

Minnesota Forest Service

WM. T. COX, *Forester*

Manual of Instructions for Forest Officers



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Note

In compliance with a provision of the State Forest Law, requiring the publication and distribution of general instructions, this "Manual of Instructions" is issued.

It is the aim of this Manual to briefly indicate the forest policy of the State and it is for the use of the officers in the field. Instructions to cover every emergency that the Ranger or Patrolman will have to meet cannot of course be given, but the policy here outlined should lead to a more hearty co-operation between the field force and the public, and result in a more uniform enforcement of the law and a greater efficiency in fire protection work.

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State Forester.

**MEMBERS OF THE MINNESOTA STATE
FORESTRY BOARD.**

Z. D. Scott, President.....Duluth
E. G. Cheyney.....St. Anthony Park
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OFFICE OF THE FORESTER.

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PREVENTION, CONTROL AND SUPPRESSION OF FOREST FIRES.

INTRODUCTION.

The forests of Minnesota cover 28,000,000 acres, of which approximately 15,000,000 acres will always remain in forest. The balance, 13,000,000 acres, is agricultural land, the greater portion of which is at the present time bearing an enormous quantity of valuable merchantable timber. To conserve the permanent forest and to put it into the best condition for maintaining and producing a permanent timber supply, is the chief purpose of the Minnesota Forest Service. Another equally important duty is the husbanding and profitable exploitation of valuable timber at present growing on land which is rapidly being cleared for agricultural purposes. The economical and profitable exploitation of these timber products will have a marked influence in shaping the further development of the State.

The Minnesota Forest Service is a specific organization, composed of the State Forester, an Assistant State Forester, Inspectors, District Rangers, State, Federal and Township Patrolmen, National Forest Officers as special rangers, and the co-operative Indian reservation patrolmen. Working in co-operation with this organization and more or less directly under its supervision is a subsidiary force comprised of

Purpose of
Minnesota
Forest
Service.

Forested
area of
Minnesota.

Organization.

patrolmen furnished by railroads and timber-cutting corporations.

By past experience it has been shown that this subsidiary force is capable of rendering very effective service. It has also, when occasions demanded, been considerably increased in numbers and consequently in fire fighting efficiency. To these forces can be added the officers of towns, villages, and cities in the timbered area. These officials are required by the Forest Law (Section 24) to exert every effort to decrease the fire danger.

DISTRICTS—BOUNDARIES.

Who Is Responsible For Districts.

With the authority of, and in compliance with, Section 10 of the Forest Law, the Forester has divided the timbered part of Minnesota into Ranger districts. In charge of each district is placed a District Ranger who is responsible for the administration of the affairs of his district, and all work pertaining thereto is carried on under his supervision.

Districts—How Bounded.

Necessarily these districts are bounded on one or more sides by other Ranger Districts, and in order to prevent confusion, or needless repetition of orders, Rangers will carefully consider any work that affects each district and occurs immediately along these boundaries. No action should be taken or work performed by a Ranger or his Patrolman along a district boundary without previous consultation or correspondence with the Ranger of the adjoining district.

Ranger
responsible
for district.

To consult
with adjoining
Rangers.

Matters Affecting Two or More Districts.

The following matters affecting two or more districts will be found to be of frequent occurrence:

- a. Fighting fire.
- b. Issue of slash disposal notices—Slash disposal by lumbermen.
- c. Road and ditch work.
- d. Railroad patrolmen and the date of their assignment.
- e. Improvement work.
- f. Changes in district boundaries.

In the event of the occurrence of a fire requiring extra help to extinguish, in the vicinity of a district boundary, the Ranger receiving notification of such fire will immediately take all steps necessary for its extinguishment. He will notify the adjoining Ranger by the quickest means at his disposal of the action he has taken, and the location of the fire. Without this procedure it is possible that the same fire may be reported to the two Rangers, in or near whose districts such fire is discovered, and they may each dispatch a fire fighting crew. With the adoption of the system of notification, this needless expense will be avoided.

Particular attention must be paid by Rangers to this branch of their work. Slash disposal notices containing instructions for logging operations in adjoining districts, where like conditions prevail, such operations being conducted by several operators, require that a similar method of slash disposal be specified by the Rangers concerned. Where a logging operation is being conducted in two or more

Fighting fire.

Notify the
adjoining
Ranger of
fires in his
district.

Issue of slash
disposal
notices.

Uniform system of slash disposal in adjoining districts.

districts, the Rangers concerned will get together and decide on the method or methods of brush disposal to be adopted, and upon one of them, preferably the Ranger in whose district the camp or camps are situated, shall fall the duty of issuing brush disposal notices, covering the whole operation.

This work is usually performed by contractors, and paid from Township, County or State funds. The contracts as a rule stipulate that the brush disposal must be performed in accordance with the provisions of the Forest Law, and that such work must have the approval of the District Ranger. Previous arrangements must be made by Rangers concerned, in order that one of them shall supervise the road and ditch work along a particular boundary, and that the work around any district shall not fall on any one Ranger, but shall be divided as equally as possible between the districts concerned.

The assigning of railroad patrolmen, the date of such assignment, and the designation of their beats is on many railroads the duty of the roadmaster, acting under the instructions of the Divisional Superintendent. Most divisions of railroads are in more than one district. Frequently a railroad patrolman's beat will extend into two Ranger districts. Under these circumstances, the Ranger in whose district is situated the headquarters of the railroad patrolman should attend to any reports or other matters relative to the railroad patrolman's work, that are required of the Ranger.

The question of the date of assigning rail-

road patrolmen to their beats and the details of their work should be previously decided on by the Rangers interested, and one of them delegated to confer with the roadmaster or other railroad official concerned.

Before the construction of lookout towers, trails and telephone lines, near district boundaries, is commenced, their location, cost, etc., should be decided on by the Rangers in or adjoining whose districts such work is contemplated.

This applies particularly to the erection of lookout towers. When the location of any tower has been decided on at a meeting of the Rangers interested, and such tower is located at or near the boundary line, arrangements should be made regarding the future care and upkeep of this tower. It may be so situated in one Ranger district that, owing to the layout of roads or trails, it is more readily accessible from the adjoining Ranger district. In such cases, it is practical economy for the Ranger of the latter district to take care of and utilize such lookout tower, and previous arrangement should be made accordingly.

With the building of new roads, consequent upon the development of the country, it will sometimes happen that a change in the boundaries of Ranger districts is advisable and advantageous. Where such a condition exists, Rangers interested should submit a joint report and map to the Forester, showing the proposed changes, and the resultant benefits. When the interests of the districts concerned will be better served by making the proposed changes, the Forester may approve the suggested alterations.

Improvement work.

Towers, telephones and trails.

Changes in District boundaries.

When changes are for the best interests of the Districts concerned.

Road and Ditch work.

Previous arrangements should be made.

Railroad patrolman's beat in two districts.

DISTRICT RANGERS.

Appointment of Rangers.

Promotion of
patrolmen.

For the purpose of encouraging capable men to enter the service and do good work, as well as to utilize their experience, appointments to the position of Ranger will be made by the Forester by the promotion of patrolmen who have proven their trustworthiness and ability. If any vacancies for patrolmen occur, such positions will be filled by the successful applicants at the patrolmen's examination, in order of merit.

Rangers' Salaries.

Salary.

Rangers will be paid a minimum wage of ninety dollars per month and traveling expenses (hereinafter described). Any increase in the salary will be left to the discretion of the Forester. Each Ranger shall be paid his salary monthly. The time from which his salary shall take effect will be the date shown on the Forest Officer's Commission, issued and signed by the State Forester.

When
effective.

Rangers' Duties.

General
duties.

Under the direction of the State Forester, the District Rangers are charged with preventing and extinguishing forest fires in their respective districts, and the performance of such other duties as may be required by the State Forester.

May employ
Patrolmen.

At any time, District Rangers, with the approval of the State Forester, may employ suitable persons, to be known as Forest Patrolmen. They are to remain upon and patrol such territory as may be assigned to them, as long as may be required to prevent and ex-

tinguish any fire. Each such patrolman so employed shall be supplied with the necessary equipment.

The State Forester and the District Ranger may, and if they are absent and fires are actually burning in the forest, the Forest Patrolmen may summon any male person of the age of eighteen years and upwards to assist in stopping the fire.

May summon
assistance.

The rate of pay for temporary labor must not exceed twenty-five cents per hour, the laborer providing his own board. In the event of the Forest Service providing board, allowance must be made in the rate of pay, which should not exceed twenty cents per hour.

Temporary
labor.

Forest officers may arrest without warrant any person found violating any provision of the Forest Law, take him before a magistrate, and there make complaint. When the District Rangers shall have information that such violation has been committed, they shall without delay make similar complaint and have the offender arrested, preferably by a peace officer. It shall then be the duty of the Ranger to see that the offender is prosecuted.

May arrest
without
warrant.

At the commencement of the patrolman's duty, the Ranger is responsible that each patrolman is furnished with the necessary equipment and general instructions defining his work. Special instructions covering improvement work should be issued as occasion requires.

Ranger to is-
sue instruc-
tions and
furnish equip-
ment to
Patrolmen.

The names, postoffice addresses, and the exact location of the headquarters of each patrolman must be furnished by the Ranger to the Forester, as soon as a man is assigned to

Patrolmen's
addresses.

his district. The Ranger should keep this information on file in his office, noting any alterations that may take place from time to time, and he should immediately inform the Forester in writing of any such alterations and their nature.

Issuance of slash disposal notices.

Ranger may authorize patrolmen-at-large to issue slash notices.

Rangers are expected, as far as possible, to personally issue slash disposal notices to lumbermen, cedar operators, contractors clearing rights-of-way and others who are cutting timber for any purpose. In some districts, owing to their large area and the numerous operations therein, it has been found impossible for the Ranger to personally issue all the requisite disposal notices. When this condition exists, the Ranger may authorize his patrolman-at-large to sign and issue slash disposal notices to the smaller operators, using the Ranger's signature, the patrolman writing immediately below this signature the word "By" and his (the patrolman's) initials.

Example: John Moore, Ranger.

By F. B.

Duties as Game Wardens.

If a Ranger or patrolman has reason to believe there is a violation of the game law, he should, instead of incurring expense, ascertain the facts and immediately notify the nearest Game Warden in writing, so that he can attend to the matter. Rangers or patrolmen are not to make any expenditures on account of game protection except in extraordinary cases, and in Itasca Park. Rangers will assist in stocking lakes and streams with fish. Rangers will report all matters of importance which come to their notice regarding game, fish, fur-bearing animals, and bird life, and in other ways assist in preserving the wild life of the State.

No person while holding any official position with the Minnesota Forest Service shall be employed as cruiser or claim locator or engage in other work for private parties without permission from the Forester.

Double employment.

With a Ranger in the course of his duty on field work finds it necessary to be absent from his headquarters for several days, he should leave with a responsible person some particulars of his whereabouts, so that in the event of his being required at his headquarters he can be located with the least loss of time. Arrangements should also be made so that any mail addressed to the Ranger in his official capacity can be delivered to a duly authorized person in the absence of the Ranger. Instructions should also be left for the proper care and recording of any service telephone and telegraph messages that may be received during his absence.

Absence of Ranger from headquarters.

Owing to the diversified conditions prevailing throughout the Ranger districts, it is possible that the field force may be confronted with situations which are not taken care of in these instructions. Under these circumstances, unless the matter is extremely urgent, the Ranger is advised to submit the matter to the Forester for his consideration and advice. If, however, the situation is such that it requires immediate attention, the field officer must act in accordance with his best judgment, carefully recording his actions and their results, and as early as possible report in detail to the Forester. Patrolmen are instructed under circumstances of a like nature to make their report to the Ranger in charge of their districts.

Duties of
field force
summarized.

The duties of the field force are three-fold: To classify the land with a view to assisting in its economic development. To secure for the people of this State a perpetual timber supply. To encourage any legitimate and progressive enterprise that will tend toward general development. Forest officers, therefore, are servants of the people. They must realize that a large proportion of law violators are such through ignorance or misunderstanding. With this fact in mind, forest officers must answer all inquiries concerning the Forest Law or the methods of the service fully and cheerfully. Their object should be to prevent unintentional violations rather than to have to punish them. Any correspondence forest officers have with the public, relative to their work, should be prompt and courteous. In no case should officers allow personal matters to affect their judgment in the fulfillment of their duties.

Rangers' Expenses.

Who may
incur
expense.

No person except the Ranger, patrolman, or other employees of the Forest Service shall incur expenses chargeable to the service in any Ranger district, and all expenses incurred by forest officers must be duly authorized and approved before payment is made.

When
allowed.

Traveling expenses are those ordinarily incurred when traveling on official business, and include transportation charges, such as railroad, ferry and livery hire, meals and lodging. The Ranger must study to keep his expenses as low as consistent with effective work.

When not
allowed.

No expenses are allowed a Ranger for maintenance when he is at his headquarters. No expenses will be allowed which are incurred

while on leave of any nature whatsoever, or while traveling from official headquarters to destination where such leave is to be taken.

Headquarters expenses may be construed to embrace, unless specifically limited in letters of authorization, any or all of the following items of expenditure, viz.:

Headquarters
expenses
defined.

1. Express charges on Service property, freight and drayage.

2. Postage on official correspondence and registration fees. (Stamps should be purchased one dollar's worth or more at a time, and a receipt taken on a sub-voucher.)

3. Necessary repairs to Service property.

4. Telephone and telegraph expense for messages on official business.

5. Such articles, as stationery, that may be actually needed and are not furnished directly from the Forester's office.

In making out expense accounts or sub-vouchers for expenditures for stationery, the price and description of articles purchased must be given in detail.

Forest officers will be reimbursed for expenditures submitted on any form of receipt signed by the person or duly authorized agent to whom payment has been made, but regular sub-vouchers should be used whenever possible.

Any properly
signed
receipt
valid.

A signed receipt must be taken for all amounts of one dollar or more. Vouchers for the receipt of railroad fares must bear the signature of the railroad official from whom the ticket was obtained, and if possible the official stamp of the railroad company; this, however, is not obligatory.

Sub-vouchers.

Sub-vouchers for livery.

Sub-vouchers for livery should show the name of the place where the expenditure was incurred, the points visited, the distance traveled, and the rate per day.

Allowance for use of horses.

When horses are owned and used by Rangers or patrolmen in the official performance of their duties, an allowance of one-half the cost of their keep will be made by the Service. This allowance will be made only for such time as the horse is actually used on Service work. In all cases where the use of a horse is desirable and an allowance is required, permission must be obtained from the Forester, and allowances will only be paid subject to his authorization. Arrangements must be made by and through the Ranger when patrolmen own horses for which they desire an allowance. It must be understood that Rangers and patrolmen use horses at their own risk. The Service cannot undertake to compensate any officer for any losses resulting from accident, sickness, or the unprofitable sale of a horse.

In the case of hotel bills, give the date and time of the first and last meals, or lodging, and the place where such expense was incurred.

Sub-vouchers must be numbered in the space provided, consecutively for the month in which they are issued, numbering the first voucher 1, and so on.

Stop overs.

All official travel must be performed by the most direct routes, and stop-overs should be avoided except when Service business renders a stop-over necessary, or under instructions from the Forester.

No unauthorized account will be considered

by the Forester, and no payment will be made for any claim submitted by any person or corporation when such claim is presented without official approval.

No payment account without official approval.

Rangers will carefully audit all bills for supplies, and make out an auditor's Voucher No. 2 for the total amount, attaching the itemized bill.

Audit bills for supplies.

When Rangers have interesting photographs pertaining to Service work, or can procure any pictures of this nature, and if such photographs can be used in any of the Service publications, or for lantern slides, the Forester may make an allowance for all pictures so used.

Photographs.

A Ranger may not exceed expenditure in excess of five hundred dollars in fire prevention, unless authorized to do so by the State Forester.

Ranger's expenditure not to exceed \$500 unless authorized.

When an expenditure in excess of five hundred dollars is rendered necessary, the Ranger must "wire" the Forester to this effect, and state the circumstances necessitating such an expenditure.

Records, Reports and Correspondence.

All official letters must be written on officially marked stationery, and the envelope must bear in the upper left-hand corner the name and headquarters of the Ranger by whom the letter was written.

Official correspondence.

Letters must be written on one side of the paper only, and in the upper left-hand corner must appear the subject of such letter. All correspondence to the head office must be addressed to the "Forester," State Capitol, St. Paul, Minn.

Treat each subject separately

In writing letters to the Forester, the Ranger must treat each subject in a separate letter.

Copies to be kept.

A carbon copy of each letter should be retained on file in the Ranger's office. Typewriters are recommended as furnishing an accurate and concise record of correspondence, but the use of them is not compulsory. File correspondence systematically, and be sure that you have an ample supply of Service stationery on hand.

Circular letters.

Circular letters from the Forester should be carefully filed and retained for ready reference, as it is necessary to frequently refer to them. It is highly important that each circular letter be carefully read immediately on receipt of same, so that no mistakes are made, such as would be likely to occur from a hasty perusal.

Franked envelopes.

The supply of franks and franked envelopes available under the co-operative agreement with the Federal Government is limited, and should only be used for correspondence in connection with the work of the federal patrolmen.

Ranger's expense account.

Attached to and accompanying auditor's Voucher No. 2 will be the itemized expense account and sub-vouchers for all amounts of one dollar or over. Especial attention must be paid to filling out pay vouchers, as in the event of error, the voucher will be returned to you for correction, probably causing a delay of one month before the check can be issued.

Patrolmen's vouchers.

State patrolmen will sign a No. 2 voucher, and the amount and expenses (if the latter are authorized) will be filled in and bear the signed approval of the Ranger.

All Rangers' approvals must be written in ink. Sub-vouchers should be written in ink, or indelible pencil.

Small pocket note-books should be used for keeping a daily record of expenses. All expenses should be carefully noted, as in the event of a Ranger's monthly expense account being lost before payment is made, he would then have a correct record from which to substantiate his claim for reimbursement.

Temporary laborer's vouchers must be receipted by the laborer, and have the signed approval of the Ranger.

When patrolmen are paid from the federal allowance, Rangers will make out a No. 2 voucher for the amount of the expense only, and forward this together with Form 1, Ranger's Report on Patrolman's Service, to reach the Forester's office by the 25th of each month.

The Ranger's diary, which must accompany his salary voucher, must show in detail the work for that day. It is not sufficient to state "in T. 15, R. 22." The diary should record, in addition to "in T. 15, R. 32," your particular reason for being there and what was accomplished. If you are unable to write all details in the "one day" space provided, use one or as many sheets as are necessary.

All salary or pay vouchers of Rangers, State patrolmen and temporary laborers must be prepared, signed and approved upon Auditor's Voucher No. 2. Rangers will not approve their own pay vouchers, since they are approved in the office of the Forester.

All vouchers must reach the Forester's office by the 25th day of each month. Rangers must

Daily record of expenses.

Temporary laborer; how paid.

Expense vouchers, Federal Patrolmen.

Ranger's diary.

Salary and pay vouchers.

Rangers must check over all vouchers.

bear this in mind and make arrangements to mail the vouchers in time. Rangers should keep on hand several No. 2 vouchers, signed by the State patrolmen in their district. By this method it will not be necessary for patrolmen to come to headquarters to sign their vouchers. Rangers must carefully check over all vouchers before forwarding them to the Forester. Vouchers must bear on the face of them in all cases the name and postoffice address of the person to whom the amount is payable.

where rubber stamps should be used.

Rubber name stamps, marked "District Ranger," name of headquarters, and with Rangers' names, are supplied to each district, and are to be used in correspondence, on sub-vouchers, requisition and property—transfer forms, envelopes, and salary vouchers,—in fact, in any place where their use will tend to neatness and system.

Where rubber stamps should not be used.

Where Rangers are signing for salaries or expenses on No. 2 Auditor's Voucher, or for any Rangers' signatures appearing at the end of letters or slash notices, or when approving temporary labor vouchers, the signatures must be written with ink or indelible pencil.

In order that mistakes in submitting vouchers and reports may be reduced to a minimum, the following table has been prepared, and a copy of it should be placed on the Ranger's desk and used as a reminder.

RANGER'S MEMORANDUM.

FOLLOWING TO REACH FORESTER'S OFFICE NOT LATER THAN 25th OF EACH MONTH: (In February not later than 23d.)

VOUCHERS for—

Ranger's salary and itemized expense with sub-vouchers for amounts of \$1.00 or more.

Patrolmen's salaries, receipted by patrolmen and approved by Ranger, accompanied by "Ranger's Report of Patrolmen's Services."

Temporary labor, receipted by laborer, giving address; filled out and approved by Ranger.

IF PAID THROUGH BANK, laborer makes assignment to bank: "I hereby assign this account to.....Bank. (Signed.....)"

Bank receipts "Auditor's Voucher No. 2" for full amount paid all laborers.

Ranger approves Auditor's Voucher No. 2.

Bank attaches "Temporary Labor Vouchers" to Auditor's Voucher No. 2 and transmits to Forester's office.

Bank paid by "Special" check from Forester's office.

IF PAID THROUGH FORESTER'S OFFICE, Ranger will submit vouchers on or before the 12th and 25th of each month.

Check will be issued to each laborer, either through State Treasurer's office or by "Special" check from Forester's office.

RANGER'S DIARY, showing detail of each day's work.

FOLLOWING TO REACH FORESTER'S OFFICE NOT LATER THAN 10th OF EACH MONTH: "Patrolmen's Time Sheets" (occupation) for preceding month. If patrol-

man's services are discontinued before end of month, "Time Sheet" must be submitted with his voucher.

FIRE REPORTS TO BE MAILED TO FORESTER'S OFFICE AS SOON AS REPORT CAN BE PROPERLY FILLED OUT.

Equipment.

Permanent property includes all equipment that is necessary to conduct the regular work of a district, such as fire fighting, reconnaissance, trail building, telephone, tower and cabin building. Included in the list of permanent property are: Tents, shovels, axes, mattocks, hoes, saws, hammers, pack-sacks, compasses, surveying instruments, badges, rubber "Service" stamps, velocipedes, padlocks, canoes, paddles, gasoline launches, adzes, scythes, camp outfits, climbers, cant-hooks, stencils, base maps, prints, marking stamps, record books, and Manual of Instructions.

Under the heading "expendable property" are included: Blank township plats, stationery, ink, pens, pencils, official forms, and postage stamps.

A complete record will be kept at the Forester's office at St. Paul of all permanent equipment that has been issued to or purchased by the field officers. This record will be supported by receipts signed by the members of the Service having custody of the property. Officers will only be relieved of responsibility for such property upon receipt of a proper transfer or a "property lost or damaged" form.

All Service equipment must bear the regulation mark of the Minnesota Forest Service;

such marks must be made so that they are conspicuous and not easily removed. Stencils and steel stamps are supplied for the purpose of marking equipment, and Rangers on receiving new equipment should immediately mark same.

All improvement work performed by the Service, such as the erection of lookout towers, telephone lines, and cabins, should bear a distinguishing mark, showing that such improvements have been constructed by and are the property of the Minnesota Forest Service.

Field officers are instructed to pay careful attention to the up-keep of all equipment issued to them. They should, as opportunity occurs, see to it that all property in their care is in perfect working order, ready at all times to be used for any emergency. Rangers will forward to the Forester's office, semi-annually, an inventory of the property charged to them, noting whether such property is serviceable or not. These inventories should reach the Forester's office the first week in January, and the first week in July. When any shortages appear in this inventory, the Ranger must report such shortage to the Forester.

Rangers and patrolmen should take every precaution when it is necessary to store Service equipment. They should see that the building wherein such equipment is placed can be securely fastened and is tight and dry. Before placing equipment in storage, a thorough overhauling is advisable. The following suggestions will show in a general way the principal points to be studied before storing equipment: Tents should be dried and repaired, axes sharp-

Marking equipment.

Marking permanent improvements

Care of equipment.

Storage of equipment.

Permanent property.

Expendable property.

Record of property.

ened and greased, shovels cleaned of rust and greased; canoes should be turned upside down and placed on racks; if it is necessary to paint or varnish canoes or launches, it should be done under proper conditions and before they are stored away. Gasoline engines should be cleaned, greased and covered. If speeders are not used during the winter months, they should be thoroughly cleaned, oiled and greased.

Borrowing
equipment.

When any equipment is borrowed from private corporations, such as lumber or railroad companies, by a forest officer, he should carefully check over such property. Make out duplicate lists, give one copy receipted by the Ranger to the duly authorized agent of the company to whom such property belongs, and keep the duplicate list yourself, signed by the company's agent.

Where companies are willing to extend this privilege, forest officers must be sure to return all property in good order, as soon as possible after the completion of their work.

Responsibil-
ity when
using private-
ly owned
towers.

When forest officers use as lookouts, privately owned structures such as water towers in towns and villages, railroad water and coal-ing stations, they should always secure permis-sion from duly authorized officials. Forest officers must assume responsibility and undertake all risks in connection with climbing any of these lookout towers.

Padlocks for
cabins, veloc-
ipedes and
storerooms.

A standard padlock has been approved by the Forester for general use on all Forest Service shelters or equipment requiring to be kept locked. These Service padlocks and a sufficient number of keys will be supplied on receipt of a "requisition" from the Ranger.

Rangers will issue to each patrolman in their districts a standard key and a record of this issue should be made on the patrolman's "property transfer." Particular care should be taken by Rangers that keys are returned by patrolmen at the completion of the latter's services. Rangers or patrolmen will be charged five (\$5.00) dollars for each key lost. This rule will be strictly enforced.

Rangers will make out in duplicate, Transfer of Property forms, listing carefully all equipment issued to a State or Federal patrolman. The patrolman will sign both forms, retaining one, and the Ranger keeping the duplicate in his office files. At the completion of the patrolman's services, or for any other reason that it is necessary for him to return any or all of his equipment, the Ranger will check off all articles returned on his "Transfer of Property" form. Careful note must be made of the condition of all property issued, and the same when such property is returned. If any property is rendered unserviceable by neglect or misuse or is lost, and no satisfactory explanation given, the cost of same shall be chargeable to the officer who has signed the receipt for such property.

Equipment
issued to a
State or Fed-
eral Patrol-
man.

Rangers are held responsible for the return of any equipment that may be issued by them to any township patrolman in their district. A Ranger should follow the same procedure as with State or Federal patrolmen; namely, secure duplicate receipts ("Transfer of Property," Form B), the township patrolman signing both, retaining one and the Ranger filing the other.

Issue of
Property to
Township
Patrolmen.

Property forms.

For use in connection with the maintenance of a correct property record, three forms are provided, namely:

Form A. Ranger's requisition.

Form B. Transfer of property.

Form D. Property lost or damaged.

When forms are to be used.

Form A is to be used when any property, both permanent and expendable, is required from the Forester's office. Care must be taken in filling out this form.

Form B (Transfer of Property) is to be used when permanent property is received by Rangers directly from the Forester's office, and by patrolmen when issued property by the Ranger.

Form D is used in the event of any equipment being lost or damaged beyond repair, the ranger or patrolman responsible for such equipment making the report.

How forms should be used.

The requisitions must be made in duplicate, and if practicable, be typewritten. The original requisition will be sent to the Forester and the duplicate will be retained and filed by the Ranger. In making requisition for supplies, explain fully all articles required, and if necessary, enclose a full explanation of any particular article at the same time.

The "Transfer of Property" forms must be made out in duplicate, one copy to be forwarded to the Forester and the other to be filed by the Ranger.

Property lost or damaged.

The property lost or damaged form must be made out in duplicate, one copy to be forwarded to the Forester and the other to be filed by the Ranger. A thorough and detailed explanation must be given for such loss or damage, and if the explanation shows the loss or damage to have been uncontrollable, the Forester

may relieve the officer concerned of the responsibility and consequent cost of such loss.

Instructions For "Property (Receipt) Transfer."

Permanent (non-expendable) equipment, if purchased:

THROUGH FORESTER'S OFFICE, by "Ranger's Requisition." Two invoices will be mailed to you. Check items received against invoice.

Fill out "PROPERTY TRANSFER" and attach one invoice, properly approved.

Transmit "Property Receipt" and approved invoice to Forester's office.

Keep other invoice for your own files.

LOCALLY, be sure that price is right. If included in your expense account, attach itemized account to sub-voucher, properly receipted. Fill out "Property Transfer" and transmit with your salary voucher. No item of property will be allowed in your expense account unless accompanied by "Property Transfer." If check is to be issued from Forester's office for equipment, have dealer attach invoice to "Auditor's Voucher No. 2." Ranger approves voucher and transmits to Forester's office with "Property Transfer."

If any items of permanent equipment are transferred to another Ranger, make "Property Transfer" in triplicate. Send all three to Ranger receiving. He will receipt all three, if O. K., and will mail the original to St. Paul office, keep duplicate and send triplicate to Ranger making the transfer. All parties concerned will thereby receive a copy of the "Property Transfer."

Leave of Absence.

Application
for leave.

Leave of absence may be granted to Rangers by the Forester. Application must be made in writing, requesting permission, and permits for leave must have the Forester's signed approval. All applications for leave of absence must give the proposed duration of such absence, the Ranger's postoffice address, and the name of the patrolman left in charge of the affairs of the district.

Leave with-
out pay.

If it is not detrimental to the best interests of his district, a Ranger may request permission for leave **without pay**, if he has private work which he wishes to perform.

Absence
without pay.

One-thirtieth of a monthly installment of salary will be deducted for every day's absence in any month where the absentee is not on a pay status during such absence. As an example, a Ranger on leave without pay from the 16th to the 31st, inclusive, of a 31-day month would receive fourteen-thirtieths of a monthly installment of salary, which at \$90 per month would represent \$42.

Private work.

When permission is granted by the Forester, in answer to a request by a Ranger for leave to perform private work, it is to be distinctly understood that no pay or expenses shall be allowed by the State during the continuance of such private work, and this must be of such a character as not to be detrimental to the Forest Service.

Legal holi-
days and
Sundays.

Rangers are considered on duty on all legal holidays and Sundays. Only in exceptional circumstances, however, are they expected to do any active work on these days.

In the event of a Ranger or patrolman being subpoenaed to serve as a witness in any

lawsuit, relative to damage caused by forest fires, his salary shall not be stopped during the continuance of the case, but no travelling expenses shall be allowed. The Ranger shall immediately notify the Forester of the date when he is subpoenaed, and the date he is released from service as a witness. He shall in his notification to the Forester give address of the place where he is serving, and the name of the patrolman left in charge of his district.

Work Outlined For the Year.

Subpoenae
for law suits.

A definite system both for field and office work must be planned and followed by the Rangers in the administration of their districts. The field work might be divided into four seasons, somewhat along the following lines:

Winter. Observing slash disposal work by loggers. Every effort should be made to foster a co-operative spirit with the lumbermen.

Spring. Observing completion of slash disposal. Particular care should be taken in order that persons or firms who conduct operations only during the winter months do not leave their brush disposal incomplete. When it appears that their intentions are to leave with the slash not taken care of, the Ranger should immediately take the necessary steps to enforce the law. Patrolmen should be instructed to carefully patrol their beats and get thoroughly acquainted with the existing conditions previous to the dangerous fire season. Fire warnings should be posted at this time. The work of organizing rural fire brigades, and any correspondence or interviews with township officers relative to the provision of a "fire fund" by levy of the five-mill tax, con-

Slash
disposal.

Patrolman
become
acquainted
with districts.

Improvement
and repair
work.

stitute other spring duties. Another important spring duty is a thorough overhauling of look-out towers, particularly wooden ones, with a view to rendering them absolutely safe. Telephone lines should be carefully tested, motor boats and canoes overhauled, axes sharpened, shovels and grub hoes looked to. The Ranger should have every part of the fire fighting equipment in thorough working order not later than the 1st of April. The appointment of railroad patrolmen and the designation of their beats should be taken up with the proper railroad officials at this time.

Fire
prevention.

Summer. Fire Season.—Every effort must be made by the Rangers to further all systematic arrangements in order to increase the fire fighting efficiency of the available forces in their districts. Unless the climatic conditions are such that there is no fire danger, no improvement work should be commenced which would interfere with vigilant fire patrol. The greatest care should be taken that the subsidiary forces, such as township and railroad patrolmen and mail carriers work in harmony with the field force in order that the best results may be obtained.

Preliminary
slash disposal
work.

Fall. Fire prevention will in ordinary seasons occupy considerable of the time of the field force during the early fall. If, however, conditions are unfavorable for forest fires, the fall is the ideal season for furthering improvement work, and plans should be made accordingly. As early as possible, the Ranger should get in touch with loggers, and when definite information of logging operations can be obtained, preliminary slash disposal notices should be issued.

Legal Help.

In the event of a Ranger having recourse to legal advice, he must not, unless authorized by the Forester to do so, employ an attorney, but must state his case in writing to the County Attorney of the county in which his district is situated. If his district should extend to more than one county, he must apply to the County Attorney of the county wherein the supposed violation is or has been committed.

Employment
of legal help.

The Attorney General advises that definite forms of complaint cannot be drawn up, since each complaint may be of a different nature. All forms must be drawn, based on facts and no skeleton form of complaint can be made from hypothetical cases.

According to law, it is the duty of the County Attorney to draw up all forms of complaints in his county. In case the County Attorney is not available for immediate action, any Justice may reduce the complaint to writing and hold the defendant until the County Attorney can take charge of the case.

All moneys received as penalties for violation of the provisions of this act, less the cost of collection and not otherwise provided for, shall be paid into the treasury of the county in which the penalties for said violation of the provisions of this act were imposed.

Fines, how
disposed of.

All fines, whether imposed in Justice or District Court, whether the arrests have been made by township or state officers, without exception are paid to the county wherein the case is tried. Witnesses and Justices of the Peace are entitled to costs as authorized by law.

Two counties
jointly
constructing
roads or
ditches.

County Commissioners.

Rangers should endeavor to get acquainted with the County Commissioners who have charge of the county affairs in his (the Ranger's) district. Where two counties are jointly constructing roads or ditches, the Ranger should confer with the commissioners of such counties, in order that the stipulations of the contracts relative to brush disposal shall meet the requirements of the Forest Law and shall be alike in both counties. Rangers should endeavor to secure the insertion of a clause in all contracts for clearing rights-of-way, whereby a sum of money is withheld until the brush disposal work has the signed approval of the District Ranger.

Relation of Forest Officer to the Public.

The object of the Minnesota Forest Service is the administration on forestry principles of the forest resources of the State. The maintenance of a permanent timber supply is of vital importance to the people of Minnesota. The first and most important step in this work is the prevention of forest fires. Another function of the Service is to segregate land suitable and most profitable for the growth of timber. The importance of the work of the Forest Service will be increased proportionately as the demand increases for forest products, consequent upon the steady settlement and development of the land suitable for agricultural purposes.

Appointment. PATROLMEN.

Examinations for the positions of patrolmen are held at the Forester's office, St. Paul, and at the various headquarters of the District

Rangers, the date to be set by the Forester. Patrolmen, who by previous service have shown their ability to perform the duties of this office and are recommended by the District Ranger, will not be required to take an examination. The examination requirements are the same for both State and Federal patrolmen.

Examinations
for Patrol-
men.

Appointments will be made to successful applicants in their order of merit. Duties and salaries will commence on receipt of a commission signed by the Forester. Attached to this commission is the Forest Officer's acceptance; patrolmen are instructed to detach and fill in this form and return to the Forester, immediately on receipt of their commission.

Method of
appointment.

The hiring of temporary local patrolmen in dangerous fire seasons shall be performed by the Ranger, and report made to the Forester for his approval.

An applicant for the patrolman's position must be at least eighteen and not over forty years of age. The physical requirements are: He must be thoroughly sound and able-bodied, capable of enduring hardships and of performing severe labor under trying conditions. He must be able to build trails and cabins, and understand packing and camping in the woods. No one without previous experience in woods' work, such as surveying, logging, estimating and timber scaling should make application for the position of patrolman.

Qualifications
of Patrolmen.

Salaries.

State Patrolmen are paid from the annual State appropriation for the preservation of forests in Minnesota, at a monthly salary of \$70.00.

State
Patrolmen.

Federal
Patrolmen.

Federal Patrolmen are paid from the allowance made by the Federal Government under the Weeks' agreement.

Salary
Federal
Patrolman.

They will be paid \$2.25 per diem, so that in a 30-day month a man will receive (thirty times \$2.25) \$67.50; in a 31-day month he will receive (thirty-one times \$2.25) \$69.75. When expenses are allowed, the patrolmen will receipt a No. 2 Auditor's Voucher for the amount. This will be approved by the Ranger and submitted together with Form M 1.

Salary for
service ter-
minating
during month.

A person paid on a per annum or monthly basis, who permanently retires from the service without serving the whole month, is entitled to one-thirtieth of a monthly installment for each day on full pay status.

The following salary table has been prepared, in order that mistakes may be avoided:

\$70.00 \$2.25			\$70.00 \$2.25		
Days.	a Month.	a Day.	Days.	a Month.	a Day.
1	2.33	2.25	16	37.33	36.00
2	4.67	4.50	17	39.67	38.25
3	7.00	6.75	18	42.00	40.50
4	9.33	9.00	19	44.33	42.75
5	11.67	11.25	20	46.67	45.00
6	14.00	13.50	21	49.00	47.25
7	16.33	15.75	22	51.33	49.50
8	18.67	18.00	23	53.67	51.75
9	21.00	20.25	24	56.00	54.00
10	23.33	22.50	25	58.33	56.25
11	25.67	24.75	26	60.67	58.50
12	28.00	27.00	27	63.00	60.75
13	30.33	29.25	28	65.33	63.00
14	32.67	31.50	29	67.67	65.25
15	35.00	33.75	30	70.00	67.50
			31		69.75

Duties.

State Patrolmen are expected to hold themselves in readiness to serve in any district, but as far as circumstances permit, patrolmen will be appointed to districts with which they are familiar.

State Patrolmen serve in any district.

Federal Patrolmen serve only in districts wherein are located the headwaters of navigable streams. All the districts in the timbered area, except District 20 and parts of Districts 3 and 12 are entitled to the service of Federal patrolmen.

Where Federal Patrolmen serve.

Patrolmen execute the work of the districts under the instructions and supervision of the Rangers. As a general rule, each patrolman is assigned a special beat or sub-district, wherein he establishes his headquarters.

Patrolmen under supervision of Rangers.

Patrolmen are authorized, in the absence of the Ranger, to arrest without warrant any person violating the provisions of the Forest Law. (Section 12.)

Authority of Patrolmen.

Patrolmen may summon help to fight fires; they will keep the time of fire fighters on books provided by the Forest Service.

May summons assistance.

If a patrolman has reason to believe there is a violation of the game law, he should, instead of incurring expense, ascertain the facts and immediately notify the nearest Game Warden in writing so that he can attend to the matter. Patrolmen are not to make any expenditures on account of game protection except in extraordinary cases and in Itasca Park.

Duties as Game Wardens.

Patrolmen will destroy any old fire warnings that are not issued by the present Forest Service organization, and have not the Forester's signature appearing on them. Old notices should always be replaced by new ones.

Destroying old notices.

Double employment.

The entire time of patrolmen must be given to the service. Double employment is not permissible.

To patrol the districts allotted to them.

Duties in the field summarized.

To extinguish any small fires they may discover and summon help to fight the larger ones. Patrolmen in dangerously dry seasons should not remain continuously at any one fire but are instructed on discovering a fire that requires help to extinguish, to summon such help, place a man temporarily in charge of the fire-fighting crew, and notify the Ranger of the conditions.

Patrolmen on their beats are to carry a shovel, fire reports, temporary labor vouchers, and must wear the official badge at all times. They will post warning notices, which will be supplied them by the Rangers.

Patrolman-at-Large.

How appointed.

In districts where extensive lumbering operations are in progress, the Ranger will require one or more assistants, to be known as patrolmen-at-large. This position may be regarded as a step in promotion, and men will be selected by the Ranger from his patrol staff to assume these duties.

Duties of Patrolmen-at-large.

Patrolmen-at-large may be given charge of the field work of any part of a district where the Ranger is unable to give adequate personal supervision.

When the absence of the Ranger requires someone in charge of his headquarter's office, this duty falls upon the patrolman-at-large. As far as funds will permit, the patrolmen-at-large will be retained throughout the entire year.

Patrolmen-at-large, when engaged on slash disposal work, or other special duty, may be allowed a maximum expense of \$20.00 per month. This expense can include railroad and ferry fare, and when placed in temporary charge of a district, hotel expenses when absent from the district headquarters.

Expense for Patrolmen at-large.

Township Patrolmen.

Extract from Sec. 24, Par. 2, Forest Laws:

"All towns, villages and cities are hereby authorized and directed to take necessary precautions to prevent the starting and spreading of forest or prairie fires and to extinguish the same, and are hereby further authorized to annually levy a tax of not more than five mills upon taxable property of such municipalities, which, when collected, shall be known as the 'Fire Fund,' which shall be used in paying all necessary and incidental expenses incurred in enforcing the provisions of this act.

Fund, how provided.

"In all townships constituted within any of the forest patrol districts which may be established by the State Forestry Board, the respective town and village officers shall co-operate as far as possible with and act under the general supervision and direction of the State Forestry officers."

In accordance with this clause, townships are advised by the Forest Service to levy this tax, and with the fund thus provided, or as much as may be necessary, to maintain a township patrolman. When appointed, a township patrolman will be given a commission and badge by the State Service, which will give him the authority necessary for the effective performance of his duties.

How Township Patrolman has State authority.

The appended are general instructions to a township patrolman, and are issued with the approval of the Forester, by the Chairman of the Town Board in whose township the patrolman is employed.

1. Patrol the town thoroughly during dry, dangerous times.
2. Guard carefully against any fire getting started.
3. Put out any fire that may be started, no matter how small it is nor on what kind of land.
4. Study the Forest Law carefully, and see that no violations of the law occur in your town.
5. See that all road slash, clearing slash, and other fire dangers are disposed of according to the law.
6. When the situation demands it, make arrests for violation of the Forest Law in the town. Summon help when necessary to fight fire in or threatening this town. Temporary labor will be paid for from the "Fire Fund" of this town. You may not incur expense chargeable to the State, unless authorized by the District Ranger to do so.
7. You are required to co-operate with the Forest Officers of the State, and act under the supervision of the District Ranger.
8. You are authorized to perform your duties by the enclosed commission from the State Forester. You will wear the badge at all times as the sign of your authority.
9. You will devote your entire time to the work, from the date of your appointment until your services are discontinued.

10. You will keep a diary, making daily notes of your travels and transactions, instructions given, etc. In any special emergency you should call upon the District Ranger for advice and consider carefully any advice he may give you.

11. You will receive \$..... a month and pay your own expenses.

Upon receipt of commission (enclosed), you should at once fill in and send the attached "acceptance" to the State Forester, St. Paul, and report in person to me, and in writing to District Ranger.....at....., Minnesota.

As guarantee of the return of the badge and other State and town property, \$15.00 will be withheld from wages due until the termination of your State Commission.

All business concerning the appointment of township patrolmen shall be transacted through the District Ranger in whose district each patrolman is located.

Rangers will forward to the Forester's office a report, giving the patrolman's name, post-office address, description of the township, the names of the town officers, the amount of tax levied, and the total amount available as a "Fire Fund" in any township voting the tax levy.

Any alterations to the forms, 2nd M. 4, "Instructions to Township Patrolmen," should be made by the Town Board with the approval of the District Ranger.

Equipment.

Rangers will issue to patrolmen all the field equipment necessary for the proper performance of their work. Form B, "Transfer of

Ranger's
report on
Township
Patrolmen.

Alterations to
Instructions.

Rangers will
issue equip-
ment.

Property," giving an itemized list of equipment will be made out by the Ranger in duplicate; the patrolman will sign both copies, retaining one, and the Ranger filing the other.

Responsibility
for equipment.

Patrolmen are instructed to keep the equipment issued them in good working order. They must return to the Ranger any broken or defective tools so that new ones can be issued to them. If equipment is lost or broken and no satisfactory explanation can be given, patrolmen will be charged the cost price of such equipment.

Patrolmen, at the termination of their services or for any other reason, must return all equipment, including badge, to the Ranger in whose district they have been employed.

Records and Reports.

Patrolmen
must report
weekly

Patrolmen are required to keep a diary, recording in detail their daily work. This must be forwarded to the Ranger each Saturday night. All time sheets, diaries and salary vouchers must be submitted to the Ranger, be approved and forwarded by him to the Forester. No salaries will be paid patrolmen unless on vouchers duly approved by the Rangers.

Diaries and
salary
vouchers.

Patrolman's time sheet, Form 9, must be submitted to the District Ranger monthly. This form should show the method of employment of patrolmen from the first day of each month to the end thereof. When patrolmen are away from the Rangers' headquarters, time sheets should be forwarded by mail.

Patrolman's
time sheet,
Form 9.

Patrolmen will furnish to the Ranger, reports of all damage caused by forest fires on Form 8.

Report fires.

All expense accounts must reach the Rang-

er's office by the 22nd of each month, be approved by the Ranger, and forwarded together with the patrolman's salary voucher, which should reach the Forester's office on the 25th day of the month.

When vouchers should reach Ranger.

Patrolman's Expense.

Patrolmen may be allowed expenses in exceptional cases; any expense must have the approval and be submitted through the District Ranger. Commissions are issued from the Forester's office, and patrolmen are instructed to report, ready for duty, to the Ranger on the date named in the commission. No travelling expenses will be allowed patrolmen if contracted previous to the date of their appointment.

Expenses
allowed
patrolmen.

In certain districts it will be advantageous for patrolmen, in order to save time in covering their beats, or to reach a fire quickly, to travel by railroad or ferry. In such instances a maximum expense of \$5.00 per month may be allowed. Patrolmen should secure authority from the Ranger before contracting expense.

Allowance
for travel.

When patrolmen are transferred from one Ranger's district to another, or are temporarily engaged on work outside the Ranger's district to which they were assigned, an allowance for expenses may be made.

Transferred
to another
district.

"A patrolman may not exceed expenditure in excess of \$50.00 for fighting fires, unless authorized to do so by the District Ranger, who may assign to him a part of his own authorized fire-fighting fund."

Authorization
to expend \$50.

Leave of Absence.

If through sickness or injury contracted during the performance of his duty, a man is tem-

Pay during
sickness.

porarily incapacitated from work, the Forester may allow him full salary for a limited time. In such a case, patrolmen must immediately notify the Ranger, so that they can be relieved until able to resume their duties.

Sundays and
legal holidays.

Patrolmen will be paid for Sundays and legal holidays and are considered on duty on these days. When conditions render patrolling unnecessary on such days, they are not expected to do any active work, but are instructed to fulfill any orders issued to them, irrespective of holidays.

EDUCATIONAL.

With the limited funds available for forestry work in Minnesota, it is necessary for the organization entrusted with the task of protecting, conserving and exploiting the State's forest resources to secure to the public a thorough knowledge of the forest conditions prevailing, and the means being adopted by the Forest Service to carry out the provisions of the Forest Law.

Forests are
natural
assets.

Our forests represent one of our greatest natural assets, and because of their enormity, many people have not considered that forest conservation is worthy of consideration. This attitude toward a conservative forest policy must not be construed too literally, and in their dealings with the public, Forest Officers must consider the fact that where opposition to the Forest Law exists, it is more often the result of ignorance than of wilful intention. Destructive forest fires are not always set wilfully, but frequently they result from failure to realize that carelessness with fire in the for-

ests will be followed by loss of both life and property.

Forest Officers in the course of their duties will necessarily meet many people who are directly interested in the welfare and preservation of the forests. It should be the officers' object to secure the active co-operation of these people. The settler or traveler in a timbered country who is careful with fire and who is active in extinguishing any fires he may discover, contributes directly to the wealth and development of his particular community and to the country generally.

Forest officers
should secure
co-operation
with public.

The mere fact that settlers have organized volunteer fire brigades does not adequately express the value to the country of these voluntary organizations. The sentiment that prompts the formation of such brigades is the true value. "One volunteer is worth a dozen pressed men." This particularly applies to fighting forest fires.

Volunteer fire
brigades.

"The North Woods," published by the Minnesota Forestry Association for the express purpose of disseminating forestry knowledge, furnishes an accurate record of the work accomplished by the Minnesota Forest Service. Forest Officers are particularly invited to contributing any interesting items relating to forestry, and as far as their time will permit, to secure new members, so that with an increased membership, a larger and more comprehensive magazine can be issued.

The "North
Woods"
magazine.

Editors of local newspapers are invariably willing to insert interesting forestry items in their publications. Forest Officers should avail themselves of this privilege and thus

Local
newspapers.

maintain interest in the forest conditions immediately affecting local communities.

Forester's annual report.

The distribution of the Forester's annual report should be performed judiciously. As the number of copies is limited, Forest Officers must place the books where they will be most appreciated and do the most good.

Fire Prevention Day.

One day of each year is set aside by the Governor of Minnesota to be known as "Fire Prevention Day," and this usually occurs in October. Forest Officers must bear this in mind, so that the work of forest fire prevention can be brought prominently to the public notice on this particular day.

Uniforms.

While the use of Service uniforms is not at present compulsory, it tends toward economy, and the dignity of the Service. The uniforms are cheaper than other suitable clothing, and are adapted to the needs of the work. Moreover, they distinguish Forest Officers from civilians and awaken in the public a proper respect for the Service and its organization.

SPECIAL CO-OPERATION.

Subsidiary Organizations.

The Forest Law prescribes that townships, villages, railroads, loggers, settlers, contractors who clear rights-of-way, and all who cut timber for any purpose, must take active measures in reducing the danger resultant from forest fires.

Co-operative fire fighting forces.

To this subsidiary organization can be added yet another fire-fighting force, comprised of National Forest Officers, Indian Reservation Patrolmen, camp watchers hired by lumber companies, rural mail carriers, and volunteer fire brigades.

In order to secure the greatest amount of good from these subsidiary organizations, Forest Officers are instructed to endeavor to so arrange the work in their districts that while being under their supervision, it will harmonize with the efforts of the several forces who are desirous of furthering the aims and objects of the Forest Service.

Co-operation With Townships.

It is advisable where towns consist of several townships, to urge the appointment of one patrolman for each township, in order that effective work can be performed.

Township patrolmen.

When a town is desirous of raising a "Fire Fund" by a tax levy, and the taxable valuation of such town is large, it will probably be necessary to levy a tax of only one mill or even less. Five mills is the maximum amount that may be levied in order to provide a Fire Fund.

Township fire fund.

"Township officers may issue town orders in payment for services rendered under Chapter 125, General Laws of 1911, at any time after the special tax provided for in such law has been levied. The issuance of such orders is permissible in anticipation of the collection of such tax, but of course such orders must not exceed the amount of such levy."

Issuance of Town orders in payment for fire protection.

"There is no objection to the use of the General Township Fund for fire protection work."

The above quotations are from a decision of the Assistant Attorney General, dated July 3d, 1912.

Rangers should keep the names of all township officers on file. This is important as every effort should be made to maintain a lively interest in fire prevention work, and these offi-

Rangers to keep names of Township officers on file.

cials should be kept posted on all matters of interest affecting such work in townships.

Co-operation With Settlers.

In the sparsely settled districts, it is oftentimes extremely difficult for townships to levy the tax necessary to provide a fire fund.

Forest officers should make a careful study of these conditions, and where taxation is not feasible, they may be able to secure the formation of Volunteer Fire Brigades. They must in any case have their plans definitely outlined, if they wish to secure a measure of success.

In each township or locality deciding to organize a Rural Fire Brigade for the protection of life and property in such township or locality, there shall be one man selected by the settlers and approved by the District Ranger, who shall be known as the captain of any brigade so formed.

There shall also be appointed two or more assistants to this man, who, in the event of fires occurring, shall act as messengers and inform the settlers in the vicinity of the whereabouts of the fire.

The settlers can then come prepared to fight fire with the least loss of time, and can bring such tools as shall have been previously agreed upon. It would be simple to have a list of available help and check off against each man's name the tools he is expected to bring.

It is advisable that some safe place or places should be designated and their whereabouts well known to the settlers, where families could be taken in the event of serious fires.

The state patrolman shall assist in every possible way, and will take charge if he hap-

pens to be present at any fire; but in his absence, the captain of the brigade will take charge and will be paid at a fixed wage, agreed upon with the District Ranger.

The settlers fighting fire shall be paid at a maximum rate of twenty-five cents per hour during the time they may be so employed.

It is well where the cutting of a trail or the erection of a Forest Service telephone is contemplated, to secure the co-operation of the settlers and others who will be benefitted. These people will invariably be found willing to assist, if the matter is put up to them rightly.

The objects of the Service should be carefully and patiently explained, particularly with settlers and lumbermen. It must be shown that the Service is not desirous of hampering their work or oppressing them in any way.

In dealing with settlers in the forested region, who use fire in clearing their land, it is necessary for forest officers to use the utmost tact and vigilance. Public sentiment is rightly in sympathy with home builders, and the control of their operations should give the least possible cause for resentment, but it should be exercised firmly, none the less.

Settlers should be shown the injury to their own interests, as well as to the public, which results from forest fires. Methods for clearing and times for burning should be freely discussed with them, and in nearly all cases it will be found possible to make amicable arrangements.

But while the aim of the Service ought always to be toward co-operation and good will, it is of the greatest importance to have it un-

State Patrolman should assist.

Rate of pay for settlers fighting fires.

Trail cutting and telephone construction.

Clearing of land.

Volunteer fire brigades.

Captain of fire brigade.

Settlers prepared to fight fire.

Place of safety.

derstood where any tendency to ignore or violate the Forest Law is shown, that public interests will be protected by every legal means.

Reporting Fires By Mail Carriers.

This feature of Federal co-operation is of great importance, owing to the fact that rural and star route mail carriers invariably travel through sparsely settled country. The Ranger should furnish rural mail carriers in his district with simple instructions for reporting fires. They should know the Ranger's postoffice address, and telephone number. It must be borne in mind by forest officers that mail carriers are instructed to report forest fires only as far as the reporting of such fires does not interfere with the carrying of the U. S. mail.

SLASH DISPOSAL.

Lumbering—Slash.

Lumbering is carried on to some extent the year around, but by far the largest operations are conducted during the winter months. It is during the progress of lumbering operations that the kindling is made for future forest fires, if the slash resulting from the numerous operations is not disposed of in a careful and scientific manner.

Notices setting forth the description of lands must be conspicuously displayed at camps where any cutting is being done. A copy of such notice must also be forwarded to the office of the State Forester before cutting begins.

Rangers should endeavor to get in touch with the various companies and individuals who are making plans for future logging operations, and

a notice along the following lines should be sent to each operator:

To Loggers and Others Cutting Timber:—

Plans for operations in the woods will soon be under way for the coming season. It is our desire to work still more in harmony with the operators this season than was possible last year. In order that your work may not be hampered after logging has commenced, it is advisable that an early understanding be reached as to the areas to be cut over and the methods of brush disposal to be employed. I wish, therefore, that you would let me know at the earliest possible date just what lands you intend to log or let contracts for logging the coming season. I will then be in a position to look over the lands more thoroughly, and in co-operation with representatives of your company, decide upon the best and most economical methods of brush disposal for each particular type of timber.

Very truly yours,

.....
Ranger District No. —

The object of the slash disposal notice is three-fold: First, to state the method to be employed in certain types; it may be necessary to issue several notices covering one operation; second, to give a definite date for the completion of the slash disposal work, in order that legal proceedings may be instituted when an operator neglects to comply with the instructions contained in the notice; and thirdly, to provide an accurate record of the lumbering operations throughout the State.

A copy of slash notice follows:

Form of
Circular
Letter.

Rangers furnish mail carriers with instructions.

Lumbering causes slash.

Posting of cutting area.

Preparatory work in connection with slash disposal.

MINNESOTA FOREST SERVICE.

Office of the Forester, St. Paul.

Notice to Dispose of Slash and Debris.

.....191.....

To.....

(Name)

.....

(Place)

Under the State Forest Law, slash and debris resulting from timber cutting must be disposed of in accordance with the directions of the State Forester. This authority is conferred on the District Rangers acting for the Forester.

(See Sections 15 and 16, Chapter 125, Laws of 1911, on back of this form.)

Since slash and debris left on.....

.....

.....

.....

constitutes or will constitute a menace to adjoining property, you are hereby notified to dispose of it as follows:

.....

.....

.....

.....

.....

.....

This work must be satisfactorily completed

.....

(When)

WM. T. COX, STATE FORESTER.

By.....

Ranger.

Rangers will make and retain a carbon copy of each notice issued.

Slash Notices.

The duty of forest officers is to check up the work of lumbermen, with a view to securing effective slash disposal during the progress and at the completion of the lumbermen's woods operations. These slash disposal notices should be issued at a definite time, and officers are instructed to arrange their work accordingly.

Issue of slash disposal notices.

1. The date on which the notice is issued.

2. The name of the responsible person, firm or corporation conducting the operations. Care should be taken when issuing notices to a corporation, that the name of their authorized local agent, as well as the title of the corporation, shall appear on the notice.

3. The place signifies the postoffice address of the responsible party or parties named in the notice.

4. Entitled "Since slash and debris left on." This space should contain an accurate description by forties of the land on which lumbering operations are being conducted. It may be necessary, owing to the variety of conditions encountered on one operation, to issue sufficient notices to cover in detail the requirements of these several conditions.

How to fill in slash disposal notices.

5. The instructions should be clear and concise and must specify the method of brush disposal to be employed on the land previously described in the notice. If it is not possible to include the descriptions and necessary instructions on the slash disposal notice, an extra sheet should be attached, and a carbon copy of this "extra" sheet fastened to the copy of the slash disposal notice issued for that particular operation.

6. The date when the work must be completed must be definitely stated. When winter piling has been required, and the brush piles to be burned as soon as snow disappears, usually from May 1st and not later than May 10th, it may, owing to wet weather conditions or a late winter, be impossible for the operator to fulfill the requirements of the notice. When for these reasons the operator fails to complete his work, after showing every desire to comply with the order, Rangers may extend the time stated on the notice.

7. Rangers should sign the notices.

It is the duty of Rangers to issue notices as far as possible. When the district is large and the operations are numerous, the patrolman-at-large may issue notices.

The employment by lumber companies of men whose special duty is to supervise the disposal of slash is advisable and this matter should be discussed by Rangers with officials of lumber companies conducting operations on a large scale. The companies retaining these specialists will undoubtedly find a considerable reduction in the cost of their slash disposal work; as a rule, it is impossible for logging superintendents or camp foremen to give much time to study to the slash disposal problem, and consequently when this work is left to them, it is usually, for the reason stated, improperly performed.

The routine of slash disposal on any or all operations may be summarized as follows:

1. Planning the most effect method of slash disposal, to meet the conditions of each individual operation.

2. Supervising the operations, observing that the requirements of the slash disposal notice are being fulfilled.

3. Completion of the work.

General Rules Covering Slash Disposal.

With the diversified conditions prevailing throughout the forested area, it is impossible to compile fixed rules; the instructions for any particular operation must always be governed by the nature of the surroundings and the character of the land, whether forestry land—and to be permanently maintained as such—or agricultural land which will be eventually cleared for farming. The following rules are based on general principles, and will be of assistance to field officers in handling slash disposal work. Rules numbered 1 to 6 apply particularly to pine slash; rules 4 and 5 to any kind of slash which has to be burned. Rules 7, 8 and 9 apply in each case especially to the types and species named therein. Rule 10 applies to slash on agricultural land not to be cleared in the near future.

1. Where timber is scattering, or the country is generally very rough and rocky, clean burning is inadvisable. In such cases, a fire line of at least 150 feet in width should be burned around each area of slash, and along rights-of-way. This rule is based upon the theory that where the trees are widely scattered their brush will not constitute a serious fire danger. Clean burning would entail a needless expense upon operators. The second part of this rule is based upon the theory that the rock country would be non-agricultural, hence, forest land. Clean burning would effect to a

Where timber is scattered, fire line should be used.

Who may issue slash disposal notices.

Employment of special men by lumbermen.

Routine of slash disposal.

Clean burning destroys soil on rocky lands.

greater or less extent the destruction of what meager ground cover is usually found in such rocky country. In some cases clean burning may also destroy the soil itself, valuable reproduction, any timber that might remain, as well as seeds which have fallen to the ground. Another point to be considered here is that the unburned brush retards evaporation of soil moisture. Also, in decaying, the debris adds to the valuable humus. Where slash from a thick stand of timber, even if on non-agricultural land and surrounded by a fire-break, will in the future be a menace to adjoining green timber not to be cut, this rule is often extended to include clean burning. The latter is usually required to be done as cutting proceeds, in order that damage to the soil, young timber, and seed may be avoided as far as possible.

Burning strip along right-of-way through area of slash.

2. A corollary to the above rule is: In cases where clean burning is not required, in addition to a fire-break of not less than 150 feet in width, to be burned around such an area of slash, a strip not less than 50 feet wide, or of a width to be determined by the Ranger, should be burned along each side of any form of right-of-way traversing the slash area. This general rule applies specifically to logging railroads in all locations, and will be of value not only in connection with clean rights-of-way, decreasing the danger of fire being set by locomotives, but in order that the strips may serve as lines of defense in fighting fires.

3. Where the land being cut over is to be cleared and used at once for agriculture, piling

and burning of the slash and debris is advisable. Clean burning will ordinarily be done in any event on such lands. It is best that it be done under supervision of forest officers and at a specified time. This is advisable because many forest fires have originated from the burning of brush on farm lands at wrong times.

Land being cleared for agricultural purposes.

4. Where operators have been permitted to postpone burning until spring, when the snow is going or gone, times should be selected for burning when the fire will not run freely on the ground. A sufficient force of men should be on hand to surely prevent fires escaping. The selection of times for burning when the fire will not run on the ground has a dual purpose. When fire will run on the ground, the danger of its escaping is increased. Furthermore, running fires are ruinous to any valuable reproduction which may exist, of any seed which may lie on the ground, and to the ground cover itself.

Spring burning of accumulated slash.

5. In piling brush for burning, care should be taken not to make piles in close proximity to any green trees, old or young, which may have been left standing. This will prevent the injury of the trees when the brush is burned. The rule should be especially observed in regard to mature trees which have been left to secure re-seeding. Equal care should be taken in regard to young timber left on any forested area.

Where brush should be piled.

6. Whenever circumstances will permit, required burning should be done during the winter, as cutting proceeds. This insures the proper disposal of the slash, and leaves no opportunity for the operator to neglect the work.

Winter burning.

Furthermore, it is usually the cheapest method of securing effective disposal. Also, when a large area of slash is left unburned until spring, there is always a chance that the snow will disappear rapidly and be followed by a dry period. Thus, unless the work of burning is begun as soon as conditions will permit and diligently pushed, there is serious danger of fires escaping. Accordingly, the work of burning may then in some cases have to be discontinued before completion. Hence, dangerous areas of slash may exist in the fire season which would not occur had the slash in question been burned closely behind the cutting.

7. Where cutting operations are being carried on in spruce or cedar timber, the branches should be lopped separately from the unused tops, so that these lie flat on the ground. One reason for this method of procedure is that these species grow largely in swamps, ordinarily more moist than the uplands; hence, decay there is more rapid. The branches lying on the ground are uniformly damp in summer. They are not so pitchy, and rot more quickly than pine and are therefore not so dangerous. If the large tops commonly to be found in spruce and cedar cutting, held high from the ground by their branches, are left intact, they dry out, remain for years, and fire will sweep through them readily. Usually, in spruce and cedar forests there are large numbers of young, healthy trees, too small to be merchantable, which often stand very closely together after the larger trees have been removed. It is the policy of the Service to protect such young valuable timber. Piling and burning of the

brush could not, in the majority of swamps, be carried on without serious injury to it. Furthermore, if burning were required, and was not done in the winter, there would be a probability of the fires getting into combustible peat soil on which spruce and cedar often grow. Other things being equal, another reason why lopping is more advisable than burning in the treatment of these forms of slash (even spruce on high land) is that piling and burning is relatively more expensive than in pine timber. The reason is that there is a greater proportion of branches in comparison to merchantable timber resulting from operations in spruce and cedar than in pine. Hence, it is cheaper to merely lop the branches than to lop, pile and burn. The relative efficiency of two possible methods of disposing of a given area of slash being equal, it is the policy of the Service to require the use of the cheaper method. Since lopping in these species (spruce and cedar) is as effective in removing the fire danger as is piling and burning, and since other considerations render lopping the more advisable, the latter is the method usually required.

8. In cedar and black spruce, where the proportionate amount of slashings to the products is greater than in perhaps any other timber, the following method, known as the "strip" method has been devised, and wherever introduced has been found both cheap and effective. In thick stands of black spruce and cedar, operators lay out their main logging roads, and at right angles to these, pace off strips of thirty paces, making these strips by blazing a

Piling
difficult in
thick stands
in swamps.

Piling slash-
ing by the
strip method.

Lopping.

tree facing the logging road. The workmen, usually piece-workers, first brush out a skidding road, starting from the blazed tree; they then commence from the logging road to make their products, being careful to fell the trees away from the brushed-out skidding roads. By following this method, the tops will be piled between the two strips, and with the lower branches piled on these tops, make brush piles that can be readily burned in the spring.

9. Hardwood slash should be disposed of by lopping as cutting proceeds, or by the burning of adequate fire-breaks around the areas of slash. The hardwood forests of Minnesota grow on land that is good for farming, unless too rocky. Therefore, the slash resulting from cutting operations will in a majority of cases be burned sooner or later, to put the land in shape for tilling. The above rule is devised to prevent the escape of fire from burning brush and to preserve remaining timber.

10. Slashings on agricultural land not to be cleared in the near future should be disposed of by lopping as cutting proceeds, and the adjacent timber protected by the construction of a fire-break around such slashing, this fire-break to be of a width and character satisfactory to the forest officer.

The foregoing rules will be found applicable throughout the State for the various conditions described. In order to render slash disposal work similar and systematic throughout the State, forest officers in devising a method for the treatment of any individual area of slash, should aim to follow the rule which most nearly applies to the conditions prevailing on that particular area.

Slash, Roads, Ditches, Railroads and Rights-of-way.

Slash and debris resulting from the cutting out of roads, ditches and rights-of-way, or for any purposes whatsoever, shall be piled and burned in the center of the right-of-way as cutting proceeds.

Rangers are responsible for the fulfillment, by contractors and others clearing roads or rights-of-way, of the provision of the Forest Law relating to slash and debris disposal.

As verbal orders are likely to be misinterpreted, it is advisable that Rangers issue slash disposal notices at the commencement of operations.

When the clearing of rights-of-way for any purpose is sub-contracted, the person, township or whoever is responsible for the work shall be held liable for the efficient disposal of the slash and debris; and they in turn should stipulate in all sub-contracts that the slash and debris must be disposed of in accordance with the requirements set forth in the slash disposal notice which has been issued by the Ranger.

Requirements of Notices.

The notices should show just what is required to be burned and what is not. The law specifies that slashings and combustible material, except merchantable timber, shall be burned.

All timber suitable for sawlogs, cordwood, mine timber, ties, posts, logging, etc., should be piled alongside the cleared right-of-way.

Excavated stumps from thick stands of timber, which will not readily burn as the work

Rangers responsible.

Issue of slash disposal notices.

When sub-contractors are employed.

Merchantable products.

Hardwood slash.

On agricultural land not to be cleared in the near future.

Rules should be uniform throughout entire State.

Stumps.

proceeds, may be piled alongside the right-of-way and burned later. These arrangements must be left to the direction of the Ranger, and particular care should be taken that a cleared space consistent with the safety of the adjoining timber is made around all piles of stumps before they are burned.

In wet weather.

Sometimes, owing to continued wet weather, contractors may be unable to burn the brush and debris as the work proceeds. The Ranger may, under these conditions, in order that the work may not be inconvenienced, or delayed, allow the piling of slash and debris alongside the right-of-way. Arrangements and date for the burning of these piles must be made in the slash disposal notices.

Burning alongside right-of-way.

Care must be taken that piles alongside the right-of-way shall not be burned at a time when the ground cover or adjoining woods will burn, for the following reasons: When the ground cover is burned, the trees are also killed and consequently, with the reduced assistance caused by the absence of such ground cover, the killed trees after a while topple over; it may be across the road or ditch, causing an added expense for their removal, or it may be they fall into the adjoining woods, making the sides of the road unsightly, and adding materially to the fire danger.

Clause inserted by counties.

Many counties have already inserted a clause in their road, ditch or right-of-way clearing contracts to the effect that a certain sum of money will be withheld until all slash disposal work has the signed approval of the District Ranger.

Where this system is not used by parties let-

ting contracts, Rangers are instructed to endeavor to secure the insertion of a similar clause in all contracts for right-of-way clearing work in their respective districts.

The following circular letter, addressed to County Commissioners, gives in detail the general requirements of the law and can be used as a basis when it is necessary for Rangers to address similar letters to townships, county or State officers in charge of road or ditch construction:

"Since logging companies, railroads and others cutting timber are required to properly dispose of the brush or slash, it would seem advisable that the state and counties conform to this requirement where they are constructing roads.

"As is well known, it has been the practice to throw the tree-tops and brush into piles or wind-rows along the edge of the woods on both sides of the road. This has a doubly harmful effect. The brush when dry constitutes a fire-trap in which a fire can quickly gain headway if anyone passing by carelessly drops a lighted match or cigar butt. It also renders the road useless as a fire-break, since a hot fire so near the road is almost sure to jump across and, because of the added heat from the brush piles, it cannot be stopped at the road. A road should constitute one of the best possible places to stop a fire.

"In any road which your county has under way or intends building, you should immediately provide for the burning of the brush and tree-tops where the road passes through wooded lands. The burning should be done by

throwing the brush into the middle of the roadway and burning it in piles when conditions are such that the adjoining woods can be protected. Someone should be left to see that the fire does not spread, since the person or persons in charge of the work are liable for all damage caused by a fire which escapes. The disposal of brush is required in accordance with Sections 4 and 5, Chapter 159, General Laws 1913, which makes it the duty of the State Forester to prescribe the manner of disposing of all brush and slashings as a means of preventing forest fires. I consider this work of special importance. It is something perfectly feasible to carry out; it costs little and should have a very beneficial effect on the control of fires in your community. I hope that you will give this matter your personal thought and attention both as a county officer and as a citizen. The State Forester Service will keep in touch with and will appreciate your efforts in the carrying out of these instructions."

RAILROADS.

Duties.

Sections 2 and 3, Chapter 159, General Laws 1913, require that railroad companies operating in timbered regions shall use the highest degree of diligence to prevent the setting and spreading of forest fires, and to cause the extinguishment of any fires set by their locomotives, or found existing upon their respective rights-of-way.

The law requires that engines shall be equipped with practical and efficient ash pans and spark arresters. All engines should be examined by the master mechanic or some employee

each time before leaving the roundhouse. A record must be kept of such examinations in a book to be furnished by the railroad company for that purpose. This record shall be open for inspection by the State Forester or any other authorized officer appointed by him.

A railroad inspector is employed by the Forest Service, and it is his duty to examine and report on the condition and practicability of the spark arresters and ash-pan devices used on locomotive engines of the various railroads throughout the State. When Rangers have good reason to believe that a railroad company is operating its engine or engines without any, or with inadequate, spark arresters, they should report the same to the inspector or the Forester, giving the name of the railroad company, the number of the engine or engines, location of the roundhouse, and the name of the engineer in charge.

Each railroad company is further required to keep its right-of-way clear of any combustible material, other than is necessary for actual construction.

When it is necessary for cedar products to be peeled alongside rights-of-way, forest officers should issue instructions to the person or firm responsible for such products, to the effect that all bark and combustible debris (culled ties, etc.), resulting from the peeling or storing of cedar products, cordwood, lagging, mine timber or logs, must be burned as they are made, or as soon afterwards as possible. A definite date should be given in the slash disposal notice. Such peeling and debris must not be allowed to accumulate.

Effectiveness of spark arresters and ash-pans devices employed.

Cedar bark and other combustible material along rights-of-way.

Precautions in setting fires.

Efficient spark arresters and ash-pan

Railroad
notices.

Rangers must take this matter up with the roadmaster, or with the section foreman on whose section any accumulations exist.

Special notices, such as are approved by the State Forester, for use on the stations and section houses of railroads, are to be furnished by the companies. Field officers should see that the instructions regarding the posting of these notices are carried out by the railroads concerned. Any failure to do so should be reported to the proper railroad official, and if the failure continues, a report to that effect should be made by the Ranger to the Forester.

Railroad Patrolmen.

The most successful method of fire prevention yet adopted by the railroads has been the employment of railroad patrolmen, in conjunction with a well cleared right-of-way.

Forest officers will consider in recommending the appointment of railroad patrolmen:

1. The condition of the right-of-way and the property adjacent thereto.
2. The character and number of the grades.
3. The number of trains passing over the track from 7 A. M. to 7 P. M.
4. The effectiveness of the spark arresters and ash-pan devices employed.
5. Fire-breaks constructed by the railroad company on private property outside their right-of-way.

When conditions necessitate the employment of fire patrolmen, and no men have been detailed for duty by the railroad, the Ranger or Rangers should take this matter up with the railroad officials concerned.

Conditions
requiring the
appointment
of railroad
patrolmen.

Date of
assignment
of railroad
patrolmen.

If, after due notification by the Ranger, railroads fail to appoint the requisite number of patrolmen, the Ranger should submit a report to that effect to the Forester at once.

Failure to
appoint
patrolmen.

Owing to the diversified conditions existing along the various railroad rights-of-way, it is not possible for companies to issue precisely the same instructions to the patrolmen they employ.

Duties of a
railroad
patrolman.

The appended instructions are in use by one of the railroads, and might be used as a basis by Rangers when formulating rules applicable to the requirements of the particular railroad situated in their district:

1. You will commence work at 8 A. M. and finish at 7 P. M. In the event of fire, you will remain on duty until such fire is controlled or until relieved.
2. You will report to the section foreman, who will keep your time.
3. You will be held responsible for your equipment and must keep the same in good order.
4. In the event of fire, you will endeavor to extinguish it; failing in this, you will notify the section crew and station agent on his section, who will notify the District Ranger.
5. In wet weather, when there is no danger from fire, you must clear up along the right-of-way, cutting grass, piling and burning debris.
6. You will keep a duplicate daily record on cards supplied you, which you will hand to the section foreman nightly.
7. Any fire patrolmen found under the influence of liquor during working hours will be instantly dismissed.

Instructions
to railroad
patrolmen.

Approved:

.....
Roadmaster.

.....
District Ranger.

A copy of these instructions or a modification of them, properly signed, should be issued by the section foreman or duly authorized official to the railroad patrolmen at the commencement of their duties.

In order to secure an accurate daily record and ready reference of each railroad patrolman's work, daily cards are in use on some of the railroads. The following form is a sample. It may be necessary to modify the arrangement of this card to meet local requirements. The expense of such cards should be borne by the railroads using them:

Patrolman
Date 191....
Time started work.... Time quit work....
No. of trips made over beat.....
Nature of work done during day.

From to		From to		From to	
Time met Train	No. of Engine	Direction	Mile Post	Direction of Wind	Weather Condition
.....
.....
.....

Sufficient space should be allowed to record the number of trains passing over the beat

daily. If necessary, two or more cards can be used.

Rangers should endeavor to secure a duplicate copy of the report of each fire that is recorded by the railroads operating in their respective districts.

The equipment of a railroad fire patrolman should consist of velocipede (speeder), shovel, axe, water pail, a sack, telephone test set, and fire report forms.

Rangers to Record Condition of Right-of-Way.

1. Rangers must carefully inspect and record the conditions existing along railroad rights-of-way in their respective districts, noting the growth of grass and brush, how often this is cut, the tree stumps, old ties, and other combustible material along such rights-of-way. They should also record the condition of the privately-owned property adjoining rights-of-way, noting clearings, swamps, sand ridges, and whether the timber is green, burned, fire-killed, or wind-fallen. These conditions, together with the location of the grades, will be the main factors in determining the requisite number of patrolmen, the length of their beats, and the method of patrol—whether by speeders or on foot.

2. The amount of power required to haul a heavy train up a steep grade is necessarily greater than would be required to haul the same train along level track. Hence, the emission of sparks is also greater. Therefore, the location of such combustible material in relation to steep grades must be carefully considered when Rangers submit their report and recommendation.

Fire reports.

Equipment of a railroad patrolman.

Condition of right-of-way in regard to inflammable material.

Character and number of grades.

Special daily reports by railroad patrolmen.

Number of
trains passing
over track
from 7 a. m.
to 7 p. m.

Special
patrolmen.

Merit of
fire-breaks
alongside
rights-of-
way.

3. Rangers will find that in some cases it is not reasonable to urge the assignment of speeder-equipped patrolmen, owing to the great number of trains passing over the tracks in their districts. When the number of trains per day renders speeder patrolling difficult, Rangers must advocate other means by which the railroads will secure protection from forest fires to the adjacent country. Among other methods which Rangers may suggest are: Patrolmen covering shorter beats on foot; patrolmen covering longer beats on foot; a special man with each section crew; and the reporting of fires by train crews. The most important point, regardless of the method adopted is to secure the appointment of a special railroad man, whose sole duty is to attend to forest fire prevention over a specified beat. When the number of trains does not exceed thirty during the twelve hour period, namely, from 7 A. M. to 7 P. M., speeder patrolmen, with suitable fire fighting equipment, will invariably give the best results, and their appointment should be insisted upon by Rangers.

Fire-Breaks.

Forest officers should endeavor to impress on railroad officials the merit of fire-breaks, particularly emphasizing the fact that the costs of one comparatively small fire resulting from a locomotive spark, if applied to the construction of a fire-break, would suffice to secure protection to private property adjoining many miles of track. Where farmers have hay meadows, or grain fields, near a railroad, they should be instructed by the Ranger to take

precautions to protect such meadows or fields from fire.

There is no legal provision requiring the construction of fire-breaks on private property by railroads; nevertheless, such work has been performed, and has demonstrated that a clean, well-kept fire-break one hundred feet or more from the center of the track is not only effective, but in view of the serious fires prevented by its construction, is excellent insurance as well.

Firebreaks
on private
property
outside of
rights-of-
way.

Privileges Allowed Forest Officers.

The railroads of this State have generally been extremely liberal in extending privileges to officers of the Forest Service. The following list has been prepared with a view to showing forest officers what privileges they can reasonably expect the railroad companies to allow:

To use velocipedes (speeders).

To ride on freight or work trains (by payment of ordinary fare).

To ride on gasoline cars or hand-cars.

To carry speeders promptly at regular freight charges.

To stop some freight trains in order to alight at a fire, between stations (except passenger or fast freight trains).

To use telegraph and telephone free on company business, through the railroad's agent.

To use railroad company's tools.

In some cases it may be necessary for forest officers to secure a specially written permit; in the majority of cases the authority of the local official is all that is required.

Rangers desirous of securing permits for themselves or any of their patrolmen, for any

Special
privileges.

Permits for these privileges to come through Forester.

privileges that may be granted by a railroad company, should submit all applications through the Forester's office. Requests for permits state the privilege desired, the name of the railroad, and the division over which the permit is to be used.

Attitude to the Public.

Railroads willing to help decrease fire hazard.

Field officers must remember that railroads are a vital necessity to the development of a new country, and in nearly all cases have been found extremely willing to adopt any fire preventive measures suggested by the Forest Service, besides experimenting with costly devices in order to eliminate forest fires set by their locomotives. It is an undeniable fact that during very dry seasons it is extremely difficult to prevent the starting of fires by locomotives, no matter how elaborate a fire fighting force has been prepared. The public generally, and farmers residing alongside railroads, particularly, are apt to be rather severe in their judgments of the railroad company when a fire starting from the right-of-way gets beyond control. In their dealings with the public, forest officers must preserve an impartial attitude, and should not enter discussions relative to the responsibility of companies and individuals with regard to forest fires, unless their duty requires this and they have first-hand information of the particular subject.

Forest officers must preserve impartial attitude.

Improvement of Railroad Companies' Methods.

Rangers must familiarize themselves with the fire protective methods that have been or are being employed by the railroads in their respective districts, and be prepared to consult and advise with the officials of such rail-

roads, so that changes tending to improve existing arrangements can be suggested by the Ranger.

IMPROVEMENTS.

Objects of Improvements.

In order to increase the efficiency of the comparatively small field force at present employed by the Forest Service, and to facilitate travel throughout the timbered area, it has been necessary to devise and construct various artificial aids. Under the first category, lookout towers of wood or steel have been constructed on sites which command extended views; cabins have been built at convenient points as shelters for Rangers and patrolmen, and as storehouses for tools. Telephone lines have been built.

Efficiency of field force increased.

Trails and Portages.

The improvement of means of travel in the forests not only facilitates the field work of the Forest Service, but is equally important for settlers and persons who frequent the woods for pleasure. This fact should be borne in mind by Forest Service Officers when laying out trails, portages, etc., as it is frequently possible to secure the active assistance of interested persons, thereby reducing the cost and, with the increased help, performing the work more thoroughly.

In cutting out trails for fire preventive patrol, care should be taken to perform clean work; all brush and wind-falls should be piled and burned. Trails should follow ridges as far as practicable, but due attention should be paid to the location of settlers and camps, in order that such trails should be of general benefit.

How to cut trails.

portages
and canoe
routes.

A similar policy should be pursued with regard to the clearing out of portages, in conjunction with canoe routes, namely, that the location of these improvements shall be studied with a view to their effectiveness and general usefulness.

Location of
camping sites.

The location of camping sites must necessarily be along the trails and portages most traveled. Field officers are instructed to clear a spot at least twenty feet in diameter, and place rocks to form an improvised fire-place. A sign-board proclaiming this clearing to be a "camping site" must be conspicuously placed. This sign should also show the distance to the next "camping site," and bear the distinguishing mark of the Service in the lower right-hand corner.

Signboards.

On all trails and portages that have been cut out by Service officers, sign-boards should be placed, giving directions and distances to principal points.

A stencil plate, to be used in marking these sign-boards, can be obtained on application to the Forester's office.

Lookout Towers.

Erection of
lookout
towers.

There are several important points to be considered when it is desirable to erect a lookout tower. The first matter which will require consideration in the selection of a suitable site, having regard to the view to be obtained of the surrounding country, the accessibility, and the telephone or telegraph communication which exists or may be installed.

It is further desirable that negotiations be entered into, if the proposed tower site is privately owned, with a view to the purchase or

extended leasing of at least one-half acre or more, including and surrounding the site. If the proposed site is on State land, the exact location should be forwarded to the Forester's office, so that the proper reservation may be made with the Land Department. No tower construction should be commenced until a satisfactory title or lease has been procured.

Title or
lease
necessary.

The lookout tower site should always be cleared of combustible material. As far as practicable, forest officers are advised to improve and beautify tower sites by setting out suitable trees.

Tower site
should be
kept clean.

By past experience, it has been found that the erection of steel towers is more satisfactory and cheaper than wooden ones, where transportation facilities are favorable. Rangers should make inquiries as to cost of both steel and wooden towers before commencing operations.

Kind of
tower to
erect.

All orders for steel towers must be placed through the Forester's office. Rangers will submit a detailed specification of their requirements, giving the name of the depot to which the tower is to be shipped. Steel towers are of "knocked down" construction and can be readily transported on wagons or sleighs.

Steel towers.

In order to reduce expenses as low as consistent with efficiency, field officers may sometimes use a tall tree as a lookout tower. These trees will oftentimes serve the purpose as effectively as a more expensive tower. Telephone steps or spikes, driven into the tree, will form the most satisfactory method of ascending these improvised lookout towers.

Trees may be
used for
towers.

How towers
should be
erected.

Usually the work of erecting lookout towers can be performed by patrolmen, when weather conditions do not necessitate constant fire patrol. In some localities, however, better results can be gotten by calling for bids for the construction of the tower. If this procedure is followed, the Ranger must draw up a duplicate form of contract, being careful in the wording of such to specify that the materials used, particularly with regard to wooden towers, must be thoroughly seasoned and sound, adequately braced, with the ladder rungs countersunk and not more than twelve inches apart. These contracts should be signed by the Ranger and contractor, and their signatures witnessed by a third party.

All towers over fifty feet high must have the ladders built inside, crossing from one side to the other, with suitable landing stages, and a railed-in platform at the top.

Care of
towers.

Rangers should paint all towers, unless made of galvanized steel, with white barn paint, and should periodically examine them with a view to the safety of field officers using such towers. All necessary repairs must be made at once. Towers that are the property of the Forest Service should be so labeled.

Cabins.

Erection of
cabins.

In some districts it may be necessary to erect cabins. These may be desirable for patrolmen's headquarters, to provide suitable storage for equipment, or for Service telephone stations. Sometimes it may be possible to combine these three purposes.

With regard to locating and securing a cabin site, similar rules would apply as to lookout

towers, namely, accessibility, possibility of telephone connection and proximity to other shelters.

Cabin site.

If the erection of a cabin is contemplated on State land, the description of the land must be forwarded through the Forester's office to the State Auditor, so that one acre may be reserved. Where it is necessary to cut timber to erect any Forest Service cabin on State land adjoining the reserved acre, a permit stating the amount and the description of the land from which the timber is to be cut, must be submitted through the Forester's office to the State Auditor. No work should be commenced until authorization has been received from the Forester.

Reservation
of State land
for cabin.

If the proposed cabin site is on privately owned land, negotiations for the purchase of such site and the necessary timber must be entered into by the Ranger with the owner of the property. The Ranger will submit to the Forester for his approval, the price and conditions governing the purchase of any cabin site and building timber.

Cabins on
privately
owned land.

Fire-Breaks.

The construction of fire-breaks has been found to be the only satisfactory means of protecting villages in the forested areas from destruction by forest fires. Section 19 of the Forest Law authorized villages and cities situated in the timber area to clear off combustible material and create sufficient fire-breaks to encircle such municipalities.

Firebreaks
around
villages.

Rangers should carefully study the forest conditions adjacent to the villages in their respective districts, and should submit their rec-

Where fire-breaks should be located.

ommendations, together with an estimated cost of the work, to the village officers. A careful survey of the country immediately surrounding villages should be undertaken by field officers before making their recommendations, for fire-break construction. The direction of prevailing winds, the density and height of the timber, the proximity of streams and clearings will require to be carefully considered when determining on the location of the fire-break. The existence of these conditions will make a material difference both in the cost and effectiveness of the work. Where the fire-break runs through or adjoins privately owned land, written permission should be secured by the village officers before actual work is commenced.

It is difficult to lay down hard and fast rules regarding the width and the distance from villages of fire-breaks, as local conditions must govern the requirements in all cases.

Telephones.

Connection of lookout towers by telephone.

Telephones play a very important part in forest fire prevention, and are also of great commercial value to the communities in which they are operated.

The ideal to be striven for by the Service is the connection by telephone of all lookout towers, with the Ranger's headquarters. When the erection of a Forest Service phone line is planned, due consideration must be paid to its location regarding the settlements through which such line must pass.

Probably the greatest expense in the erection of a phone line is that of labor. This

can be considerably reduced by securing the assistance of interested persons along the route.

When the phone line runs through or adjoins privately owned land, written permission should be secured by the officer in charge before construction is commenced.

Permission to run through private land.

A telephone expert is placed in charge of Forest Service work of any magnitude, and Rangers are expected to secure his advice regarding the practicability of any telephone scheme they may have under consideration.

Expert in charge.

Notices.

Two forms of notices, entitled (1) "Help" and (2) "Consider" are issued by the Forester. The "Help" notice is to be used in the timbered section and the "Consider" notice is intended to be displayed in the prairie regions adjacent to the forests. These notices will be supplied to Rangers by the Forester upon request.

Warning fire notices.

The plentiful use of these warning notices in conspicuous places is important.

In dangerously dry seasons, it may be necessary for Rangers to issue special warning notices. When conditions warrant the issue of special notices, Rangers should submit a copy for the approval of the Forester.

Issue of special notices by Rangers.

When it is apparent that willful mutilation of warning notices has taken place, field officers should endeavor to locate and arrest the guilty person or persons. Section 18 of the Forest Law provides a penalty for any one convicted of this offense.

Punishment for destroying notices.

FOREST FIRES.

Kinds of Forest Fires.

All forest fires start as small fires. Three kinds are distinguished:

Surface fires.

1. Surface fires, which spread over the surface of the forest floor, fed by debris and undergrowth.

Ground fires.

2. Ground fires, which smolder or burn only in the ground, consuming duff and humus and often the roots of trees.

3. Crown fires, which consume the entire forest cover. Nearly all crown fires start from ground or surface fires, and in order for fire to get into the tree crowns, the foliage must be close to the ground, or else the litter and undergrowth must be very heavy and inflammable.

Causes of Forest Fires.

Crown fires.
Hot dry seasons decrease amount of moisture in forest.

It needs no argument to prove that dry wood burns better than wet, nor that droughts, hot seasons, hot waves, and warm winds decrease the amount of moisture in a forest and thereby increase the fire hazard. Nevertheless, it is not true that every drought is coincident with great fires, nor is it strictly true that all great fires have followed hot seasons. Other factors, such as wind, topography, and the inflammability of the type of forest in which a fire occurs, bear upon the hazard. Moreover, its origin determines to some extent whether or not a fire will become a great conflagration.

Other factors.

The following table classifies the various causes of forest fires and will serve as a ready reference:

CLASSIFICATION OF THE CAUSES OF FOREST FIRES.

FOREST FIRES.

Preventable; caused by man.	Intentional.	Sparks or ashes from engines.	INCENDIARY.
			Maliciousness or willful negligence. Contempt for the law. To cover crime. To drive game.
	Unintentional.	Generally from uncontrolled fires.	RAILROADS.
			Passenger, freight and work engines. Steam shovels and plows. Logging engines.
Generally unpreventable			SAWMILLS.
			Permanent mills. Temporary mills. Portable mills. Donkey engines.
			BRUSH BURNING.
			Clearing lands or right-of-way. Slash, rubbish, or garbage burning. Stubble or meadow burning.
			CAMPERS.
			Construction campers. Recreation parties and picnickers. Miners and prospectors. Hunters and fishermen. Berry pickers. Cruisers, surveyors and river drivers. smokers, children, tramps, drunks.
			MISCELLANEOUS.
			Fires from burning buildings, or from prairies or other fires, if the origin of the original fire is not known. If origin can be determined it is classified accordingly.
			Sparks from chimneys, and stacks other than those classified under "Railroads" and "Sawmills."
			Blasting, except as covered by the classification "Brush Burning."
			From electric wires, unless accompanied by lightning.
			Spontaneous combustion, either chemical or mechanical.
			UNKNOWN.
			Includes fires the cause of which is not determinable with reasonable certainty.
			LIGHTNING.

Factors Necessary For Effective Fire Control.

Three very essential factors that contribute to the effective and economic control of forest fires are the discovery of a forest fire in its incipency, an accurate knowledge of the locality by the forest officer in charge of fire fighting operations, and the employment of efficient fire fighters.

When a fire has gotten a start, spreading over an acre or more, and the condition of the forest cover is favorable to the spread of such fire, the forest officer should not make any futile attempts to extinguish it, but should summon the necessary help.

If sufficient help is not available in the vicinity, the forest officer should place a capable man in charge and proceed to the nearest settlement or village where the necessary help can be obtained.

The success of fire fighting operations will rest partly with capable leadership and partly with the ability of the fire fighters employed. Forest officers in securing men should endeavor to hire men who have an interest in the extinguishment of the fire, and are used to hard manual labor. Loafers and hangers-on should only be engaged on occasion of extreme urgency.

The number of men required will be controlled by the weather and condition of the forest cover and by the proximity of any natural or artificial fire-breaks, which may be a lake, river, wet swamp, ditch or highway. Forest officers should bear in mind, however, that in forest fire fighting, it is an economic policy

to have sufficient help at the commencement of operations, and therefore in their desire to economize financially, should not do so at the expense of an effective force.

Whenever any choice of time exists, the night or early morning hours are the best time to accomplish effective fire fighting as forest fires die down during the night time and flare up again during the day, rendering fire fighting operations during the latter period less effective.

The long handled shovel, mattock, hoe and axe are the tools that will be most used in fighting fire. A wet sack where water is obtainable can also be used to advantage in fighting surface or ground fires.

The value of the long handled shovel cannot be overestimated, and is to be preferred to any other tool for general fire fighting purposes.

Every effort should be made by field officers to control forest fires by such methods as trenching, covering with dirt, or quenching with water. Only when any or all of these methods have been tried and found ineffective, should back-firing be resorted to. All due precautions should be taken in setting back-fires.

It is necessary that a definite line be established, if not already existing, in the form of a highway or river, in order that the back-fires may be effectually controlled and made to serve their intended purpose. The greatest care should be taken to preserve as much green timber or property as is consistent with effective fire control.

Time to
fight fire.

Tools for
fighting fire.

Use of
back-firing.

Hiring suitable
men for
fire fighting.

Number of
men required.

General Rules—Fighting Forest Fires.

In fighting fire, the following general principles should be carefully studied by field officers:

1. Do not get excited. A little thinking often saves labor and makes work successful. Ill-planned efforts suggested by haste and excitement rarely lead to success.
2. Protect human lives first and foremost, by directing them to safety.
3. Protect the valuable timber rather than the brush or waste.
4. Never leave a fire, unless driven away, until it is put out. When a patrolman, under stress of work, has to absent himself from a fire, he should always put a competent man in charge.
5. Young saplings suffer more than old, mature timber. A surface fire in open woods, though not dangerous to old timber, does great harm by killing seedlings.
6. A fire rushes up hill, crosses a crest slowly, and is more or less checked in traveling down. Therefore, if possible, use the crest of the ridge and the bottom as lines of attack.
7. A good trail, a road, a stream, or a clearing, checks the fire. Use them whenever possible.
8. Dry sand or earth thrown on a fire is usually as effective as water and easier to get.
9. In peat bogs or muskeg, ditching is the only effectual means to stop a fire spreading.

Payment of Temporary Fire Fighters.

When it is necessary to hire men to fight fire, their wages shall be paid from the time they

Fire fighters
to be paid.
Rate of pay.

are summoned and retained by the forest officers.

The law provides a maximum wage of twenty-five cents per hour, and this cannot be exceeded. In some districts the going wages will be a considerably lower rate than this, and Rangers are instructed to accordingly fix the rate of wages in their districts in conformity with it.

In cases where Rangers furnish provisions and lodgings for the fire fighting crew, a proportionate allowance must be made by Rangers in the wages paid.

When it is necessary to transport fire fighting crews some distance to a fire, all costs incurred for transportation must be paid by the Ranger.

Special time books are provided; these are to be used by field officers for keeping the time of temporary laborers. When several fires are burning at the same time, necessitating the employment of separate crews, comprised of many men, one man of each crew should be commissioned as time-keeper. The patrolman directing fire fighting operations should make the rounds of the various crews and check up the time recorded by the several time-keepers, transferring the complete time report to the Ranger's office at the conclusion of fire fighting activities.

The patrolman in charge should secure the signatures of all laborers employed, on a temporary labor voucher. In order to avoid disputes, the patrolman should draw the attention of the laborer to the amount to which he is entitled, as no alterations can be made when once the laborer's signature is attached.

Wages to be
paid when
board is
furnished.

Cost of
transporta-
tion.

Keeping time
of fire
fighters.

Payment of
fire fighters.

Fire fighters
paid through
local banks.

Banks to
submit
vouchers
through
Forester's
office.

Owner's
liability.

Township
liability.

Arrangements have been effected by Rangers with local banks whereby they handle the temporary labor vouchers without any charges. By this method the laborer gets his wages at the completion of his work, and its general adoption is recommended.

All temporary labor vouchers thus paid by banks must accompany the auditor's voucher for the total amount, and should in any case be submitted through the Forester's office. No vouchers will be allowed unless approved by the District Ranger.

Meadow and Peat Bog Fires.

The expense incurred in the extinguishment of any meadow or peat bog fire should be borne by the person or firm on whose land such fire is burning.

Forest officers should notify the owner or owners on whose land such fire is burning, and acquaint them with the provisions of the law. (See Sections 18 and 22, State Law.)

In townships where there is a probability of meadow or peat bog fires starting, Rangers should recommend the provision of the "Fire Fund" by the five mill tax.

The amount of the State appropriation available for fire prevention and suppression is insufficient to do more than to properly provide patrol and protection of the heavily timbered area, where forest fires resulting in loss to life and property are liable to occur.

Consequently meadow and peat bog fires which, if taken care of in their incipency, are easily controlled and are not dangerous to life and property, should be taken care of by the owner or owners of the land whereon such fires

are situated, or by the local township authorities.

Investigation of All Forest Fires.

It is the duty of forest officers to carefully investigate all fires that occur in their respective districts, with a view to ascertaining if such fires have been wilfully set, and, if evidence to that effect can be obtained, to arrest the offender.

Officers must bear in mind that an arrest does not necessarily mean a conviction, and that their cases must be supported by direct and reliable evidence. The testimony of a credible witness, that he saw the defendant set the fire, is the best evidence, but it is sufficient to convict if circumstances prove beyond a reasonable doubt that the fire was set by him.

The Forester to Be Notified of Conditions.

Rangers should notify the Forester by wire immediately on the outbreak of serious forest fires in their districts and should keep him posted on the conditions.

Telephone or telegraph messages should be carefully worded and explicit. Where long distance telephone communication is available, Rangers should ask for the State Forester, State Capitol, St. Paul. Telegrams should be similarly addressed. Both forms of messages should be signed with the Ranger's surname only.

RECONNAISSANCE SURVEY.

Mapping.

It has been found that maps of the timbered region of Minnesota are inadequate, and in

All fires
must be
investigated.

Evidence
and witnesses
necessary to
obtain
conviction.

the northern part of the State are in some cases inaccurate. With the exception of the work undertaken and recorded by the field officers of the Forest Service, there has been no systematically conducted soil or timber survey undertaken in Minnesota which records forest and agricultural types.

The work of the Forest Service demands reliable maps so that the field force, through the information furnished by such maps, can perform more effective fire fighting work and so that the location of such areas as are suitable only for producing timber can be determined with a fair degree of accuracy. Surveys by special reconnaissance parties can then be made to obtain what additional data and information is needed for the permanent maintenance of all such tracts in forest growth.

The 6-inch blank township diagrams supplied to Rangers are intended to be used in field work, and are the same scale required on the district maps. It is not intended that Rangers should draw elaborate maps; accuracy should be their main objective. All symbols and lettering should be plain and legible.

The sectional plat books supplied are to be used in recording forest conditions, soil and timber types. Each book contains 108 pages, sufficient for recording the conditions by sections of three townships. Space is also provided for field notes. Field officers are instructed, when commencing any classification records in these plat books, to number the townships, and the sections in such townships, consecutively. For the purpose of ready reference, the numbers of the townships exam-

Why reliable maps are required.

Use of blank township diagrams.

Sectional plat books—how to use them.

ined should be written in ink on the front cover. The Ranger's name and postoffice address should also appear inside the cover, so that in the event of loss, it could if found, be more readily returned.

Base Maps.

Each Ranger will receive copies of a base map of his district. This base map has, for the sake of convenience, been divided into quadrangles.

A special tube will be used in transmitting these prints by mail and should be kept only for that purpose.

On receipt of these base maps, Rangers are instructed to forward a "Transfer of Property" Form B to the Forester's office. Such maps will be regarded as permanent property.

The copies issued to the Rangers are to be used as follows:

a. One copy shall show all improvements, marked **clearly** and **accurately**, and shall include railroads, towns, roads, trails, fire-breaks, ditches, portages, lookout towers, telephone and telegraph lines.

b. One copy shall show types of agricultural soil and types of non-agricultural soil.

c. One copy shall show forest conditions; whether the land is covered with merchantable timber, whether it is reproducing and covered with young growth, or whether it is entirely devoid of any tree growth.

The base maps with the data thereon recorded will be submitted to the Forester's office at St. Paul. A letter will be sent out to the Rangers giving the date when it is desirable to call in the field work.

Issued from Forester's office.

Special tube for transmission of maps.

How used.

Maps sent to Forester.

There will be kept in the Forester's office a permanent map of the forested area, to which the data secured by the Rangers can be periodically transferred.

When the data contained on these prints has been transferred to the permanent map in the Forester's office, the copies will be returned to the Rangers, for recording additional new data. Such copies of base map will be used as long as they are serviceable, and as long as the data shown on them can be practically recorded. If a print becomes unserviceable for any reason, it must be returned to the Forester's office, and a new one will be issued. Rangers will use Form A, Ranger's Requisition, when ordering new prints.

Rangers are not required to secure data in more than their own districts, and if any quadrangle contains a part of another Ranger's district, this part should be left blank.

In order to secure uniformity, the scale should be one inch to the mile. This scale is about the smallest compatible with the practical use of symbols, which are employed to denote the conditions of soil and timber shown on the maps. When it is necessary to draw either enlarged or reduced maps of any part of a district, Rangers should use a proportionate ratio, 2, 4 or 8 inches in the case of larger maps, and $\frac{1}{2}$, $\frac{1}{4}$ or $\frac{1}{8}$ inch where a reduction is required.

In the event of forest fires occurring which burn over considerable territory, it will be advisable to record on a special map the area burned over.

Patrolmen will return all plats, township diagrams and maps to the District Ranger at the























completion of their services, and the Ranger will instruct them so to do.

Patrolmen will be supplied by the District Ranger with the necessary blanks and prints of the district. There should be a special effort on the part of all field men to make all data and information collected a matter of record.

In order to simplify and standardize map work in the Ranger's office and in the field, so that in transferring the data to the permanent map in the Forester's office mistakes may be avoided, the following list of conventional signs has been prepared:

Symbols.

DESIGNATIONS FOR IMPROVEMENTS

 Fire Line	 Cabin
 Wagon Road	 Logging Camp
 Trail	 Sawmill portable
 Railroad	 Sawmill, stationary
 Telephone Line	 Mine location
 Ditch	 Triangulation station
 Bridge	 Lookout Tower
 Patrolman's hdqrs	 P.O. Post Office
 House (settlers)	 Bench Mark
 School	 Portage
 Church	 Dam

Unserviceable prints.

Quadrangles containing part of another District.

Extra Maps—Scale to be used.

Forest fires—Special maps required.

Return of data.

In order to secure uniformity in coloring maps, boxes containing 12 colored crayons are furnished with a descriptive label for use in field and office.

DESIGNATIONS FOR SHOWING TYPES OF LAND.

Agricultural Land.

- 2 Upland.
- 8 Drainage lands.
- 34 Improved.

Non-Agricultural Land.

- 21 Rock.
- 24 Sand or gravel ridges, old lake beds.
- 27 Clay with boulders.

Designations For Showing Forest Conditions.

- 13 Merchantable conifers.
- 44 Merchantable hardwoods.
- 14 Culled conifers.
- 19 Cut-over conifers.
- 11 Reproducing to hardwoods.
- 16 Reproducing to conifers.

Reconnaissance.

This reconnaissance work by Rangers and their patrolmen must necessarily be accomplished at times when there is no fire danger threatening or slash disposal work to be taken care of. Fire prevention is the most important task at the present time, but field officers are instructed to diligently avail themselves of any opportunities that will occur in "off" seasons to record approximately the location and extent of agricultural and non-agricultural or forest land.

When reconnaissance work should be done.

Rangers and patrolmen are instructed to use great care in recording soil and forest conditions. When it is apparent that the general character of the land is strictly non-agricultural, Rangers should indicate the approximate boundaries of such land and submit a report to the Forester. Special reconnaissance parties are detailed by the Forester to make careful studies of any areas that are considered specially adapted to timber growth.

Special reconnaissance parties.

Forest fire prevention and land classification are the two important initial steps that must necessarily precede the work of reforestation. It is obvious that in order for any stand of timber, particularly small, immature trees, to grow to a merchantable size, forest fires must be reduced to a minimum. The vast areas of cut-over non-agricultural lands, both State and privately owned in Minnesota, should be reforested and producing timber, thereby securing a revenue to the owners and to the communities. Therefore, field officers are urged to use their best efforts toward securing effective fire prevention. Several million acres of forest land throughout the State already have excellent stands of young, healthy timber.

Reforestation.

Importance of Land Classification.

The importance of land classification is as necessary from an agriculturist's standpoint as from the forester's. Many farmers are now attempting to farm land that is most unprofitable, and could be more suitably and profitably employed growing timber than for any other purpose. Again, in the vicinity of rich agricultural districts, there may be a barren ridge, which has been considered worthless by a

Agricultural and non-agricultural lands.

farming community. With such a ridge planted to suitable trees, it will be found to be as great a revenue producer and equally as necessary to the community, when once it has begun to yield merchantable timber, as any of the adjacent farming land.

All non-agricultural lands to be recorded.

Forest officers, in classifying land, will make careful notes of the existence of barren ridges and young growth of pine with due regard to the location of nearby settlements. It may be possible in some cases for adjacent municipalities to secure for themselves such tracts for municipal forests. The fact must be borne in mind that the main objective of the Forest Service is economical production of timber on all non-agricultural lands within the State, and field officers are directed to study the work of fire prevention and land classification with this object in view.

Method of Classifying Lands.

As this classification work must be done in the forest, the results attending it will depend largely on the experience and ability of the man conducting such work, but the following suggestions may be helpful and tend to standardize classification work.

Horse-shoe method.

In traversing a section, and in order to see every forty on such section, the horse-shoe method will usually give the best results.

In recording distinct types, such as muskeg, or ridges, a definite line should mark the limits of the types.

Regarding data.

In recording data in these books, it will be necessary to use written definitions in conjunction with the conventional signs. The date, the method of survey used, the starting point, the

direction, as well as any unusual or exceptional conditions on any particular section, should be carefully recorded in the space provided, at the time the observation is made.

Units of Distance and Area.

7.92 inches=1 link.

25 links=1 rod.

100 links, 66 feet=1 chain.

320 rods, 80 chains=1 mile.

160 square rods=10 square chains=1 acre.

640 acres=1 square mile or section.

INDEX.

DISTRICTS.

How bounded.....	6
Matters affecting two or more districts.....	7, 8, 9
Who is responsible for district.....	6

EDUCATIONAL.

Fire prevention day.....	44
Forests are natural assets.....	42
Publications	43
Uniforms	44
Volunteer fire brigades.....	43

FORESTED AREA OF MINNESOTA..... 5

FOREST FIRES.

Causes	78-79
Factors necessary for effective control	
80, 81	
Forester to be notified of conditions....	85
General rules for fire fighting.....	82, 83, 84
Investigation of.....	85
Kinds	78
Meadow and peat-bog fires.....	84
Payment of temporary fire fighters	
82, 83, 84	

IMPROVEMENTS.

Cabins	74, 75
Fire-breaks	75, 76
Lookout towers	72, 73, 74
Notices	77
Object of.....	71
Telephones	76, 77
Trails and portages.....	71, 72

MINNESOTA FOREST SERVICE.

Organization	5, 6
Purpose of.....	5

PATROLMEN.

Appointment of.....	33
Duties	35, 36
Equipment	40
Expense	41, 42
Federal	34, 35
Leave of absence.....	41
Patrolman-at-large	36, 37
Records and reports.....	40, 41
Salaries	34
State	34, 35
Township.....	37, 38, 39

RANGERS.

Appointment	11
County Commissioners.....	31, 32
Duties.....	11, 12, 13, 14
Equipment.....	22, 23, 24, 25, 26
Expense.....	15, 16, 17
Instructions for transfer of property...	27
Leave of absence.....	28, 29
Legal help.....	31
Memorandum	21
Records, reports and correspondence	
18, 19, 20	
Relation of forest officers to the public.	32
Salaries	11
Work outlined for the year.....	29, 30, 31

RAILROADS.

Attitude to the public.....	70
Duties of.....	62, 63
Fire-breaks	68, 69
Improvement of railroad company's	
methods	70, 71
Patrolmen.....	64, 65, 66, 67, 68

Privileges allowed forest officers.....	69, 70
Rangers to record condition of rights-of-way	67, 68

RECONNAISSANCE SURVEY.

Base maps.....	87, 88-89
Importance of land classification.....	91, 92
Mapping	85, 86
Method of land classification.....	92, 93
Reconnaissance	90
Units of distance and area.....	93

SLASH DISPOSAL.

General rules	53 to 58
Lumbering	49, 49
Roads, ditches, railroads and rights-of-way	59, 60, 61, 62
Slash notices	50, 51, 52, 53

SPECIAL CO-OPERATION.

Rural mail carriers.....	48
Settlers.....	46, 47, 48
Subsidiary organizations.....	44
Townships	45