

A TRAINING PLAN FOR SHORT-TERM FOREST GUARDS  
ON FURLOUGH STATUS

by

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## PREFACE

The majority of our forest fires are discovered and handled in their earlier stages by the short term employee, commonly known as the forest guard. These men are recruited from all walks of life and some are with little or no experience in such type of work, however the general public measures the efficiency and judgment of the Forest Service in fire control work by the way the guards react to their duties in such emergencies.

The low salaried forest guard holds a very responsible position in the protection organization as a slight mistake in judgment or lack of knowledge of the many duties and operations in fire detection may result in delay in finding the fire, when it is small and controllable by one or two men, and by the time the mistake is corrected and additional men dispatched to the fire it may require days to stop where minutes would have controlled it soon after discovery.

The fireman in charge of suppression of a small fire by poor judgment and the use of poor techniques of fire fighting could easily let a fire get away with a resultant loss of our natural resources, as well as equipment, supplies, and money losses of hundreds or thousands of dollars.

The forest guard is the key man in the above mentioned

situations, and as he represents the Forest Service, it is to the advantage of all concerned that this man be a true representative of the Service by being well trained in all phases of fire control. Since his reactions to such emergencies reflect the quality of training he has received, it follows that we must consider guard training a very important part of forest protection and one which can hardly be overemphasized.

The purpose of this paper is to present some of the problems of the present training plan and to show the possibilities for improving upon this plan by additional training other than on the job training.

Most forest administrators realize the importance of all possible training and endeavor to give the utmost under existing conditions, but by presenting the possibilities and advantages of additional methods it is hoped that these officials may recognize the values and perhaps use this material as a basis for improvement of their present training plans.

The writer has not attempted to revise or change existing plans and procedures but suggests material which should add to the present plan and thus make guard training more dynamic.

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## TABLE OF CONTENTS

	Page
Chapter I    Presentation of the Problems	1
Present System of Training . . . . .	1
Need for Preseason Training . . . . .	4
Need for Additional Training . . . . .	4
Need for Special Training . . . . .	4
Provision for Emergencies . . . . .	5
Summary . . . . .	5
Chapter II    The Present System . . . . .	6
Group Training . . . . .	6
Individual Training . . . . .	8
In Place . . . . .	8
Inspection . . . . .	8
Telephone . . . . .	8
Correspondence . . . . .	9
Self Application . . . . .	9
Project . . . . .	9
Follow-up . . . . .	9
Summary . . . . .	9
Chapter III    The Proposed Plan . . . . .	11
Purpose . . . . .	11
Objectives . . . . .	11
Correspondence Courses . . . . .	12
Army Extension Courses . . . . .	14
Purpose of the Courses . . . . .	14
Courses . . . . .	14
Instruction . . . . .	15
Chapter IV    Development of Proposed Plan . . . . .	17
Selection of Trainees . . . . .	17

## TABLE OF CONTENTS

	Page
Selection of Trainers . . . . .	17
Preparation of Courses . . . . .	18
Job Analyses . . . . .	20
Sources of Material . . . . .	29
Preparation of Instruction Material . . . . .	30
Suggestions on Preparation of Courses . . . . .	31
Suggestions for Preparation of Lessons . . . . .	32
Summary . . . . .	35
<b>Chapter V Administration of Plan . . . . .</b>	<b>36</b>
Preparation of Courses . . . . .	37
Preparation of Lessons . . . . .	37
Mailing Instruction Materials . . . . .	37
Checking Lessons . . . . .	37
Giving Tests . . . . .	37
Records . . . . .	38
Follow-up Work . . . . .	38
<b>Chapter VI Anticipated Results of Proposed Plan . . . . .</b>	<b>39</b>
Better Trained Personnel . . . . .	39
Higher Efficiency . . . . .	40
Economy . . . . .	40
Ambition to Advance . . . . .	40
Inexpensive to Administer . . . . .	41
Preliminary Size-up of Men . . . . .	41
Follow-up Training Improved . . . . .	42
Assists in Preparing Training Plans . . . . .	42
Improves the Fire School Curriculum . . . . .	42
Comes During Ranger Slack Time . . . . .	43
Better Informed Corps . . . . .	44
Preparation for Emergency . . . . .	45
Improved Morale . . . . .	45
<b>Chapter VII Summary . . . . .</b>	<b>47</b>

## TABLE OF CONTENTS

	Page
Appendix A . . . . .	49
Appendix B . . . . .	76
Appendix C . . . . .	79
Bibliography . . . . .	96

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# A TRAINING PLAN FOR SHORT-TERM FOREST GUARDS ON FURLOUGH STATUS

## CHAPTER I

### PRESENTATION OF THE PROBLEM

The present system of training short-term forest guards presents several problems, which if solved, will increase the efficiency of the organization with a subsequent decrease in fire costs. These problems will be discussed under the following headings: 1. Present system of training; 2. Need for preseason training; 3. Need for additional training; 4. Need for special training; 5. Provision for emergencies.

1. Present System of Training. Two types of training are used in preparing the forest guard for his duties namely; group, and individual training.

The group training consists of a three or four-day school prior to the opening of the fire season which normally occurs on July first. It has not been considered feasible to hold this fire school earlier in the season due to the fact that approximately seventy per cent of the personnel are either working at regular jobs which would not permit a break in service at that time, or attending college which would likewise prohibit leaving class rooms

for several days in the spring.

These few days preceding the fire season are very busy ones for the Ranger and staff, as they are engaged in maintenance of roads, trails, communication systems, and stations in preparation for the fire season. Often the Administrator is confronted with the problem of fire school and an early fire season with hazardous conditions existing at the time the school is in session. This will result in low attendance at the school and a lack of needed training for these protection men. Many times the hazard is so great at this time on our east side forests that all key men, including yearlong personnel and dispatcher, are unable to attend the fire school which materially affects the class schedules and the teaching set-up. Last minute class cancellations are not uncommon due to necessary fire control work by instructors, and sometimes the entire group of trainees from a certain district or districts have returned to their forest to fight fire during the three-day school, thus greatly affecting the fire school schedule.

The fact that a number of men miss the group training presents a real training problem, as this training must be given later, and quite often the training officer only partially trains the men, due to a lack of time during a busy fire season.

The type of training offered at fire school must of

necessity be general in nature to fit the large group of varied experiences. This limits the variety of courses and usually results in fundamental initial training for the inexperienced men and very little advanced training for the experienced men due to time and expense involved. This presents an important problem to training officials as they realize that their experienced men need advanced training if they are to be eligible for more responsible positions. Provision for the experienced man is an annual problem and worth more consideration.

The limited time devoted to instruction at the guard training school will not thoroughly prepare the man for his job. It must be kept in mind that relatively few jobs can be adequately presented and not all jobs lend themselves to group training. It is evident, and experience proves that intensive group training of men for a limited period does not produce qualified and thoroughly trained men. (12)

Regulations specify that inspections and individual training be given during the season, while the guard is on the job, but due to the pressure of administrative work and size of staff personnel this phase of the training is often neglected or may be given in a perfunctory manner. To be effective, such training should be initiated soon after the group training period and such is not always the case.

2. Need for Preseason Training. In selecting new men for the protection force the administrative officer, in many cases, has no assurance that the man is qualified for the job until after the fire school. In the majority of districts, men are sent to their stations immediately after fire school, and should he react unfavorably to training while there, the Ranger is confronted with the following problem: The fire season is on and a suitably trained man is not available to replace him. Should he be used and given follow up training or discharged and a new man used to replace him?

3. Need for Additional Training. The problem of advanced, or additional training for experienced men may present itself at the time the fire school is in session.

Many experienced men are being held on the district due to hazardous fire weather and cannot attend the school. Some of these men are in need of advanced training at this time, as their experience and knowledge of the district makes them eligible for promotion to more responsible positions, or training in overhead positions for fire or other crews.

4. Need for Special Training. There is always a need for training along special lines for selected men which cannot be given at the fire school due to group schedules, economy of time, and instructors. The Administrator may

want a man trained in timber sale work, inspection of logging operations, special mapping, etc. and the fire school schedule will not permit numerous special courses.

5. Provision for Emergencies. There is always the possibility of an early fire season or very hazardous fire weather at the time the fire school is scheduled which would limit or prohibit such a school. Funds may not be available for the school, and in either emergency, the training would of necessity be given on the job.

This would present a serious training problem particularly with the advent of new men on the district.

#### SUMMARY

In bringing out the problems of the present system an attempt was made to show how the group training plan is affected by such factors as: Time scheduled, length of school, funds allocated, availability of trainees and trainers, and type of training material possible. How the individual or on the job training is influenced by lack of time and administrative personnel.

The failure of the present system to fully provide for preseason, advanced, and special training, has also been discussed with the purpose of showing some of the present problems and opening the way for possible improvements.

## CHAPTER II

### THE PRESENT SYSTEM

Forest guard training at present is on a seasonal basis and consists of two main types of training known as group training and individual training.

#### GROUP TRAINING

This plan calls for an intensive three or four-day fire school just prior to the opening of the fire season.

Each National forest of the state conducts its own school and is attended by men from each district of that forest. This may include four to seven districts with forty to one hundred men. An effort is made to select a centrally located place for the school where proper facilities are available.

Yearlong officers and qualified guards serve as instructors and these men prepare lesson plans, present the work, and send a record of the students ability to headquarters at the close of the school. The Mount Hood National Forest of Oregon enjoys the distinction of being the only forest in the state to use a teaching staff composed entirely of qualified guards. This plan has been very successful during the past two years and has relieved Rangers at a busy time of the season and provided excellent

experience for the guards used as trainers.

Initial and review training are given in the following subjects: Detection, fire chasing, fire suppression, public relations, law enforcement, radio, first aid, and progressive fire line construction.

Advanced training is usually given in fire suppression, timekeeping, foremanship, progressive fire line construction, and fire behavior.

Such classes as detection, fire chasing, fire suppression, and progressive line construction are usually conducted in four-hour periods in order to cover the required material, while the other subjects may be covered in a two-hour session. The ideal schedule would permit a new man to take all classes offered in initial training, but this does not work out in practice due to the limited time the school is in operation.

The camp schedule is so planned that men are kept busy during the three-day period to avoid a waste of time and money. In addition to daily classes, evening conferences are held on important topics and time is also provided for recreation.

At the close of the fire school the men meet with their Rangers for final instructions and then go to their official stations for active duty, where they are subjected to individual training on the job.

## INDIVIDUAL TRAINING

Seven different methods are used in giving on the job training and each will be discussed briefly in order to give the reader an understanding of the methods used.

1. In Place. Training at the guard's official station. A new lookout is accompanied to his station by the Ranger, dispatcher, or qualified training officer, who gives him the necessary instruction at the lookout. This training may include setting up the fire finder, location of other lookouts, trails, roads, landmarks, false smokes, and other information of importance to this particular station.

2. Inspection. The inspection officer while inspecting the station, equipment, and the guard, will pick up weak points in the guard's training or knowledge of his duties and can immediately correct with the proper instruction.

3. Telephone. This method presents an excellent opportunity for the dispatcher to give necessary training as he is in communication with all stations on the district.

The dispatcher may give the lookout the legal description of a so-called fire and have him report it back to him on a lookout form. The report is checked by the dispatcher and questions and answers exchanged thus improving the man's training.



4. Correspondence. Some districts mail questions on the guard handbook to the men during the season with a definite date set for their return, thus stimulating a study of the handbook.

5. Self Application. The guard studies printed material provided him at his station and thus improves his knowledge by study.

6. Project. The Ranger may assign a guard to the task of posting fire prevention posters in his territory which trains him in the lay of the country, knowledge of roads, trails, and camp grounds. This accomplishes the dual purpose of training and necessary work.

7. Follow-Up. This method is used to train the man whose training record shows a need for additional training in some detail jobs as shown by his guard school record. This follow-up training should be given soon after the school and by a qualified man.

#### SUMMARY

The present training system is of a seasonal nature and begins with the group training at guard school which is followed by individual training as needed during the summer.

Time and money are often the limiting factors for a satisfactory group training plan, while lack of time on the

Ranger's part and a non-interested dispatcher will materially affect the "on the job" training plan.

## CHAPTER III

### THE PROPOSED PLAN

#### PURPOSE

To give initial, advanced, and special training to all short-term forest guards in need of such training by means of extension courses during the time they are on furlough status.\*

#### OBJECTIVES

1. To supply sufficient training for all men at the lowest cost.
2. To prepare for advancement in the service.
3. To train for special work depending upon the job requirements.
4. To fill the gaps in the present system of training.
5. To keep men informed throughout the year on protection material and information pertinent to their district.
6. To correlate such work with the seasonal training plan to avoid duplication of work or overlapping courses.
7. To improve the esprit-de-corps.

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\* Forest Guards work during the fire season (July-October) and are then furloughed until the next fire season.

## CORRESPONDENCE COURSES

Correspondence schools have been in operation for some fifty years and an investigation of their enrollments during this period will show the popularity of such education.

Extension or correspondence work may have definite advantages over other types of education under certain conditions due to economy, practicability, and correlation with a trade, or profession and in other cases the college method will prove advantageous. A few facts concerning extension courses are presented here to show the wide use of this type of work.

Correspondence courses started at the University of Chicago in 1892 and now fifty-two institutions enroll over sixty thousand students each year. The courses run along mechanical lines and the average cost is six dollars per semester. (7) The state of North Dakota has free supervised high school correspondence courses, and trains five thousand students annually. This plan was made possible by legislation and an appropriation of forty thousand dollars in 1935. Over three hundred high schools used this service in 1938. (10)

One of the oldest and best known of the correspondence schools, The International, now boasts of two hundred thousand students and an alumni of four millions. This school is now fifty years old and started with an enrollment of

one thousand students. (2)

One of the most recent extension services is the W.P.A. controlled courses prepared by the California State Department of Education.

These courses numbering thirty-four are available to members of the Civilian Conservation Corps, at no cost, in the ninth corps area. Similar schools are located in other regions and large numbers of the boys are being educated in this manner. (17)

The army has a very extensive system of correspondence training which provides training for one hundred seventeen thousand Reserve officers, and in addition the courses are used by candidates for reserve commissions and by members of the National Guard. A considerable part of R.O.T.C. training at colleges and universities over the nation is also based on these army extension courses. (16)

Reviewing the above material, we may readily see how extension work has flourished in this country, and the evidence substantiates its wide use by all types and classes of people from grade school student to college graduate. It has been stated that "more students are enrolled today in correspondence schools of the United States than there are in all of our Colleges and Universities combined." (6)

## ARMY EXTENSION COURSES

The army extension work is reviewed here to bring out some of the procedures which are applicable to a forest training plan. The army plan has been quite successful and is past the trial stage so a plan devised along similar lines for training forest service men has its possibilities.

## PURPOSE OF THE COURSES

To provide for the Reserve officer a systematic course of study which will better fit him to perform his duties, and incidentally assist in preparing himself for promotion to the higher grades.

## COURSES--Scope, Length, and Qualifications for Enrollment

Nineteen courses are provided pertaining to the arms and service of the army. Each of these courses consists of short subcourses arranged in logical and progressive order; each subcourse covers one subject or phase of military knowledge necessary for appointment or promotion.

Each subcourse contains an orienting introduction showing the purposes, and the scope of the course, number of lessons in the subcourse, estimated time required, and the required texts and maps. There are twenty-three common

subcourses, each divided into three or more lessons. Subcourses require from six to twenty hours to complete.

The courses are revised annually and corrections made as soon as errors are discovered. Upon satisfactory completion of each subcourse, a certificate, which is accepted in lieu of examination in that subject for appointment or promotion, is given to the student.

The courses are available throughout the entire year but instruction is suspended during the summer months.

Enrollment is by a series of subcourses. A Reserve officer normally enrolls in the subcourse series pertaining to the next higher grade, i.e., a second lieutenant should enroll in the 20 series. A first lieutenant should enroll in the 30 series, and so on.

## INSTRUCTION

The instruction consists primarily in the assignment of a task, preparation by the student on exercises requiring the use of knowledge gained, and criticisms and comments upon the student's work.

Upon enrollment, students are assigned to a definite instructor, to whom the solutions of problems and lesson sheets are submitted. Regular army officers are usually appointed as instructors. As soon as a student completes a designated lesson or lessons, he forwards the completed

lesson sheets to his instructor, asking for help when needed. The instructor grades the paper, offers suggestions, and makes pertinent comments on the quality of the work and makes clear any indefinite solution. New lesson material is furnished by the instructor according to the needs of the individual. Instruction is of the personal type insofar as practicable.

The courses are provided at no expense to the student, including all texts, maps, and Government franked envelopes. (3)



## CHAPTER IV

### DEVELOPMENT OF PROPOSED PLAN

#### SELECTION OF TRAINEES

Personnel records form an excellent basis for determination of a guard's eligibility for advancement in the service or the possibility of his being used by the Ranger for special work. The personnel records give a fairly complete picture of the man including his education, experience, personal appearance, character, ability, and training record while employed.

The personal interview gives the Ranger an opportunity to talk with the man, get his viewpoint, discover what he likes and what his future plans are, which aids in the selection of men for advancement.

The questionnaire may be used as a substitute for the interview, to aid in selecting men for training, but is less substantial than the interview because the personal element, which is so important, is lost.

#### SELECTION OF TRAINERS

The Ranger is the logical man to handle this type of training for the following reasons: First--He knows each station on his district and the type of man he would like

to have placed at each of these positions. Second--He knows the duties of each job in the district and can easily work out training material for that position. Third--He does not have the pressure of important administration work at this time as he does in the summer and can devote more time to training. Fourth--He can get a preliminary size-up of his new men and will know something of their abilities before the guard training school. This will aid him in working up his guard training plans for the season. Fifth--After he has inspected his men during the season he will know who needs additional training and how much. This can be given by him during the winter. And last--By working with his guards he will improve the group morale in his district which is so necessary in times of extreme fire emergency.

An experienced qualified guard on the district may be used to handle this training if it is not advisable for the Ranger to do it, but in most cases the Ranger is far better qualified.

#### PREPARATION OF COURSES

In the preparation of course material, the different positions must be broken down into their main divisions and then again divided into the main jobs and detailed operations to accomplish these jobs together with a list of the

knowledge and skill required to perform these detail operations. The detail duties of the job are analyzed to determine what the man must know in order to properly do the job. A job analysis of the detection division of the fire guard position follows.

The forest guard position is a general term and may include the lookout, the lookout fireman, the recreation guard, and the administrative guard. The fire guard position may be broken down into the following divisions which are designated as courses for correspondence work--Detection, Public Relations and Law Enforcement, Firechasing, Fire Suppression, and Tools, Equipment and Quarters. These main divisions are identical with the guard training plan so that an extension course in detection will parallel the group training course of the same name.

Job analyses, with knowledge requirements, have been made for the detection, firechasing, and fire suppression divisions of the fire guard position in order to show the procedures used in developing courses. The detection analysis will be used later in lesson planning for initial training. Similar analyses have been made for the position of foreman to develop course material for special training and the dispatcher position to develop material for advanced training.

Position--Fire Guards (Lookouts and Lookout Firemen)

Division--Detection

Job--Operation and Care of Firefinder

Operations to accomplish:

A. Setting up firefinder

Knowledge and skill required

1. Know the importance of a rigid, firm, base
2. Know how to dodge obstructions
3. Know how to place map on instrument

B. Leveling instrument

Knowledge and skill required

1. How to use spirit level
2. How to level by thumb screws

C. Orienting instrument

Knowledge and skill required

1. How to determine true north
2. How to adjust meridian on map
3. How to adjust firefinder plate
4. How to orient with other station

D. Checking alidade

Knowledge and skill required

1. How to check rear and front sights
2. How to adjust hairs
3. How to adjust tape

Division--Detection, continued

Job--Operation and Care of Firefinder, continued

Operations to accomplish:

E. Use of alidade

Knowledge and skill required

1. How to turn alidade
2. How to sight correctly
3. How to use tape for distance
4. How to get vertical angle
5. How to read vertical scale
6. How to read azimuth
7. How to use vernier

F. Learning country with firefinder

Knowledge and skill required

1. Know location of main mountains
2. Know location of ridges and drainage
3. Know correlation with firefinder map
4. Know use of panoramic pictures and  
topographic maps

G. Estimating location and distance

Knowledge and skill required

1. How to determine distance from known  
landmarks
2. How to use the scale on tape for  
distance

**Division--Detection, continued****Job--Operation and Care of Firefinder, continued****Operations to accomplish:****H. Measuring width of fires****Knowledge and skill required**

1. How to use the firefinder for determining width of fires

**I. Care of instrument****Knowledge and skill required**

1. Know how to replace hairs
2. Know proper oil to use
3. Know how to cover firefinder

**Job--Examination of Country for Smoke****Operations to accomplish:****A. Make general observations****Knowledge and skill required**

1. Know how to scrutinize territory
2. Know portion to study most carefully

**B. Make systematic check looks****Knowledge and skill required**

1. Know the procedure of a check look
2. Know the time and frequency
3. Know the correlation with other stations

## Division--Detection, continued

### Job--Examination of Country for Smoke, continued

#### Operations to accomplish:

##### C. Locate and record legitimate and false smokes

###### Knowledge and skill required

1. Know location of industrial smokes
2. Know location of false smokes
3. Be able to identify fog, dust, slides, burns, and smoke
4. Know how to record legitimate and false smokes

##### D. Make night observations if necessary

###### Knowledge and skill required

1. How to record location of lightning strikes mentally for later check
2. How to check progress of going fire

##### E. Systematic search for "sleeper" fires

###### Knowledge and skill required

1. How to constantly check location

### Job--Progress of Lightning Storms

#### Operations to accomplish:

##### A. Continuous observation of cloud formations

###### Knowledge and skill required

1. Know the importance of observing clouds
2. Know cloud types

Division--Detection, continued

Job--Progress of Lightning Storms, continued

Operations to accomplish:

B. Report approach and formation of thunder clouds

Knowledge and skill required

1. Know dangerous cloud formations
2. Know how to determine distance by landmarks or by interval between flash and sound
3. Know direction and speed of storm movement
4. Know if cloud to cloud or cloud to ground
5. Know safety precautions during lightning storm

C. Keep dispatcher informed on storm

Knowledge and skill required

1. Know the direction in which storm is moving
2. Know the speed of storm
3. Know the number and location of strikes

D. Recording location of strikes on special map

Knowledge and skill required

1. How to properly record
2. How to prepare to watch for future fires



Division--Detection, continued

Job--Progress of Lightning Storms, continued

Operations to accomplish:

E. Filling out lightning storm report

Knowledge and skill required

1. Know what to observe
2. Know how to fill out form 1100
3. Know how to report each storm separately

Job--Locate and Report Fires

Operations to accomplish:

A. Locate fire with firefinder

Knowledge and skill required

1. Know the importance of sighting on base of smoke
2. Know how to take the proper azimuth reading
3. Know how to read proper vertical angle
4. Know how to obtain the distance by means of tape
5. Know how to mark location on map
6. Know how to check readings

Division--Detection, continued

Job--Locate and Report Fires, continued

Operations to accomplish:

B. Locate fire by local landmarks

Knowledge and skill required

1. Knowledge of the country
2. Understanding of map features and correlation with country
3. How to give recognizable local landmarks

C. Make out lookout report

Knowledge and skill required

1. Location by township, range, section, and subdivision
2. How to properly record azimuth, distance, and vertical angle
3. Know how to represent volume, character, and color of smoke
4. How to fill out report form in full
5. Realize the importance of speed and accuracy

Division--Detection, continued

Job--Locate and Report Fires, continued

Operations to accomplish:

D. Report fire

Knowledge and skill required

1. Know proper person to contact
2. Know the proper rate of speech and enunciation
3. Know how to control emotions
4. Know the proper order of items
5. Know the importance of complete and accurate data

Job--Progress Report on Going Fire

Operations to accomplish:

A. Furnish information to dispatcher

Knowledge and skill required

1. How to keep headquarters informed
2. Know wind and weather data

B. Determine spread of fire

Knowledge and skill required

1. How to estimate spread
2. How to measure with firefinder

Division--Detection, continued

Job--Progress Report on Going Fire, continued

Operations to accomplish:

C. Keep chronological record

Knowledge and skill required

1. Know how to make entries on lookout form
2. Know what to record on form
3. Know the importance of keeping a record

Job analyses are the basis for systematic training and may be made by an experienced man who is familiar with the duties of the different positions, and the ability to think through each detail operation.

#### SOURCES OF MATERIAL

The basic source of material for initial guard training is the guard handbook. This handbook is prepared by the Forest Service for each forest region of the United States. The text used in Region six is used in the states of Oregon and Washington. (14) "Fire Fighting" (9) and "The Lookout System" (8) are also basic sources of training for the fire guard.

Standard Forest Service handbooks and manuals, copies of which are found in any Ranger Station, are available as well as numerous government bulletins which are excellent sources of material for extension training. The State Forestry Department has a number of handbooks, manuals, and publications suitable for this work, the State Fire Laws being used extensively in guard training and law enforcement. The Civilian Conservation Corps extension courses would be available to the Forest Service should they desire to use this prepared material. The writer has reviewed these courses and the majority are not applicable to forest guard training. However, the general forestry, surveying,

and truck driving courses have possibilities and are excellent extension courses.

Ample material, in handbook or manual form, is published and used by the Forest Service in the field and provides excellent course material for guard training in all phases of initial and advanced work.

Textbooks are available at the State, City, College, University, and Forest Service libraries for reference material, if the instructor deems it advisable to use these sources in special training.

#### PREPARATION OF INSTRUCTION MATERIAL

The first step in the preparation of instruction materials is the study of the job analysis. The detection division of the fire guard position has been designated as a course so the following jobs will be covered by lessons.

1. Operation and care of firefinder.
2. Examination of country for smoke.
3. Progress of lightning storms.

4. Location report and making of progress report on fires.

An estimate of the time required to complete the course should be included in the general instructions sent the student with the course introduction. A sample course introduction sheet is shown in Appendix B.

## SUGGESTIONS ON PREPARATION OF COURSES

1. Divide the position into the main divisions or groups of similar duties.
2. Make a course of each of the main divisions if feasible.
3. Endeavor to make the main divisions or courses cover the same material as the guard school course of the same name.
4. A course should have three or more lessons.
5. A course should require approximately fifteen to thirty hours to complete.
6. Make the course a complete unit of training.

After deciding on the jobs making up the lessons, the next step is one of lesson planning. This step is the most difficult and the instructor must make wise decisions as to what to include in the lesson and what to omit. It is sometimes difficult to give detailed instruction by correspondence and here the experience and judgment of the planning officer will materially aid in making the proper lesson plan.

The first lesson in this course will be on the operation and care of the firefinder, so operation A, Setting Up the Firefinder will be included. The details of knowledge and skill required such as: 1. Having a rigid, firm base; 2. Dodging obstructions; 3. Placing map on instrument, will

serve as an instruction outline since these things are the items which are to be taught. Then go down the list of operations B, C, D, E, F, G, H, and I studying each one to decide whether to include it in the lesson or not, then after selecting these operations for the lesson, the next step is to get the reference material ready to correlate with the lesson material. After checking the reference material with the analysis it is found that the references for lesson Number One are as follows--Guard Handbook, pages 52-59, Lookout Manual, pages 15-52.

Knowing the lesson title, the references, and the operations (A-I) which are to be covered in Lesson One, the next step is to prepare the exercise which may be in the form of questions, problems, or case studies. Each part is weighted and the total of all lesson parts will be 100 points. This material is placed on the assignment sheet and the first lesson assignment is completed, as shown in Appendix C.

#### SUGGESTIONS ON PREPARATION OF LESSONS

1. Teach general information and principles and not a mass of details.
2. Teach phases of subjects that are essential.
3. Conserve the students time and give the maximum instruction with the minimum amount of nonpro-



ductive work.

4. Try to give the student practice in applying the information and principles explained in the assignment.
5. Fit the exercises to the experience and expected capability of the student.
6. True false type questions are not satisfactory.
7. Yes or no type questions without explanation are not good.
8. Word the questions in definite terms requiring a complete but concise answer.
9. Avoid "discuss so and so" type questions as they leave the student in doubt as to what is wanted of him and opens the way to unlimited essays quite difficult to grade.
10. Do not make the lesson too long. Three hours should approximate an evenings work. Remember that your students are doing other work during the day and must use evenings for the extension study.

Upon the completion of the lessons in a course the instructor will prepare an examination over the entire course, which may be arranged so that it can be answered with or without the aid of assigned text material. The instructor may want to send out a review lesson occasion-

ally, to test the students' retentive powers and to add further training on some difficult phase of the course. Sample review lessons and examinations are shown in Appendix C.

It would be advantageous to issue a few suggestions on how to study extension material, as some of the recipients of this type of training are not familiar with good study habits and procedures. A suggested list of such suggestions and the form in which to present the same is found in Appendix B.

A few general instructions as to form to use in answering lesson assignments, size of paper, margin to use, and how to label the papers are of value to the student and the instructor. The papers are checked by the instructor in less time, and corrections, criticisms, and suggestions are easily found by the student if a recognized system is used by both. A sample sheet of such instructions will be found in Appendix B.

The instructor should check the instruction materials such as assignments, reviews, and examinations for proper form, proper thought and wording, and for the proper time allowance. It is advisable to give the exam or the assignment to a person familiar with the work to test for possible weak points, should conditions permit. After the course has been given to several men the instructor will be

able to make these corrections and can gradually improve the work by a study of the reactions of the students to the instructive materials.

## SUMMARY

The brunt of the work falls upon the Ranger who will want to select the men he will later train.

A detailed job analysis forms the basis for the training material and a position such as fire guard is broken down into divisions to get the courses. A further break down is made to determine what the man should know or do, to perform the operation of the jobs, and this acts as a training outline for the lesson material. The actual preparation of the lessons is dependent upon the judgment, knowledge, and experience of the instructor, who is the chief motivator of the plan.

The Fire Guard position was broken down into the divisions of Detection, Firechasing, and Suppression to show the analysis procedures. The division called Detection is a complete course and lesson plans, reviews, and examinations are shown for this course, thus showing the necessary steps or procedures to develop and operate a correspondence course. In a similar manner courses could be made for firechasing and fire suppression, or any other division of the fire guard position.

## CHAPTER V

### ADMINISTRATION OF PLAN

Chapter four deals with the details of the development of the plan from the selection of men to be trained, to and including the preparation of lessons. In chapter five we assume that the men have been selected for training by the District Ranger of a Forest and he will act as the training officer. He may have four to six new men for initial training, possibly two men for some special training, and three or four men for advanced training which would make a total of nine to twelve men for extension work.

The training period should begin soon after January first for the old men in order that they may complete the work before they are needed for maintenance and other work early in the spring. The Rangers usually have the replacements or new men engaged by February first and could immediately initiate their training.

This will allow four or five months for the extension courses, giving the administrator time to use the resultant records in making out his training needs for the summer.

The steps in the actual operation of the plan are discussed briefly here in chronological order to serve as a guide in preparation of a similar plan.

1. Preparation of Courses. Made by job analyses and correlation with group training plans.

2. Preparation of Lessons. The use of the job analyses, detail operations, and knowledge and skill required to perform.

3. Mailing Out Instruction Materials. These materials include the course introduction, how to study, how to prepare answer sheets, lesson assignments, review lessons, examinations, and all texts, maps, and other material used in presenting the work to the student. These materials are mailed to the student with stamped envelopes for their return free of charge.

Preliminary instructions should emphasize the importance of returning Government property and the penalties involved.

4. Checking Lessons. The instructor should check the lessons promptly and return to the student with corrections, criticisms, etc. so he may profit by such advice in future lessons. "One certain way of killing interest in correspondence training is that of allowing papers submitted for review and correction to remain unattended or unreturned for long periods of time." (12)

5. Giving Tests. A comprehensive test over the entire course should be given upon completion of such work and the corrected papers together with the final course

grade should be returned to the student. Numerical grades based on one hundred per cent are recommended as this system is more easily understood by the average person than other systems of grading.

A paragraph of commendation or constructive criticism from the instructor, written in an informal manner, is valued highly by the student and will inspire him to do better work. The Ranger has a splendid opportunity to know his men, their viewpoints, ambitions, etc. by these exchanges and holds a valuable tool which may be used in building up the morale of his organization.

6. Records. In conducting extension training for a group of men, the instructor must of necessity keep records concerning lessons completed, examinations, courses completed, grades, etc. in order to systematize the administrative work. A suggested form is shown in Appendix C.

7. Follow-Up Work. From a study of the guards' training plan and inspection outline, which is used during the fire season, the instructor may plan the proper follow-up training during the winter months by correspondence. The extension training records will also aid him in planning training needs for the fire season, as he will know how his new men react to training, and what additional training they will require before actual duty.

## CHAPTER VI

## ANTICIPATED RESULTS OF PROPOSED PLAN

After investigating the different phases of the extension training plan from preparation to administration we are faced with the all important problem of results. Will the plan work? Will it accomplish the desired objectives and purposes?

In answer to these questions, we can present the entire plan with all available evidence and predict the possible results. The actual trial will be the final answer.

However, if we faithfully follow our purposes and objectives as herein set forth we are justified in anticipating the following results from such a training plan.

1. Better Trained Personnel. By giving extension training along advanced and special lines we are adding more training to the personnel and by using it as a device for follow-up training the training plan will be more complete than under the present system. The presentation of a large percentage of fundamentals by extension methods will greatly aid the seasonal plan by permitting more intensive or additional work. If a correspondence course devotes fifteen hours to a course which is covered in four hours during guard school, the men will absorb more and have more opportunity for study and review which will

result in better training.

2. Higher Efficiency. It usually follows that the more training a man receives in the different phases of his job, the more efficient he becomes provided he receives the proper training. In a recent study made by Hornby in Region One of the Forest Service, it was found that there is a relation between seasons in which bad fires occur, reduced overhead, and man days of training given to short-term employees. In 1934 after shorter training periods, more fire losses resulted due to lower efficiency of the protection force. (5)

3. Economy. This factor enters in follow-up training which is given during the busy fire season. If given by extension methods the valuable fire season time will be saved. In a survey of the costs of guard training, made by the writer this year, it was found to average eight dollars and seventy cents per man day in Oregon. By giving extension work during the winter one day might be eliminated from the guard school if sufficient funds are not available for a three-day school. This might easily mean a saving of two hundred fifty dollars to the Forest.

4. Ambition to Advance. To the man who cannot afford college work, the extension courses provide a means of advanced study and training which will allow him to advance in the Service. He is given the materials with which to



improve his knowledge and can work out his advancement step by step at home and at no cost. If he is interested in his protection job he will want to improve, and no better opportunity presents itself than this type of training.

5. Inexpensive to Administer. The only cost is the time given the plan by the instructor as all texts, materials, and postage are provided by the Government.

6. Preliminary Size-Up of Men. It would be advantageous to know the ability of the new man to absorb training and fit into the protection force before the fire season, but under the present plan the new men are on active duty immediately after the group training period. Many times the man does not measure up to expectations but must be used, as there is not sufficient time in which to train another.

Folweiler recommends that prospective employees be subjected to a short training period well in advance of the fire season to determine the ability of the prospects to absorb the sort of information required of them. These prospects who do not function satisfactorily should be eliminated and the men who are likely to prove satisfactory should be given group training at a later period. (4)

These difficulties may be overcome by giving extension work several months prior to the guard training school, as the Ranger will know much more about his new men.

7. Follow-Up Training Improved. Extension work presents an excellent method of improving the weak points which show up during the fire season.

This follow-up work is applicable to both new and experienced men who may need a course or a part of a course to round out their training and it would be far better to give the training during the winter than wait until the summer training period.

8. Assists in Preparing Training Plans. The records of the extension work will help determine training needs for the new man, as the instructor will know just what the man will need to complete his training. Should he do poor work in one phase of the work, the Ranger may eliminate or shift to other work.

The experienced men who need additional training, if given such training during the winter, are free to man key positions early in the season or protect the forest during guard training school.

By doing much of the follow-up training by mail we eliminate valuable time consuming trips to remote stations during a busy fire season and thus simplify our training set-up during the summer.

9. Improves the Fire School Curriculum. If we could teach the new men one or two courses by correspondence we would thus double or treble the time allocated to fire

suppression at guard school. The detection and public relations courses are time consuming ones at guard school, and are usually scheduled for four hours each. By giving these two courses by correspondence, eight hours or possibly two more classes in fire suppression could be given.

The Forest Service Officials realize the importance of fire suppression and the need for much practice on different fire situations which will bring out different techniques of control.

If by using extension training for many fundamentals, which consume approximately fifty per cent of the time in fire school, we can provide more field experience and more actual fire experience, in our guard schools, the resultant improvement in training and enrichment of the guard school curriculum will alone be justification for the installation of correspondence training.

10. Comes During Ranger Slack Time. If the correspondence work comes after the first of the year it will fit in with routine work of more or less equal priority whereas should it come earlier the completion of the fire season duties will interfere, and having correspondence training run late in May and June will interfere with fire control planning and spring organization and maintenance work. Conducting the extension training between fire seasons seems the apropos time upon consideration of the

Rangers yearlong duties.

11. Better Informed Corps. The average fire guard reports for fire school in June, receives three days of intensive instruction and immediately goes to his station for the summer months. He is given a mass of material such as guard handbook, fire fighters' manual, lookout manual, fire laws, public relations material, resort information, forest information, maps, forms, and other special instructions. In order to be efficient at his position in the forest, he must be familiar with all of this material at once, and the average man finds it practically impossible to accomplish this goal during his brief sojourn in the forest.

On a well organized district each man is busy at his job and finds little time, while on duty, to really concentrate and master all of the materials with which he is supplied.

Should he take extension work during the winter, where he uses this material and has a definite time for study, the guard will become more familiar with the material and at the opening of the fire season will be able to handle his job more intelligently and with higher efficiency. He can be kept informed throughout the year of forest information of importance to his district and his position on the forest.

12. Preparation for Emergency. If some unforeseen situation should develop, such as loss of funds for the group training school, or extreme hazardous fire weather at the time of the scheduled school, the administrators are presented with a serious training problem. This would probably necessitate elimination of group initial training and substitution of individual training while the man is on the job. The time involved in giving such training combined with a dangerous fire season and important administrative duties, might easily result in insufficient training, low morale, and a "blow-up" in an emergency.

By giving initial training prior to the fire season through correspondence, the new men will have been prepared for such emergencies and will require but little individual training on the job. In a like manner the experienced men who have received follow-up training by correspondence will more efficiently handle their assignments at the opening of the fire season.

13. Improved Morale. It is a recognized fact that the guard training school helps the morale of the entire protection force.

Here the men meet, exchange ideas, work with experienced men, and get a better idea of the significance of their jobs.

By taking some preliminary training prior to guard

school the man is familiar with the protective system and is interested in applying the knowledge gained. He also feels that he knows his Ranger through the extension work, and these factors tend toward improved morale of the entire force.

## CHAPTER VII

## SUMMARY

In the preparation and presentation of this paper, the author has endeavored to indicate the problems confronting the administrators of the present system of guard training, and to suggest remedial measures whereby such training will become more complete.

The purpose of the plan and the objectives set forth are based upon actual needs and the practicability of the extension method of training. The use of extensive training needs little evidence to justify its use, due to the fact that the United States Army, with training problems similar in many respects to the Forest Service problems, has employed this system of training for many years with unquestionable results. This record together with the wide use of correspondence training in industry and other fields, precludes the possibility of failure in a guard training plan.

The development of the training plan, which is based upon the scientific preparation of job analyses, is shown in detail for a complete training course and enables the reader to follow the steps in proper order from the selection of students to the recording of their achievement records. If courses and lessons are systematically prepared and administered it is logical to anticipate the

results, as set forth in the objectives of the plan.

The present national emergency brings to us a realization of the importance of our forest resources. The business of transporting supplies, housing soldiers, building fortifications, and the manufacturing of war materials results in a heavy drain on our forests; consequently we must regard forest defense as national defense and realize the significance of a well trained personnel and highly efficient protective force to prevent fire losses.

Military and defense service will result in high turnover of forest guards annually which will necessitate a more intensive system of training than has been used in the past. Additional preseason training may be of vital importance in the preparation of men to fill these vacancies and the extension system would become an indispensable ally.

This paper is dedicated to the administrator who realizes the importance of well trained personnel and is willing to sacrifice time and energy to pioneer development work with extension training plans.



APPENDIX A  
JOB ANALYSES

	Page
Position of Fire Guard	
Division -- Firechasing	49
Division -- Fire Suppression	59
Division -- Dispatcher	64
Position of Foreman	
Division -- Trail Construction and Maintenance	67

Position--Fire Guard

Division--Firechasing

Job--Use of Forest Maps

Operations to accomplish:

A. Locate a point by legal description

Knowledge and skill required

1. Know the meaning of township, range, section, and subdivision

B. Give legal description of a point on map

Knowledge and skill required

1. Know proper order of recording description
2. Know the meaning of terms used

C. Locate and describe point by local landmarks

Knowledge and skill required

1. Know local landmarks
2. Know how to give clear complete description

D. Study of topographic map

Knowledge and skill required

1. Know what a topog map shows
2. Know what contours are
3. Know the meaning of map symbols
4. Know how to orient map

Division--Firechasing, continued

Job--Use of Forest Maps, continued

Operations to accomplish:

E. Determine and record map corrections

Knowledge and skill required

1. Must know country to discover mistakes
2. Must be able to judge distance accurately
3. Must be able to correlate map with country
4. Must be able to record corrections and report to headquarters

F. Orientation of map

Knowledge and skill required

1. Know how to orient with country
2. Know that the natural position for reading title makes upper part north
3. Know how to orient with compass

Job--Readiness for Getaway to Fire

Operations to accomplish:

A. Check fireman's outfit

Knowledge and skill required

1. Know what the outfit contains
2. Know that sharp edged tools must be covered
3. Know how to pack to prevent breakage

Division--Firechasing, continued

Job--Readiness for Getaway to Fire, continued

Operations to accomplish:

B. Check transportation facilities

Knowledge and skill required

1. Know requirements for car
2. Know that car must be ready to go at any time

C. Check forms at telephone

Knowledge and skill required

1. Have lookout forms at telephone
2. Have pencil on string at telephone
3. Have map within reach of telephone

D. Check wearing apparel

Knowledge and skill required

1. Know that serviceable clothes are needed
2. Know that proper shoes or boots are important

Job--Learn Country and Correlate with Map

Operations to accomplish:

A. Make exploration trips

Knowledge and skill required

1. How to practice observation
2. How to frequently study the country and map

Division--Firechasing, continued

Job--Learn Country and Correlate with Map, continued

Operations to accomplish:

B. Make notes on map

Knowledge and skill required

1. How to record data properly

C. Study panoramic photos

Knowledge and skill required

1. How to find plus or minus angle
2. How to locate azimuth reading
3. How to find point by use of photo and readings

Job--Receive and Record Fire Report

Operations to accomplish:

A. Record report on lookout form

Knowledge and skill required

1. How to record on form
2. How to check for accuracy by repeating back
3. How to get all available information

B. Mark location on map

Knowledge and skill required

1. Know how to locate by legal description
2. Know how to check location with report

Division--Firechasing, continued

Job--Receive and Record Fire Report, continued

Operations to accomplish:

C. Check location on panoramic photo

Knowledge and skill required

1. Know how to compare with lookouts description

D. Plan and check route

Knowledge and skill required

1. Must know country to understand dispatcher's directions
2. Must know approximate time to get to fire
3. Must check plans and instructions so there will be no misunderstanding
4. Must plan to save time

Job--Travel to and Locate Fire

Operations to accomplish:

A. Check out with dispatcher

Knowledge and skill required

1. Must record time
2. Must know elapsed time standards

Division--Firechasing, continued

Job--Travel to and Locate Fire, continued

Operations to accomplish:

B. Pick up help as instructed

Knowledge and skill required

1. Know location of help at all times
2. Know how many men needed
3. Know that he cannot wait for help as he must go to fire
4. Know that reinforcement will follow if necessary

C. Determine and apply best method of finding fire from the following:

a. Map and protractor

Knowledge and skill required

1. How to orient protractor with meridian
2. How to use string for line of sight on azimuth reading
3. How to get distance by map scale

Division--Firechasing, continued

Job--Travel to and Locate Fire, continued

Operations to accomplish:

- C. Determine and apply best method of finding fire from the following, continued:

b. Compass

Knowledge and skill required

1. How to read north end of needle
2. Know declination and how to set
3. How to orient for azimuth reading
4. How to hold compass
5. How to run line, using trees or object for sight
6. Know how to get backsights
7. Know how to use brake to settle needle
8. Know how to correct for local attraction

c. Pacing

Knowledge and skill required

1. Know how to determine length of pace (two steps)
2. Know how to allow for slope
3. Know how to judge per cent slope
4. Know how to prepare pacing chart
5. Know importance of memorizing or having chart with fire outfit
6. Know how to tally



Division--Firechasing, continued

Job--Travel to and Locate Fire, continued

Operations to accomplish:

- C. Determine and apply best method of finding fire from the following, continued:

d. Getting on lookout's line of sight

Knowledge and skill required

1. Know how to convert azimuth to backsight
2. Know which way to go if backsight does not coincide with lookout
3. Know how to estimate distance to line of sight

e. Known points

Knowledge and skill required

1. How to locate the known point
2. How to plot fire or take compass shot from known point

f. Correlation of map location with ground

Knowledge and skill required

1. How to determine distance to line of sight from known point
2. Know that cannot see lookout
3. Must know country and correlate with map location

Division--Firechasing, continued

Job--Travel to and Locate Fire, continued

Operations to accomplish:

- C. Determine and apply best method of finding fire from the following, continued:

g. Two point intersection

Knowledge and skill required

1. How to locate his position from two known points by using protractor
2. How to get reading to fire from his position with protractor
3. How to determine distance to fire by map scale

h. Tangent offset

Knowledge and skill required

1. Must be able to see lookout
2. Know that the tangent at 1 mile is 92 feet for 1 degree
3. How to get distance from lookout

Division--Firechasing, continued

Job--Travel to and Locate Fire, continued

Operations to accomplish:

- C. Determine and apply best method of finding fire from the following, continued:

i. Gridironing

Knowledge and skill required

1. Know that fire is small
2. Know how to do job systematically
3. Know how to turn accurate right angles
4. Know how to completely cover area in vicinity of fire
5. Know that he may have to grid on both sides of line of sight

j. Arranged signals

Knowledge and skill required

1. Know meaning of bomb signals
2. Know meaning of rifle signals
3. Know to record time and origin of any signals heard

k. Know time or arrival at fire

Knowledge and skill required

1. Know that he must record arrival time before doing anything else
2. Realize the importance of fire records

Division--Fire Suppression (Small Fires)

Job--Initial Action

Operations to accomplish:

A. Select safe place for fireman's outfit

Knowledge and skill required

1. Know what a safe place is
2. Know how to mark location so it is easily found

B. Size up fire and look for evidence

Knowledge and skill required

1. Know local suppression policy
2. Know that he must go around the fire
3. Know that he must have a complete picture of all factors affecting spread and control
4. Know how to determine points where fire may get away
5. Know that spot fires are dangerous
6. Know fire behavior under different conditions

Division--Fire Suppression (Small Fires), continued

Job--Initial Action, continued

Operations to accomplish:

C. Plan attack

Knowledge and skill required

1. Know how to analyze his data
2. Know how to select point of attack
3. Know methods to use
4. Know tools to use
5. Know how many men to use

D. Control of fire

Knowledge and skill required

1. Know how to locate line
2. Know how to place men
3. Know requirements of fire line construction
4. Know safety measures to protect men
5. Know that time of control is important
6. Know that it is important to get trail around fire rapidly
7. Know that snags are prospective torches

Division--Fire Suppression (Small Fires), continued

Job--Initial Action, continued

Operations to accomplish:

E. Mop up fire

Knowledge and skill required

1. Know that fire is unsafe until dead out
2. Know how to use water and dirt
3. Know how to cold trail
4. Know that smoking snags are dangerous

F. Staying with fire

Knowledge and skill required

1. Know regional policy concerning leaving fires
2. Know how to determine damage
3. Know how to determine area of fire

G. Make out report

Knowledge and skill required

1. Know that complete data is required
2. Know that report must be made out at the scene of the fire
3. Know meaning of all terms used on report form

H. Reassemble fire fighting outfit

Knowledge and skill required

1. Know how to pack equipment
2. Know that all tools must be accounted for

Division--Fire Suppression (Small Fires), continued

Job--Initial Action, continued

Operations to accomplish:

I. Scout for other fires before leaving country

Knowledge and skill required

1. Know where to look for possible spot fires
2. Know how to adequately cover area in vicinity of fire

J. Report to dispatcher

Knowledge and skill required

1. Know the importance of report to headquarters when fire is out
2. Know that help may be needed on other fires

Job--Recondition Fire Equipment on Return from Fire

Operations to accomplish:

A. Check for shortages

Knowledge and skill required

1. Know that rations, first aid kits, and flashlight batteries must be kept at full strength
2. Must know each item of his outfit

Division--Fire Suppression (Small Fires), continued

Job--Recondition Fire Equipment on Return from Fire,  
continued

Operations to accomplish:

B. Care of fire tools

Knowledge and skill required

1. How to sharpen tools
2. How to make repairs

C. Reassemble equipment

Knowledge and skill required

1. Know importance of having outfit ready  
at all times

D. Order replacements

Knowledge and skill required

1. Know how to check to see that nothing  
is omitted
2. Know how to order replacements im-  
mediately on return from a fire



Division--Dispatcher

Job--Taking Reports and Dispatching Men

Operations to accomplish:

A. Taking lookout report

Knowledge and skill required

1. Know that report should be read back to avoid mistakes
2. Know that one fire should be reported at a time
3. Know that several reports from same station must be numbered for reference
4. Know how to control emotions

B. Plotting fire

Knowledge and skill required

1. Know how to plot on plotting board
2. Know how to plot cross shots for intersection
3. Know that he must mark location of fire on plotting map
4. Know that if in doubt call other lookouts for shots

C. Calculation of probabilities

Knowledge and skill required

1. Know fuel types and burning conditions
2. Know how to compute probabilities

Division--Dispatcher, continued

Job--Taking Reports and Dispatching Men, continued

Operations to accomplish:

D. Dispatching men

Knowledge and skill required

1. Know the district fire plan
2. Know how many and what men to send
3. Know the roads and trails
4. Know what route for men to take
5. Know what equipment and supplies to send
6. Know that men have complete directions and data
7. Know that constant check with lookouts on progress of fire is necessary
8. Know how to plan for reinforcements

E. Sending supplies and equipment

Knowledge and skill required

1. Know what equipment to send
2. Know food requirements per man day
3. Know that equipment and supplies must arrive at destination promptly
4. Know availability of equipment
5. Know location of supplies
6. Know how to get additional supplies if needed

Division--Dispatcher, continued

Job--Taking Reports and Dispatching Men, continued

Operations to accomplish:

F. Reassemble equipment

Knowledge and skill required

1. Know how to check with standard list
2. Know that shortages must be replaced
3. Know that tools must be reconditioned
4. Know that replacements must go to  
stations promptly
5. Know how to keep record of lost and  
damaged property
6. Know how to order replacements

G. Make reports

Knowledge and skill required

1. Know how to assemble data and make  
complete fire report
2. Know how to make 10-day fire reports
3. Know how to record and file all  
pertinent fire data

Position--Foreman

Division--Trail Construction and Maintenance

Job--Organization and Supervision

Operations to accomplish:

A. Assembling equipment

Knowledge and skill required

1. Know what and how much to take of--  
maps and forms, tools, mess equipment,  
tentage, bedding, food, fire tools,  
personal equipment
2. Know that a first aid kit is necessary
3. Know that a radio or telephone set  
should go
4. Know how many pack animals required,  
if he has to pack equipment
5. Know that all equipment must be charged  
out and checked in again

B. Pack equipment

Knowledge and skill required

1. Know how to handle pack stock
2. Know how to prepare equipment for  
packing
3. Know how to pack animals
4. Know how much grain to take

Division--Trail Construction and Maintenance, continued

Job--Organization and Supervision, continued

Operations to accomplish:

C. Location of Camps

Knowledge and skill required

1. Know how to locate for convenience, water, and stock feed
2. Know how to locate to avoid excessive walking to the job
3. Know sanitary precautions for camps

D. Planning the work

Knowledge and skill required

1. Know how to place men to best advantage
2. Know which parts to do first
3. Know proper tools to use

E. Supervising the work

Knowledge and skill required

1. Know how to handle men
2. Know how to give training on job
3. Know how to secure good work
4. Know safety measures

Division--Trail Construction and Maintenance, continued

Job--Organization and Supervision, continued

Operations to accomplish:

F. Keeping records

Knowledge and skill required

1. Know how to keep time
2. Know how to make construction reports
3. Know how to make maintenance reports
4. Know how to keep cost records and board records
5. Know how to make trail log report
6. Know how to use radio or portable telephone
7. Know how to keep diary and what to enter
8. Know how to make out injury reports

G. Fire organization

Knowledge and skill required

1. Know that crew will be subject to fire duty
2. Know how to organize crew into fire fighting unit
3. Know how to handle crew on fire
4. Know to report in case of lightning storm
5. Know how to keep fire equipment ready for immediate use

Division--Trail Construction and Maintenance, continued

Job--Organization and Supervision, continued

Operations to accomplish:

H. Know Forest Service policy

Knowledge and skill required

1. Know needs for way and secondary trails
2. Know that progress of work depends on funds
3. Know that high degree of accuracy not required
4. Know maintenance policy
5. Know that crew must be fire fighters

Job--Trail Location

Operations to accomplish:

A. Reconnaissance

Knowledge and skill required

1. Know how to judge topographical features
2. Know how to judge on fire control basis
3. Know how to obtain physical factors
4. Know where to locate control points
5. Know how to use the Abney level
6. Know how to use the Aneroid barometer
7. Know how to prepare cost estimates

Division--Trail Construction and Maintenance, continued

Job--Trail Location, continued

Operations to accomplish:

B. Final location

Knowledge and skill required

1. Know established control points
2. Know how to mark grade with stakes
3. Know how to blaze location
4. Know grade specifications

Job--Construction

Operations to accomplish:

A. Clearing right of way

Knowledge and skill required

1. Know width and overhead clearance requirements
2. Know how to cut stumps
3. Know when to blast stumps
4. Know how to dispose of brush
5. Know how to use powder



Division--Trail Construction and Maintenance, continued

Job--Construction, continued

Operations to accomplish:

B. Grade construction

Knowledge and skill required

1. Know tread requirements for all classes
2. Know clearance requirements
3. Know width for different slopes
4. Know methods to use on rock slides,  
switch backs, and steep cliffs

C. Drainage of grade

Knowledge and skill required

1. Know how and where to make open ditches
2. Know how and where to install waterlogs
3. Know how and where to install culverts

D. Corduroy work

Knowledge and skill required

1. Know that it is best to try to avoid  
wet spots
2. Know how to consider draining marshy  
spots
3. Know how to construct corduroy

Division--Trail Construction and Maintenance, continued

Job--Construction, continued

Operations to accomplish:

E. Bridge construction

Knowledge and skill required

1. Know policy of avoiding bridges if a ford is possible
2. Know the chief points in location and construction of bridges
3. Know that must have a minimum span for following--stable abutments, ample clearance above water, place where stream is straight, proper size stringers, suitable foundations, preservative on joints
4. Know how to use construction plan and drawings of stringer and truss types

Division--Trail Construction and Maintenance, continued

Job--Trail Marking

Operations to accomplish:

A. Use of blazes

Knowledge and skill required

1. Know policy of using blazes
2. Know standard blaze pattern
3. Know size to make
4. Know proper location for blaze
5. Know how to make blaze, depth, and  
visibility

B. Use of signs

Knowledge and skill required

1. Know sign policy of forest
2. Know proper location for signs
3. Know kind of post to use
4. Know how to set post
5. Know how to prepare metal signs

Division--Trail Construction and Maintenance, continued

Job--Maintenance Work

Operations to accomplish:

A. Knowledge of policy

Knowledge and skill required

1. Know the needs
2. Know maintenance standards
3. Know three main classifications--  
emergency, ordinary, and extraordinary
4. Know that planning work must correlate  
with fire control
5. Understand relocation policy

B. Actual maintenance

Knowledge and skill required

1. Procedure similar to construction  
Covered under construction

APPENDIX B  
INSTRUCTIONS

	Page
Instructions on How to Study	76
Instructions on How to Prepare Lesson Sheets	77
Course Introduction	78

## UNITED STATES FOREST SERVICE

## Extension Training

## HOW TO STUDY

1. Have a good place to study available, with proper light, and all equipment handy.
2. Have a study system and budget your time.
3. Adhere to your time schedule.
4. Learn how to concentrate by pushing distractions aside.
5. Recognize the consequences of poor work and the rewards of good work.
6. Make your work specific and definite.
7. Keep in good physical trim as you will do much better with your lessons.

To learn to study necessarily means to know how to think, to observe, to concentrate, to analyze, and to organize.

## UNITED STATES FOREST SERVICE

## Extension Training

## HOW TO PREPARE ANSWER SHEETS

1. Be sure to have your name, course name, lesson number, date, and time required to work the lesson in upper right hand corner of the first lesson sheet in the order given.
2. Have your name on each sheet you fill out.
3. Use white typing paper size 8½" x 11" and write plainly on one side of the paper only.
4. Leave a left hand margin of two inches for instructor's corrections.
5. Work your assignment carefully.
6. Make your answers long enough to show your instructor that you know the subject.
7. Return lessons promptly in the stamped envelopes sent you.
8. Do not hesitate to ask your instructor for help on assigned material not clear to you.

UNITED STATES FOREST SERVICE  
Extension Course in Detection

INTRODUCTION

Purpose

The purpose of this course is to give initial training in the different phases of detection in order that the guard may be able to handle the position of lookout satisfactorily.

Number of Lessons and Approximate Time Required

This course consists of the following lessons:

1. Operation and Care of Firefinder
2. Examination of Country for Smoke
3. Progress of Lightning Storms
4. Locate and Report Fires and Give Progress Report

The approximate time for the course is twelve hours.



APPENDIX C  
SAMPLE FORMS

	Page
Lesson Assignment Sheets	
Course--Detection	
Lesson Number 1	79
Lesson Number 2	81
Lesson Number R	83
Lesson Number 3	85
Lesson Number 4	87
Examination Sheets	
Course--Detection	
Final Examination	90
Student's Answer Sheets	
Course--Detection	
Lesson Number 1	93
Extension Training Record Sheet	
Record of John Doe	95

U. S. FOREST SERVICE  
EXTENSION COURSE  
FIRE GUARD POSITION  
LESSON ASSIGNMENT SHEET

Course	Detection
Lesson No. 1	Operation and Care of Firefinder
Estimated Time	3 hours
Assignment	Guard Handbook pp. 52-59 Lookout Manual pp. 15-52
Materials Required	None
Maximum Weight	100
Suggestions	None

Exercise  
Weight

- 20 1. List the six main steps in setting up a firefinder and explain each.
- 10 2. Explain the use of the alidade in sighting a fire and getting the plus vertical angle.
- 20 3. Show by a diagram similar to Figure 6, page 27, L. M. the correct reading for azimuth  $185^{\circ} 46'$ .
- 5 4. Tell how you can learn the country with the aid of the firefinder.
- 10 5. What is a topographic map and why is it useful?

- 5     6. How do we determine distances from known landmarks?
- 5     7. How is the f.f. tape used to determine distance?
- 10    8. Explain how you would use the f.f. to determine the width of a large fire several miles from your lookout.
- 10    9. Explain how you would use a panoramic picture to locate a fire.
- 5     10. Give the rules for the care of the firefinder.

U. S. FOREST SERVICE  
EXTENSION COURSE  
FIRE GUARD POSITION  
LESSON ASSIGNMENT SHEET

Course	Detection
Lesson No. 2	Examination of Country for Smoke
Estimated Time	2 hours
Assignment	Guard Handbook pp. 52-59 Part 7 Supplement Lookout Manual pp. 36-37 and p. 50
Materials Required	None
Maximum Weight	100
Suggestions	None

Exercise  
Weight

- 10 1. How would you scrutinize your territory?
- 10 2. Why is it necessary to study some portions more carefully than others?
- 10 3. Explain the systematic check look and tell why it is so important.
- 10 4. What are legitimate and false smokes?  
Why should we mark them on the map?
- 10 5. What data is necessary on a false smoke record form?

- 10 6. What are the working hours for a lookout?
- 10 7. Why is it important to report progress of going fires to the dispatcher?
- 10 8. What are sleeper fires and why is it important to search for them?
- 20 9. Suppose you have a severe lightning storm at night and the strikes come too fast for fire-finder shots. What is the correct procedure in the above situation?

## U. S. FOREST SERVICE

## EXTENSION COURSE

## FIRE GUARD POSITION

## REVIEW LESSON SHEET

Course	Detection
Lesson No. R	The Firefinder
Estimated Time	1 hour
Assignment	None
Materials Required	None
Suggestions	Try to work without reference to texts
Maximum Weight	100

Exercise  
Height

- 5    1. Why is the 360 mark at the south side of the firefinder?
- 10   2. What is the azimuth reading for a fire SW of the lookout?
- 10   3. Distinguish between horizontal and vertical angle.
- 10   4. Show by two labeled diagrams, where to place the spirit level in leveling the firefinder.
- 10   5. What is the tangent offset of a  $2^{\circ}$  angle at four miles?

- 20      6. Using Figure 10, page 35, L. M. name the following parts: L, U, E, N, M, P, H, J, D, and C.
- 15      7. Diagram the firefinder circle and label the Cardinal points with the proper degrees.
- 5        8. Which sight is called the rear sight?
- 10      9. If your map scale is  $\frac{1}{2}$  inch per mile and the tape distance to a fire is  $4 \frac{1}{32}$  inches, how many miles to the fire?
- 5        10. Why hold the eye as far down on the slot as possible?

U. S. FOREST SERVICE  
EXTENSION COURSE  
FIRE GUARD POSITION  
LESSON ASSIGNMENT SHEET

Course	Detection
Lesson No. 3	Progress of Lightning Storms
Estimated Time	2 hours
Assignment	Guard Handbook pp. 54-56 Lookout Manual p. 40, pp. 51-52
Materials Required	Lightning report form 1100
Maximum Weight	100
Suggestions	Study pictures of cloud formations in a good dictionary or science text.

Exercise  
Weight

- 5 1. Why is it so important to observe all cloud formations however small?
- 10 2. If sound travels 1200 feet per second, how can you complete the distance from your station to the storm?
- 20 3. What safety precautions would you observe during a severe lightning storm over your lookout?



- 10     4. Why is it so necessary to keep the dispatcher informed on the storm?
- 10     5. What do you tell him about the storm?
- 5       6. How do you record strikes on the map?
- 20     7. Fill out the enclosed form 1100 in full for an assumed lightning storm.
- 5       8. Do all direct lightning strikes to ground start fires? Why?
- 5       9. When are "mental notes" taken on lightning strikes?
- 10     10. You are out posting trail signs four miles by trail from your station and you see a lightning storm approaching. What would you do?

U. S. FOREST SERVICE  
EXTENSION COURSE  
FIRE GUARD POSITION  
LESSON ASSIGNMENT SHEET

Course	Detection
Lesson No. 4	Locate, Report, and Give Progress Reports on Going Fires
Estimated Time	3 hours
Assignment	Guard Handbook pp. 42-44, p. 59 Lookout Manual pp. 26-29, pp. 40-50
Materials Required	Lookout report form, Mt. Hood Forest Map $\frac{1}{4}$ in.
Maximum Weight	100
Suggestions	None

Exercise  
Weight

- 5 1. Give the steps, in proper order, in locating a fire with the firefinder.
- 5 2. Why are local landmarks important aids in locating fires?
- 5 3. Why are speed and accuracy important in reporting a fire?

- 5     4. What terms are used to describe "volume, character, and color of smoke"?
- 5     5. What terms are used to explain "type of forest"?
- 25    6. You are the Mt. Wilson lookout and sight a fire due east of you near the top of a ridge (300 yards). The fire is on the west slope of the ridge and is in a dead snag which is in sparse second growth Douglas fir timber. The fire is a lightning strike and the steel tape distance is  $2 \frac{5}{6}$  miles. Fill out the lookout report form from the above data. Use standard elapsed time values where needed.
- 5     7. Give the proper procedure used in reporting the fire.
- 5     8. Two hours later, this fire is smoking up badly. What will you do? What items will the dispatcher be interested in?
- 5     9. What kind of record do you keep of this going fire?
- 5     10. Two men were dispatched from Clackamas Lake to this fire, five minutes after you reported it. When should they arrive at the fire? Explain.
- 5     11. Locate Twp 3 S, R 5 W, W.M. by means of a diagram.

- 5 12. Give the legal description of Oak Grove Bu.  
(Found on the forest map)
- 10 13. Locate the following tract of land by means  
of a diagram NE  $\frac{1}{4}$ , SW  $\frac{1}{4}$ , NW  $\frac{1}{4}$  Sec. 12, Twp 4 N,  
R 3 E, W.M. How many acres in the tract?
- 5 14. What is the approximate latitude and longitude  
of Mt. Wilson?
- 5 15. Find the distance in miles from the center of  
Section 11 to the center of Section 26 of a  
township.

## U. S. FOREST SERVICE

## EXTENSION COURSE

## FIRE GUARD POSITION

## EXAMINATION SHEET

Course	Detection
Estimated Time	2 hours
Materials Required	Mt. Hood Map $\frac{1}{4}$ in. Lookout report form. Small protractor
Maximum weight	100
Suggestions	Use no references for this exam except the materials listed above

Exercise  
Weight

- 5 1. List, in order, six general rules for setting up any firefinder.
- 10 2. How would you orient a firefinder with an established lookout by the mirror flash method?
- 5 3. Explain, in proper order, the procedure in "shooting" a fire due east of you and at a lower elevation.
- 15 4. You are asked to determine the size of a going fire by the dispatcher. Your f.f. map scale is  $\frac{1}{2}$  in. = 1 mile and the azimuth on one side of

the fire is  $90^{\circ} 20'$  and at the other edge the reading is  $91^{\circ} 15'$ . The distance to the fire by the tape is  $4\frac{1}{2}$  inches. How wide is the fire?

- 10     5. Give three examples each of legitimate and false smokes. How are they recorded?
- 5       6. What are sleeper fires?
- 5       7. Show by means of a problem, how to estimate distance to a lightning storm.
- 5       8. Give safety rules to observe during lightning storms (a) If in lookout (b) If out-of-doors.
- 5       9. What items should be reported to the dispatcher concerning approaching lightning storms?
- 5       10. What is the lookouts procedure in handling a series of strikes?
- 20     11. You are the lookout on Si Si Bu. (Elevation 5600 feet) and observe a fire burning on the west slope of the small Bu. (Elevation 4527 feet) about 1 mile south of Lemiti Bu. The fire is burning in lodgepole pine and the base is sighted. You observe the fire at 1:26 P. M. July 3rd and it shows up during an electrical storm. Fill out the Lookout report as completely as possible from the data supplied. (Compute approximate readings for f.f.)

- 10 12. Using standard elapsed time values estimate the time required for a fireman to start initial attack on the fire if he is stationed at Olallie Lake G. S.

John Doe

Detection

Lesson 1

Feb. 10, 1941

3½ hours

I

1. Have a firm solid base upon which the instrument is to be placed. It must be firmly attached to the floor so that the firefinder cannot be thrown out of adjustment by any movement of the base.
2. See that the base map is in proper position corresponding to the azimuth circle. The lookout position is at the exact center of the map and a true N - S line through this point must coincide with the straight line from 0 to 180 on the azimuth circle. The north end of the N - S line is next to the front sight.
3. It must be oriented to true north. Have a nearby lookout, who is oriented, sight on your mirror flash and convert to backsight and add, 9 feet per mile of departure or distance E - W between lookouts. Then the azimuth reading is set at the backsight and revolve entire upper plate until his sight cuts the oriented lookout. Clamp in place and it is oriented.
4. Level the instrument. Use the small spirit level on the graduated rim of the firefinder parallel to the



John Doe

## Lesson 1

line joining two opposite leveling screws and level with the thumb screws, do this in the other position for the other screws and recheck until it is absolutely level.

5. Check the sights for plumb.

Hang a weighted thread in the building and sight it through the bottom of rear sight. If it does not coincide with the hair the front sight needs adjusting. Then sight on small object and raise eye slowly from bottom to top of rear sight. If small point or object moves away the rear sight needs adjusting.

6. Provision for dodging obstructions. The majority of instruments are mounted on parallel tracks so they slide in opposite directions to avoid obstructions.

## II

Etc.

## EXTENSION TRAINING RECORD

Name John DoeExperience 0 yrs.P.O. Address Oregon City, Ore. R.F.D. #5

## Course--

Detection

	<u>Mailed</u>	<u>Returned</u>	<u>Checked</u>	<u>Mailed</u>	<u>Grade</u>	<u>Time</u>
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Final Grade 89\*

Lesson 1	2/4/41	2/10/41	2/12/41	2/13/41	94	3½
Lesson 2	2/13	2/10	2/17	2/20	86	2
Lesson R	2/20	2/26	2/27	3/2	90	1½
Lesson 3	3/2	3/10	3/12	3/15	87	2½
Lesson 4	3/15	3/18	3/19	3/20	92	3
Exam	3/20	3/25	3/26	3/27	88	2½ 15

## Course--

P.R. &amp; Law

Final Grade 86

Lesson 1	3/27/41	3/30/41	4/2/41	4/3/41	84	3
Lesson 2	4/3	4/10	4/11	4/12	82	3
Lesson R	4/12	4/16	4/16	4/16	85	2
Exam	4/16	4/24	4/24	4/24	90	2 10

## Course--

Firechasing

Final Grade     

Lesson 1

Etc.

Etc.

\* Course Exam counts 1/3 of final grade.

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