the general location determined, the next factor to analyze is the grade, and in order to have some definite information upon which to work, a reconnaissance survey is run over the proposed line, gathering data as to elevations and paced distances of various major controlling points which are plotted on profile paper, and the approximate grade determined.

Major controlling points are such as saddles, terminals, top or bottoms of cliffs, bridge sites and other obstacles which can only be crossed or passed at one elevation. The minor controlling points are such obstacles as cliffs, bogs, streams and the like which should be dodged if possible, but if need be, could be crossed at any desired elevation.

With the approximate grade determined, we are now ready to start the preliminary survey of the trail which is made for the purpose of tabulating the remaining factors to be analyzed, namely, the location of the minor controlling points, the exact grade whether broken or uniform, and the most economical location under the specifications. This data is collected and recorded on a profile sheet called “Trail Topography.”

In trail location when grade and alignment are being considered, grade always takes preference. In the example we will now take, bear these points in mind.

(1) That, when a point is spoken of as five feet above a station, it means that the point is five feet above, but may be 25 or 30 feet off line.

(2) That what we are preparing is a vertical picture of the country showing the elevation and horizontal position of various minor controlling points.

From the reconnaissance survey, it appeared that a 6 per cent grade would be about right to run on between Sta. 0 and Sta. 10 in order to take advantage of the opening at Sta. 10, this being a minor control point. Sta. 0 is a major point, being a terminal. A 6 per cent line is now plotted on the sheet of profile paper, in order to guide the locator as to where his line is likely to fall, 20° to an inch being used for vertical scale and 200° to the inch horizontal. The dotted line shows the present trail and because of the ease of travel, it is used for the preliminary line.

The distance from Stations 0 to 1 is chained and the per cent of grade measured as -2, which gives the elevation of Station 1, 2 feet lower than Station 0. At 0 x45 and 3 feet above the line is a rock 8 feet wide along line of trail and 5 feet high, which is sketched in on the profile paper exactly to scale. Station 1 to 2 is chained and the per cent read as plus 6, giving elevation of Station 2 as 4 feet above Station 0.

At Station 1 plus 85 another rock is encountered 3 feet above line, 10° wide, 7 foot high, which is also plotted as shown.

Instruments for FOREST WORK

We make the new type Abney Level adopted by the U. S. Forest Service for topographic surveys. This level also has graduations for chainage correction, degrees and per cent of elevation.

Our products include various instruments for preliminary work, as well as a full line of Transits and Levels, Tapes, Rods, etc.

Write for our catalog and for information regarding any instruments in which you are interested.

KEUFFEL & ESSER CO.

NEW YORK, 127 Fulton St. General Office and Factories, HOBOKEN, N. J.
CHICAGO ST. LOUIS SAN FRANCISCO MONTREAL
516-20 S. Dearborn St 817 Locust St. 48-50 Second St. 5 Notre Dame St. W.
Drawing Materials Mechanical and Surveying Instruments Measuring Tape
Gurley Forestry Instruments

Have you ever observed the painstaking care visible in the workmanship of the Gurley instruments specially designed for forest surveying?

Their accuracy, durability, and extreme light weight are emphatically praised by the Engineers of the U. S. Forest Service, who use the Gurley Light Mountain Transit almost exclusively. Our Explorers and Reconnaissance models are also well adapted for fast and accurate forest work.

May we send you our latest literature?

W. & L. E. GURLEY, Troy, N. Y.
Western Branch, Seattle, Washington.

No. 27-A Precise Transit, Price $206.00. Light Mountain Size.
The Gallatin, comprising one of a group of several National Forests surrounding the Yellowstone National Park, is perhaps more fortunate from a game standpoint than some of the adjoining forests, since it contains a large area of fairly open grazing land at a lower elevation than the summer feeding grounds of the game, into which it is natural for big game, especially elk, to drift for late fall and winter feed. Each season large droves of elk, estimated in numbers anywhere from twenty-five hundred to ten thousand, have drifted ahead of deep snow and low temperature out of the Park onto the headwaters of the Gallatin River.

For a number of years the various departments of the Government, the state game wardens and a lot of sportsmen and local residents have realized that protective measures which would insure winter feed for this game and further regulate hunting were necessary. The Forest Service, I believe, took the initial step, in that as early as 1909, regulated-grazing, which had as its principal aim the reservation of sufficient forage for winter elk grazing, was put into effect in this region.

In 1911 the State Legislature created the Gallatin Game Preserve and prohibited hunting therein. This act went a long way in protecting the game and made practically impossible the wholesale slaughter of elk by lawless hunters.

The Forest Service continued to prohibit the grazing of domestic stock in all but a very small portion of the area included within the game preserve, and in addition prohibited the grazing of domestic stock on other adjoining areas and prohibited the grazing of sheep on an additional area of approximately one hundred twenty thousand acres.

These several administrative acts of the Forest Service closed a total of approximately seventy thousand acres against the grazing of all classes of domestic stock, and an additional area of 120,000 acres against sheep grazing, allowing only light grazing by cattle and horses. This leaves an abundance of winter forage for the elk and provides excellent hunting grounds. The State Legislature in 1914 released from the game preserve that portion lying west of the Gallatin River, but the grazing of domestic stock is still excluded therefrom.

The protection against hunters in the game preserve, and the reservation of sufficient winter feed has enabled the elk to drift out of the Park without danger of being slaughtered before the close of the hunting season. Sufficient elk drift out of the preserve to afford excellent hunting, and I believe the Gallatin will soon be recognized as the Sportsman's Mecca. During the past season it is estimated that there...
Expression in Taxidermy

Is the result of years of experience—our natural life-like mountings remind you of how the specimen looked when you raised your gun to shoot. Try our quality work first—then you're sure to be proud of your trophies. We have the largest and best establishment in the West. When you take a good skin or game head send it to us and let us mount it just right, with all the naturalness and expression you saw in the living animal.

There's no satisfaction in telling your friends of the big game you have killed, if you can't prove it. But your specimens prove your story. Suppose you say:

"THE DAY I KILLED THAT MOUNTAIN LION—" you point—and there he is before you, sinister, menacing—confirming your narrative—giving wing to your hearer's imagination.

Your trophies properly mounted, embody every detail of the hunt—the difficult stalking—the final struggle. At a glance they set astir gossamer memories—you live again through all the thrills of strenuous, care-free days—catch faint woodsey odors and the smell of Mountain Pine.

Beautiful Rugs

Made from skins of your own catch. They not only tell the story of your hunting trip, but attractively decorate your home. Send your best skins and furs to us—our quality work will transform them into elegant rugs of rich beauty—the envy of your friends.

We have a selected line of fur rugs and game heads for sale. Write for our new illustrated catalog, Field Guide and Records of North American Big Game—ALL FREE.

JONAS BROS., TAXIDERMISTS

1027 Broadway, Denver, Colo Branch, Livingston, Mont.

were as many as three hundred hunters in the Upper Gallatin at one time.

Two game wardens and a forest ranger were in the region of the preserve most of the hunting season. Another ranger and myself were there the last two and one-half weeks. Only a few violations of the law were observed, and the offenders were immediately prosecuted.

A few "rough edges" must still be worked off before complete observance of the law can be expected. Any specific recommendations along this line would be premature and out of place in this article.

It is estimated that not less than three hundred and fifty elk and quite a lot of deer were brought out by hunters this year, and a considerably larger number last season.

The very heavy snow fall in the mountains during the first half of December added to the pleasure of the sportsman, and afforded unique experiences in hunting and transportation.

During the two days following the close of the season it was not uncommon sight to see as many as twenty-five automobiles "stalled" in the snow within a few feet of each other. Excessive gasoline charges and hire of teams to pull the autos out added materially to the already high cost of living. The hundreds of hunters camped out for several days, in some cases weeks, in the winter time, and the hardships endured by professional men who were not hardened to such a life makes one realize that the lure of hunting big game has not entirely passed.

Hunting lodges and resorts are being developed which will ultimately take care of hunters who desire such accommodations. The West Gallatin Auto road connects with all such resorts, and a few hours' ride will take you to any of them from Bozeman.

If you know of any sportsmen who want a clean, vigorous hunt for big game, I know of no better place to recommend than the Upper Gallatin; for the last two weeks of the season it affords the added pleasure of giving a very creditable imitation of the German firing line. A matter which should be mentioned is the fact that no accidents or deaths to hunters have ever occurred, until this season, when a young man was accidentally shot by his partner, who was carrying a "cocked" gun, and one other man killed by a snow slide. The absence of accidents from stray bullets can only be accounted for by the thick timber found in that locality.
THE FOREST SERVICE AS AN ORGANIZATION FOR NATIONAL DEFENSE

Excerpts from a Circular Letter to the Men of the Forest Service
By Henry S. Graves; Forester.

All members of the Forest Service are deeply concerned in the question of how, individually and as an organization they may do their part in the preparation of our country for national defense. Service to the public has always been the single purpose of our organization. All are now waiting for a word to show how each individual and the Service as a whole can contribute to help the Nation in time of an emergency.

In case of a national crisis the Forest Service could probably render its most effective service as a civil organization, co-operating with and assisting the military branch, rather than by having its individual members leave the Service and be absorbed in the army or navy. It is probable that the Forest Service would be called upon for its principal service at or near the points where its men are located, and in line with its present functions. Some men might be needed for work directly in connection with the military branch; the bulk of the men would doubtless be needed as forest officers and forest technicians in charge of work which their knowledge, local experience, and position of local influence and leadership enables them to do better than any other persons in the country.

The Forest Service has very important public responsibilities to perform in charge of public property, in aiding various industries, and in helping, in a multitude of ways, local public welfare. The Service would not be relieved of these responsibilities in any ordinary emergency which is likely to occur. The steel plants would not shut down in case of war. They would, however, be utilized to aid in national defense and in the maintenance of internal welfare. The Forest enterprises should be maintained also in case of war to aid in military defense and to sustain local welfare, community and individual, which is already being served by the undertaking.

It happens that our organization contains many men having qualifications which would make them of use to the military branch in its own special field. The number of such men who could be spared for specialized duty as volunteer members of the military branches would depend on the defense service that could be performed by the organization as now constituted, and place, and on the character of the emergency. The question of how many men would be needed for the regular Forest Service work under the restrictions of emergency conditions, of how many would be needed for special work on behalf of the military branches, and the number who could be spared for volunteer service in the army or navy, would be determined by the Secretary of Agriculture working in co-operation with the heads of the military organizations.

The movement for national defense is much more far-reaching than preparation to meet the emer-
gencies or possible international difficulties. It looks also to a more efficient organization of all the resources of the country in time of peace. Every step contemplated in the organization of our natural resources in national defense is a step forward in the better use and conservation of these resources for the general welfare and prosperity of the country in the time of peace.

In case of need the Forest Service could co-operate with the military authorities in a number of ways. When requested by the military authorities the Forest Service, throughout the territory its present organization reaches, could secure information on men of military age and their capabilities, supplies and the facilities for their production, beef-cattle and sheep, draft, saddle and pack animals, hides and wool, mineral and timber and the facilities for their production, facilities for transport, and other information. It could also aid in arrangements for their acquisition or collection. The Forest Service could secure map data, cover data, information in regard to local affairs and situations. The Forest Service could also, if called upon, perform certain patrol functions in the protection of property and life in the region covered by its organization.

The co-operation functions so far enumerated refer primarily to the National Forest organizations. In addition, particularly qualified men in the other branches of the Forest Service, as the research branches, might render important service in connection with certain industries whose increased output is vital to the welfare of the country. The forest, water power, and livestock industries would be their particular field of usefulness.

It is obvious that we could render our highest national service as an organization and it is urgent that the organization be sufficiently intact to render that service. What it can do in co-operation with the military establishment would be arranged between the departments concerned.

I wish to emphasize that the service of the clerical force, both men and women, may be just as necessary as that of the men in the field.

Of course, every man is at liberty to volunteer for the militia or to enlist in any military organization. I suggest, however, that any one desiring to volunteer in this way consider first whether he cannot render better service to the country by remaining with the Forest Service or joining the military branch as a specialist as provided for in this letter.

To this end an individual inventory of the Service is being prepared which will show the qualifications, training, and personal situation of each member. It will be given an opportunity to state the circumstances under which he is willing to offer his services for hazardous duty. No one would be required to perform such duty against his will short of a change in the country's military system.
You usually get in quality about what you pay for.

It is not often we get something for nothing.

If you are looking for quality you can find it in the Lefever—if your main consideration is cheapness of price—look for some other gun.

The Lefever won the World's Championship at Olympic Games in London.

Write for catalog—double guns, $25.00 up.

Lefever
The Gun of Quality

The installation of the first wireless station on any of the National Forests (so far as we know) was that at the Baseline Ranger Station on the Apache Forest, in November, 1916. The project was conceived and carried out by Ranger William R. Warner with the assistance of Mr. Ray M. Potter of Clifton, Arizona.

The Baseline Ranger Station, by reason of its location, has been the cause of a good deal of difficulty in the administration of the Forest for the past eight or nine years. Situated in the valley of the Blue River, in a very rough and inaccessible region, the only way in which the Station can be reached is by travelling up or down the Blue and Frisco Rivers, or by means of trails leading east or west from the river. Travel up or down the river is difficult and slow because the channel is periodically flooded by the summer rains or the melting of the winter snows. A fee of $150.00 is asked by Clifton physicians to make the trip up the Blue River to Baseline Station. Often, for days at a time, during the period of floods, no travel up or down the river is possible. The nearest town is Clifton, Arizona, 35 miles south of the Station on the Frisco River, and the nearest postoffice is a ranch postoffice at Blue, Arizona, 28 miles north, on the Blue River.

The Forest Service has constructed a telephone line from Springerville to the Blue Ranger Station and to Blue Post-office. From this point south, however, and from Clifton north, to Baseline Station a reconnaissance estimate of the cost of a telephone line to Baseline Station has indicated a sum at between $2,500 and $3,000 for construction alone. Moreover, because the telephone line would be compelled to follow the river bed, the cost of maintaining such a line, if constructed, would be excessive in view of the periodical floods.

Mail directed to or from Baseline Station is delayed in delivery anywhere from two to three weeks. A month or six weeks often elapses before a letter and reply can be received.

In the dangerous fire season, the District Ranger is practically cut off from quick communication with the rest of the Forest, and while fires on Baseline District can be detected from primary lookout points on both the Apache and Gila Forests, no means of communicating the location of such fires to the Baseline Ranger exist, except by messenger.

In view of this unsatisfactory condition, Ranger Warner, on his own initiative, installed the wireless station. Communication is now established between Baseline Station and Clifton, Arizona, (there being two non-commercial stations at Clifton) and matters needing prompt attention can be communicated through the Forest officer stationed at Clifton to the Springerville office and vice versa. In fact, instead of being entirely cut off from the world, Baseline Station can now receive wireless reports from as far north as Vancouver, B. C., and as far south as Key West, Florida. In addition, the scattered ranchers up and down the Blue River are enabled to get in touch with Clifton whenever an emergency arises. The wireless has already been used by the Sheriff at Clifton in apprehending law-breakers.

By the time the next fire season occurs, it is planned to install an additional wireless equipment at a primary lookout point on the Blue Range and thus direct communication can be had with both Baseline Station and Clifton from the Springerville office.

The entire cost of installation at Base-

(Continued on Page 57).
SHOOT

Ithaca Guns

MADE IN U.S.A.

SHOOTING QUALITIES
WARRANTED

Shot travel through a gun barrel over 800 feet per second.
Shot flatten when driven at this high speed into an improper choke
Flat shot fly wild and make a poor pattern
Our taper choke gives a close, hard hitting pattern.
Ask your father, grandfather or any man who uses one.
Shooting qualities guaranteed.
Catalog FREE— double hammerless guns
$24.00 up; Single trap guns $85.00
up.

ITHACA GUN CO., ITHACA, N. Y.

RANGER SULLIVAN'S AUGERPLANE.

Forest Ranger Don S. Sullivan, with headquarters at Apache, Arizona, in charge of the Peloncillo and Animas Divisions of the Chiricahua National Forest, has prepared a diagram of what he calls an Augerplane. This is an air craft especially designed for rising perpendicularly and then proceeding from one point to another. The design of air crafts heretofore considered practicable have not been usable on National Forests on account of the fact that a considerable level area is necessary for acquiring momentum necessary to rise. This stumbling block has given rise to Ranger Sullivan's innovation. He states that a working model is now in process of construction and that he hopes to have shop drawings ready by the opening of another fire season.

(Editor's Note:—We assured Ranger Sullivan that his invention augured well for the future prevention of fire on the Chiricahua, and that we were sure our readers would not be bored by an article written on so high a plane.)
THE GENUINE U. S. Army Shoe

A Boon to the Outdoors Man

Combines the Maximum of Comfort, Quality and Appearance

Our stock, one of the largest in the country, is the GENUINE U. S. Army Marching Shoe, made on the Justly Famous Munson Last, exactly in accordance with the Government specifications:

No. 65 Russet Leather, Price $6.50
No. 67 Black Leather, Price $6.50

(When ordering, mention size and width usually worn, or send outline of foot.)

Browning Bros. Co., Ogden, Utah
Everything for Every Sport for Every Season
Established for Half a Century
Known the World Over

SLEEP ON AIR
WITH A COMFORT SLEEPING POCKET

You can lie on a pile of rocks and be comfortable. The most complete outdoor camp bed. Recommended by hunters, campers, forest service, physicians and invalids. Just the bed for automobile camping. It complies with every requirement.

Every piece of goods Guaranteed
Catalogue Free
AIR GOODS DEPT.

Athol Mfg. Co.
ATHOL, MASS.

Filson Cruising Shirt

Has six pockets, one of which is a large back pocket 30x21, which makes a complete pack.

We manufacture all kinds of clothing for Out of Doors People.

Send for Free Catalogue.
C. C. Filson
1011 1st Ave.
Seattle Washington

THE PICTURE ON THE COVER.

The name of this publication, "Kaimin," is taken from the language of the Flathead tribe of Indians that formerly camped on the land that now comprises the University Campus, and means "something written" or "something in black and white." The cover picture is a photograph taken by R. H. McKay of Missoula. The picture is of a Flathead Indian and was taken on the summit of Mount Sentinel, about a hundred yards distant from the Forest School Lookout Station on the campus.

A FEW 1917 RANGER SCHOOL STUDENTS.

Ha Ribison
Ha Ale
Nelson
Berland
Carnby
G R e m m p

Ghipperfield
KeI chm
Blake
S chowe
Chris tensen

Patters
Knop F

HUbhard
Cowan
Colvin
Benninghaus Ven
Gray E a
Roberts
Halvorson
Perino
Kingsley H

McLean
Mahoney
Peyto
W hitlemore.

SEND IT IN.

If you have a bit of news, send it in. Or a joke that will amuse, send it in. A story that is true, an incident that's new, "We want to hear from you," send it in. Never mind about your style, If it's only worth the while, send it in. Will your story make us laugh? send it in. Will it make a paragraph? send it in. If some good your words can teach, If some distant reader reach, If you have a glowing speech, send it in.

— Editor.
NATIONAL FOREST WIRELESS
(Continued from Page 54.)
line has amounted to about $135.00, and
the cost of maintenance will probably not
exceed $2.00 or $3.00 per month. Contrary
to expectation, very little difficulty has
been experienced by Ranger Warner in be­
coming familiar with the code. Deputy
Supervisor Adams at Clifton is rapidly
picking up the code, and it is reasonable
to expect that any Forest officer can be­
come familiar with it after a brief ex­
perience. Messrs. Adams and Warner are
in almost daily communication over admin­
istrative details relating to the southern
portion of the Forest.
It is very possible that within the next
few years wireless telegraphy will be used
extensively by the Service as a means of
communication. It is possible, too, that
the wireless stations can be converted into
wireless telephony stations at a compara­
tively low cost. This question is now be­
ing investigated by Mr. Slonaker, Tele­
phone Expert of the District Office.
The first wireless message sent from
Baseline Station was that of November
27. It happened that District Forester
Redington was a visitor at Baseline when
the wireless station was first installed and
the first message was forwarded by him,
via the Western Union at Clifton, to all
the District Offices and to the Washing­
ton Office. This message is liable to be­
come an historic one in the history of
the Service.

Settle the Canoe Question Now—Buy an “Old Town Canoe”

This 18-foot “Old Town” Guide’s Canoe at $34 will serve you season in and
season out—fishing, hunting and camping and cruising. It is the usual canoe for
forestry work. It has width for a big load, flat floor that makes shallow draft and
trust lines that give speed and stability. 4000 “Old Town Canoes” now ready. Easy
to buy from the dealer or factory.
Read our catalog. It gives the plain facts about canoeing and canoe buying.
Send For Catalog.

Newton High Power Rifles and Cartridges

A COMBINATION THAT SETS A NEW MARK
IN ARMS AND AMMUNITION EFFICIENCY
Newton Rifles and Cartridges deliver smashing blows over the longest game­
shooting ranges, far higher than any others of corresponding calibers. They
have high velocity and heavy
bullet weight, by which both
energy and accuracy are in­
creased. The .256 Newton
is typical. This strikes a blow of 1932 ft. lbs. at a distance of 300 yds., or from 3½ to 5½
times as heavy as any other nominal .25 or .250 caliber. No other cartridge this size
has as much power at the muzzle of the Rifle as the Newton .256 has 300 yards away.
The same general proportionate power runs through the others of the Newton series,
a .22, .30 and .35 caliber.
148 page Catalog and Hand-Book for Riflemen, sent for stamp.

NEWTON ARMS COMPANY
506 MUTUAL LIFE BLDG.
BUFFALO, N. Y., U. S. A

“Mention The Kaimin to Advertisers.”
SILVICULTURAL MANAGEMENT—
(Continued from Page Fourteen.)
tained by an intensive timber-survey crew will in
some cases be so old as to be practically useless when
it is needed for intensive forest management. Work­
ing plans are already essential on some forests,
notably the Coeur d' Alene, Kaniksu, Pend Oreille
and Deer Lodge, and certain units of other forests
such as the Red Lodge unit of the Beartooth and
the Little Rockies division of the Jefferson.
It would be beyond the scope of this article to
consider the conditions on these forests and to show
the rapid development which takes place in man­
agement plans as the cut of timber increases. The
first step in management is a limitation of cut on
each forest. Such limitations applied to whole for­
est are theoretical in the highest degree, but they
are interesting as indicating what the possibilities
are. As soon as a forest begins to approach its
limitation, a different and more complete control is
necessary. Just one example will suffice: The
Pend Oreille Forest has a limitation of cut of 40 mil­
lion board feet annually. We have found upon an­
alysing the situation that there are at least five units
or working circles into which the forest should be
divided. A limitation for the whole forest is wholly
meaningless and even a limitation by working cir­
cles is not much better. For one of the units eco­


THE MONTANA FOREST SCHOOL OFFERS:
Four years of undergraduate training in Forestry.
Four years of undergraduate training in Forest Engineering.
Fourteen weeks of special short course training for Forest
Rangers.
Fourteen weeks of special advanced training for Forest Rangers,
Forest Supervisors, and other Forest Officers.
Address Inquiries to Dean of the Forest School,
State University, Missoula, Montana.
Let Funsten Help You Add To Your Income

STRINGING WIRE FROM A HORSE'S BACK.

Again "necessity is the mother of invention." Forest Guard William A. Stoneraker lives in the Chamberlain Basin, which is in a very remote portion of the Idaho National Forest, and his horse is often his only help in his improvement work. To help him string his telephone lines, Mr. Stoneraker invented a wire-stringing apparatus, which is carried on his horse's back. The reel bearing the coil of wire forms part of the pack saddle in such manner as to revolve freely and string off the wire as the horse travels along the line of telephone construction.

GAME PRESERVATION IN THE EASTERN FORESTS

Legislation recently enacted by Congress empowers the President to establish Federal Game Preserves on lands acquired under the Weeks Law. Prior to this the legislature of North Carolina had taken action to relinquish to the Federal Government jurisdiction over game, fish and birds on the Federal lands. Acting under this authority the President has proclaimed the Pisgah National Game Preserve, including some 88,000 acres of land owned or contracted for by the Government and to include all lands to be acquired within the Pisgah Purchase Area. These lands are well stocked with deer, turkey and pheasant and the streams with brook and rainbow trout, due to the careful protection given by Mr. George W. Vanderbilt, from whom a large portion of the land was acquired. Regulations have been promulgated by the Secretary of Agriculture prohibiting hunting and designating the fishing season and the conditions governing the taking of fish. Owing to the heavy demand for fishing privileges it has been necessary to limit the number of days of fishing to be allowed. A charge is also made for the privilege of fishing. On the other hand, the Government will undertake systematically to restock the streams so as to keep at the maximum the fishing resources. Action has not as yet been taken to introduce Federal control in game matters over other lands in North Carolina, but steps will doubtless be taken in this direction in the near future. Other Southern Appalachian States are considering taking the same action as North Carolina and in all probability a few years more will see Federal jurisdiction over game, fish and birds, on very large areas in the Southern Appalachians.

THE COLVILLE AUTO REEL.

A ranger on the Colville National Forest having to take down ten miles of telephone wire on the Wauconda Republic line, let it down on the ground, spliced it into sections of one-quarter and one-half mile each; a rude reel was attached to one rear wheel of his Ford; this was jacked off the ground, and by attaching one end of the wire to the reel, each section was rapidly wound up. The fact that the road paralleled the telephone line made this method possible.

Funsten is supremely ready to serve you; to sell you the best trapping outfit at the lowest price—to instruct you how to use it most effectively—to buy your furs for the most money.

Take the first step towards complete success in trapping now.

Write for Trappers' Supply Catalog, Trappers' Guide, Game Laws, and Market Reports. Absolutely Free!

How to Kill Moles

Mole skins are valuable both summer and winter. You can get every mole in a burrow instantly with the Funsten Perfect Smoker and the new hose attachment. This device shoots sulphureous smoke into a burrow, forcing the mole to run through the passages. With two or three traps and the smoker, you can clean out a burrow in a few minutes. Cheapest and most effective method of destroying gophers. Write for full details.
ECONOMICAL SEED COLLECTION
On the Sevier National Forest.

In response to a request made of Supervisor Humphrey of the Sevier National forest, we have received this interesting account of the seed-collection work on that forest:

In the collection of Yellow Pine seed on the Sevier Forest during the season of 1915 the cones from which we extracted the seed were purchased from individuals, fifty cents per bushel being paid for the cones delivered in Panguitch. Part of the cones were picked from the fallen trees in timber sale operations on the Mammoth Creek, while the remainder were picked from the trees by means of a long edging to which was attached a sharp, V-shaped hook. The persons picking cones stand on the ground and hook the cones from the lower branches of the trees. Forty cents per bushel was paid for the cones delivered at Panguitch, 18 miles above Panguitch Lake. These were hauled to town by the Ranger in charge of the work. After bringing the cones to town they were spread on drying sheets in the sun for several days; they were then raked over and put through a box shaker operated by hand. This box shaker is about ten or twelve feet long and about thirty inches wide. The box has end gates that may be removed to empty the cones after they have been threshed. The bottom of the box is made of light galvanized tin perforated with holes approximately one inch square. This box was swung at each end from the ground with bale wire and a drying sheet fastened underneath the box to catch the seeds which were shaken from the cones by the operator. After all the loose seeds had been shaken from the cones they were again spread on the canvas and allowed to remain for several days, when they were given the final shaking; after which the cones were discarded and the seed taken from the canvas and fanned and winnowed, after which they were run through a fanning mill until they were thoroughly cleaned.

The exceptional yield of seed per bushel of cones is attributed to the excellent weather which prevailed during the time the cones were drying and to the excellent quality of the seed crop for that year.

A WATER ALFORJAS.
Devised in District Four.

The complete equipment consists of two water bags, total capacity 2 1/2 gallons, and a hand force pump with hose and attachments. Fitted to the alforjas is an arrangement of straps and cinches for looping over the trees of an ordinary pack saddle and then for binding them firmly to the horse the same as any load would be secured. In case of emergency a regular riding saddle would serve just as well. The total load including saddle, pump, alforjas when full of water, and attachments will weigh about 250 pounds.

The water is drawn out of the top of both bags at the same time through a hose on the inside that extends to the bottom, thus a siphon action is utilized. This method is employed to eliminate leaking through a defective faucet, should one be attached to the bottom of the alforjas.

Ranger A. A. Casner of the Boise National Forest used this apparatus very extensively last season. The following is one typical case where it proved its worth:

“In August I had a fire of about four acres on a steep sidehill. The upward surface spread of this fire was easily checked when it reached the crest of the hill, where there was not much down material, but below and close in there was considerable burning going on. At the extreme lower edge of the area there was a heavily limbed, standing dry tree, about four feet in diameter, burning around the

WHEN it comes to tobacco an' complexions, any improvement on Nature ain't any improvement. Velvet is made Nature's way.

Velvet Joe

"Mention The Kaimin to Advertisers."
ANTHI-MIDALENDOL

A perfect safe and harmless external preparation for irritations of the skin, of whatever character, cause or source.

A PHYSICIAN'S PRESCRIPTION

The very latest and THE BEST thing known for IVY POISONING.

Those who, through nerve-irritation, are constantly troubled, every year, at certain seasons, with recurrent attacks of that distressing affection, will find a boon indeed in ANTI-TOXICODENEDOL, which also gives complete and instantaneous relief from itching irritations of the skin, whether caused by insect or of purely nervous origin. Sure and certain protection against the pain, irritation and soreness caused by Ivy-Poisoning, Bee Stings, Chiggers, Mosquito Bites, Ticks, Sun-Burn, Wasps, Hornets, Hives, Insect Bites, etc.

DIRECTIONS—Merely 'dab' on lightly with a cork, the finger tips, or the hollow hand, or a whip of cotton.

PRICE, FIFTY CENTS

Front Chemical Co.
P. O. BOX 452 CINCINNATI, O.

A NEW EMERGENCY TELEPHONE.

By "Telephone" Adams of District One.

A new portable telephone was designed last year by Mr. R. B. Adams, telephone engineer; on which letters patent were secured in the name of Mr. Adams and were assigned to the Department of Agriculture. This portable telephone weighs about 2 1/2 pounds, which makes it the lightest set of its kind ever designed. This entire set is constructed of aluminum and all the equipment is mounted on a hollow tube which contains the necessary battery for signalling and talking. On one end of this tube is mounted a receiver, and on the other end a transmitter. Between the receiver and transmitter is a box containing an induction coil and interrupter and two switches. The method of signalling is accomplished by means of a high frequency current. These signals are received at a distant point on what is known as a "Howler." The howler is a high wound telephone receiver having an adjustable diaphragm and a megaphone about five inches long. This howler when receiving a signal gives off a screeching sound which is easily heard in all parts of the building wherein it is located. Satisfactory signals have been sent under field conditions with this portable telephone for a distance of 90 miles without difficulty. Conversations have been carried on with this telephone for 700 miles, and the transmission over it was equal to any of the standard wall telephones.

The use of this telephone by a field officer only requires that he carry in addition to the portable about 30 feet of very light insulated wire and about three feet of No. 4 B. W. G. galvanized iron wire. This iron wire is pointed on one end and is used for the necessary ground connection. When the field officer desires to use this telephone he makes connection with the main line wire by means of the small insulated wire, pushes his ground wire in the ground and establishes connection with the portable telephone on the binding posts made for that purpose.

When calling, a series of short and long signals are made, using the code ring of the station called, by depressing the push button on the portable marked "signal" then after the party called has answered, conversation may be carried on with this party by the party calling by depressing the button on the portable marked "talk."

One hundred of these portable telephones were in use in this district during the past year and very satisfactory results were obtained from their use.
The Call of the Last West

Anacoda Copper Mining Company's Western Montana logged off lands; excellent opportunity to purchase direct from the company without promotion or commission charges; low-price agricultural land; 10 yearly payments. Values fixed by experienced appraisers. Our holdings cover a country of unparalleled fertility, salubrious climate, ample moisture, rapid growing seasons, beautiful mountain scenery, railway transportation, telephone, telegraph, good schools, in the near future electric light and power, and many other advantages which combine to make it the finest and richest section in which to live and work in the entire Northwest. Address:

Blackfoot Land Development Company
DRAWER 1590
MISSOULA MONTANA

FORESTERS TO FRANCE.

While the Forestry Kaism is on the press the first authoritative news comes that a regiment of foresters is to accompany the engineers who will be the first American soldiers to go to France. On Page 52 we print excerpts from a circular letter written by the Forester to the men of the Forest Service. This letter was sent out only a week or two after Congress had declared that a state of war existed with Germany. Forester Graves foresaw the stampede which might result in the first days of excitement of Forest Service men into the ranks of the regular army, and of the National Guard of the various states. Foresters are vigorous, red-blooded men. They are courageous and patriotic. They are inured to hardships and would, of course, make very good soldiers in any branch of the army.

Foresters have a special training, however, which makes them of particular and peculiar value in branches of the army where men of their training are most needed.

It is known that Forester Graves intended his letter of several months ago to hold the Foresters steadfast until they were needed in a place for which their particular training made them most valuable. It is a tribute to the efficiency of the men in the Forest Service that this place was found in the first body of American men who are to go to France.

The regiment will be recruited from the Foresters of the Forest Service, and from lumbermen and woodsmen who have ability as logging engineers, sawmill operators and in working with logs and structural timbers. It is planned to recruit 1,200 men and 50 officers. Plans for organization of this force are now being made by Forester Graves in Washington.

When England first went to the defense of Belgium, an organization of Foresters was recruited among the lumbermen and woodsmen of Canada and in the Canadian Bureau of Forestry. These men have rendered a valiant and valuable service to the Allies. Their work has been with the engineers and pioneer corps. Their special branch of service has been in the utilization of the forests of England and France for the preparation of materials used by the engineers and in work with the engineers in the handling and placing of timbers and in the building of timber structures.

Unquestionably, we are entered into a tremendous conflict, and one which, if through a separate peace the granaries and factories of Russia become available to Germany, may not be brought to a successful conclusion until after many years. It seems almost inevitable that we shall send many men to France. Camps must be prepared for these men. Lines of transportation must be prepared. Defenses must be built and rebuilt.

It is a credit to the Forest Service that its men are going in the first line and that they are ready to go. They can do much there to make things possible to the millions of Americans who will follow them.

—D. S.

William Rooney, freshman, will spend the summer cruising timber for the Anaconda Copper Mining Company in Western Montana.

Everett Butler has been assigned to growth studies and will work with D. R. Brewer of District 1 on the Flathead and Blackfoot Forests.
A Great Outfitting Store

This store with its many completely stocked departments presents every facility for outfitting for field work and affords a convenient center from which to draw supplies as needed.

Many of the lines specially advertised in this annual will be found here in regular stock, while we are factory agents for many others.

Here you will find a full line of K. & E. draughtsmen's tools and drawing materials, including drawing instruments for topographic work.

Here you will find everything in the way of camp equipment, from tin cups to tents, camp furniture, bedding, portable houses, etc.

Here you will find guns and revolvers in all makes and models, ammunition, and everything else that goes with them.

Here you will find kodaks, films and photographic supplies. Thermos bottles, etc.

Here you will find groceries and provisions.

Here you will find riding and pack saddles and all accessories.

Here you will find a specialized clothing service for the outer, regulation foresters' suits, all manner of khaki clothing, flannel shirts, service hats, etc.

Here you will find mountain boots in many styles, puttees, leggings, as well as footwear of every other description.

In all departments incomparable service, a knowledge of requirements and goods of quality.

STATE UNIVERSITY OF MONTANA—
(Continued from Page Five.)

request was made.

The school is closely associated with the pharmaceutical association of the state and has its loyal support and co-operation. The school renders service in connection with the compounding of difficult prescriptions, and other problems which are submitted by druggists.

The study of drug-producing plants with special reference to the adaptation of these plants to Montana soil and climate has been a subject of intensive study at the school for two years, and a drug garden has been cultivated. Here experiments are conducted which bid fair to be greatly beneficial commercially as well as to the students.

Departments of Home Economics are maintained with slightly different purposes at the State University, the State College of Agriculture and Mechanic Arts, and at the State Normal College. At the last, the relation of home economics to the whole system of public school education is the most prominent point of view. At the State College of Agriculture and Mechanic Arts the vocation aspect is particularly emphasized. At the State University home economics is treated more particularly as one of the elements of a liberal general education.

At all of these institutions, however, the work is founded on a thoroughly scientific basis, and at the same time is strictly practical in its development. The equipment in each institution is ample for work in sewing, tailoring, and the study of textiles, in cookery, food-study, house-planning, furnishing, and sanitation, and in household management.

Many graduates are teaching domestic economy in public schools, academies, or colleges; some are hospital dietitians; home-makers have claimed a large number; one is teaching in Panama, and another is teaching this work in a mission school in South Africa.

Instruction is available in vocal music and the violin and piano. Music is treated as a part of liberal education, and standards and requirements are the same as in other departments. Those who wish to specialize in music have excellent opportunities to study with those who are masters in vocal and instrumental performances.

A summer session is offered each year for six weeks in June and July. The courses which are offered are designed primarily to meet the needs of school superintendents, principals and teachers connected with either grade or high schools, who desire to become more familiar with the recent progress of education, and of college students who wish to shorten their University course, and those preparing for state and county examinations.
SPECIAL OFFER
To Forestry Students and Foresters

To each one becoming a new Subscribing Member ($3.00 a year, including American Forestry) of the American Forestry Association, will be presented, free of charge the book described in the attached coupon.

American Forestry Association
1410 H. St., N. W.
Washington, D. C.

American Forestry Association,
1410 H. St., N. W., Washington, D. C.

Enclosed find $3.00 for new Subscribing Membership in the American Forestry Association for one year, including specially bound forestry reports by leading experts on:

- Forest Publicity
- Federal Forest Policy
- State Forest Policy
- Forest Taxation
- Forest Fires
- Lumbering
- Forest Planting
- Forest Utilization
- Forest School Education
- Forest Investigations

Name: ........................................
Address: ....................................
Missoula

The seat of the State University of Montana, sends greetings to all foresters and others, who receive this magazine of the School of Forestry.

Missoula is "a fine little city in a fine big country" and here conditions are all that can be desired by those who wish to pursue a University course.

Missoula is metropolitan in every way. It is ideally located in the heart of the Rocky Mountains and the Bitter Root Mountains. It is a city of homes and has attained the title of "The Garden City." Missoula offers much for the student, especially foresters. Huge lumber mills—three of them—are located in and close to the city; forest-covered mountains rise on all sides; practical work in forestry can be had any afternoon by taking a trip into the hills.

Missoula offers every co-operation to students and a large majority of those who come here to attend the State University are able to be partially self-supporting through the co-operation of merchants.

Missoula is a likeable city in every way and the students are made to feel at home from the minute they arrive. It is a "real" University city in all that implies; it is clean, physically and morally. You will like Missoula and after your college course we know we will have a friend in you.

Missoula extends an invitation to you to come.

For further information write

Missoula Chamber of Commerce

D. D. Richards

Secretary.
The University of Montana

The University of Montana is constituted under the provisions of Chapter 82 of the Laws of the Thirteenth Legislative Assembly, March 14, 1913 (effective July 1, 1913). The general control and supervision of the University is vested in the State Board of Education. The Chancellor of the University is the chief executive officer. For each of the component institutions there is a local executive board.

MONTANA STATE BOARD OF EDUCATION

S. V. Stewart, Governor..................................Ex-officio, President
S. C. Ford, Attorney General................................Ex-Officio
May Trumpet, Sup't of Public Instruction........Ex-officio Body.
C. H. Hall.........(1918) W. S. Hartman.........(1920)
J. Bruce Kramer........(1918) C. E. K. Vidal........(1920)
Leo H. Paul........(1919) John Dietrich........(1921)
W. H. Nye........(1919) A. L. Stone.........(1921)

EDWARD C. ELLIOTT, Chancellor of the University

THE STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS AT Bozeman.

Established February 16, 1893, and consisting of:
- The College of Agriculture
- The College of Engineering
- The College of Applied Science
- The College of Industrial Arts
- The College of Home Economics
- The School of Mechanic Arts
- The School of Art
- The Secretarial Course
- The School of Music
- The Summer Session
- The Agricultural Experiment Station
- The Agricultural Extension Service

James M. Hamilton, President.

THE STATE SCHOOL OF MINES at Butte.

Established February 17, 1893.

CHARLES H. BOWMAN, President.

THE STATE NORMAL COLLEGE at Dillon.

Established February 23, 1893, and consisting of:
- The Two-year Elementary Course
- The Three-year Course
- The Four-Year Course
- The Graduate Course

JOSPEH E. MONROE, President.

Different schools and colleges, address the President of the State Capitol, Helena, Montana.

THE STATE UNIVERSITY at Missoula.

Established February 17, 1893, and consisting of:
- The College of Arts and Sciences
- The School of Law
- The School of Pharmacy
- The School of Forestry
- The School of Journalism
- The School of Music
- The Summer Session
- The Biological Station (Flathead Lake)
- The Extension Service
- The Graduate Department

FREDERICK C. SCHEUCH, Acting President.

For publications and detailed information concerning the particular institution concerned. Communications intended for the Chancellor of the University should be addressed to

FREDERICK C. SCHEUCH, Acting President, Missoula, Montana

The State University

Of Montana, located at Missoula, Montana, on the Pacific slope of the Rocky Mountains, in the midst of the most beautiful scenery in the world and with climate, water supply and general living conditions unsurpassed, offers special advantages to students. The State University offers general courses in

- The College of Arts and Sciences
- The Summer Sessions
- The Extension Service
  Special and Vocational Courses in
- The School of Law
- The School of Pharmacy
- The School of Forestry
- The School of Journalism
- The School of Music

Opportunity for special research work leading to advanced degrees in
- The Graduate Department
- The Biological Station

For information concerning any of these courses and general information address

FREDERICK C. SCHEUCH
Acting President, Missoula, Montana