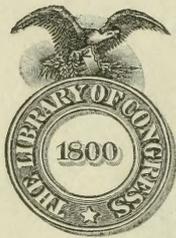


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Pennsylvania Dept. of Forestry.

Forster's manual.

1912.



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December 1912

Commonwealth of Pennsylvania.

Department of Forestry.

FORESTER'S MANUAL.

PART I.

GENERAL INSTRUCTIONS
OUTLINE FOR ANNUAL REPORT
INSTRUCTIONS UPON FORMS

13-33001

HARRISBURG:
C. E. AUGHINBAUGH, PRINTER TO THE STATE OF PENNSYLVANIA.
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GENERAL INSTRUCTIONS.

1. The business of the Department is increasing rapidly, and time must be saved in every possible way. Uniformity in terms used, in statements of expenses, and in various kinds of reports is absolutely necessary. Brevity and conciseness can best be obtained by tabulated data, and with this idea in view many of the forms have been evolved. Some have been taken almost without change from the records of forest management abroad, but in most cases time-tested forms have been used as the basis and such changes made as were necessary to make them of most value to the Department.

2. In many cases details will have to be given on separate sheets or on the back of forms dealing with the particular subject which needs to be set forth at greater length than is called for in the form itself.

3. The Department of Forestry uses a great many kinds of forms, a few of which do not concern the foresters or rangers in the field. Each forester should have a supply of all necessary forms on hand.

4. Each forester should be sure to place his name and the date in the right hand corner, at the top of each form or sheet used. No paper should be filed or sent from a forester's office without being dated and signed.

5. Careful attention should be given as to what each form is and to the instructions for using it. Many times the business of the Department is burdened or delayed by reason of the fact that forms must be returned with repeated instructions for correction.

6. Fill out proper report form as soon as each operation is finished and file it.

7. Use one form sheet for each operation, to be kept as part of reserve file. For report to Department in some cases one sheet may be used as a summary.

8. Keep a duplicate of each report.

9. Tabulate as much material as possible.

10. Always include cost of rangers' and foresters' time in the cost of any operation.

11. On forms upon which financial statements are made, as voucher, receipt, pay roll, etc., no erasures are permitted. If errors are made, new forms must be filled up.

12. The terms "miscellaneous items," "incidentals," and similar ones must not be used.

13. Neatness in all cases is required, and proper English is insisted upon.

14. The work in which the Department is engaged is for the benefit of the whole people of Pennsylvania. Money appropriated by the Legislature is taken from the people's money in the Treasury. Every citizen, therefore, has a direct interest in the work.

(a) Every forester must keep his records in such shape that he may be able, on a moment's notice, to turn to any item of operation

or expense and give what information may be desired, either by an official of the State or by a citizen.

(b) All records and operations must be open to inspection.

15. Make notes as to improvement of forms or outline and submit the same with your annual report.

16. If in doubt concerning anything, write immediately to the Department for information and assistance.

17. Order all forms by number.

18. Forms have been made uniform as to size, either $8\frac{1}{2}$ x 7 or $8\frac{1}{2}$ x 14 inches.

(a) One fold is sufficient in the case of the small size.

(b) To fold the large size

1—When the heading is across the $8\frac{1}{2}$ inch side, take the form at the bottom of the sheet in right hand and fold in half to the top, and then fold in half again in similar direction. Any backing may now be placed on the upper surface of the fold at the left end.

2—When the heading is across the 14 inch side, take the left edge of the form and fold over to the right, and then fold in half again in similar direction. A backing may now be placed upon the form, at the top, as it lies folded.

19. All report material not written on forms must be on paper of the same size as the forms, viz., $8\frac{1}{2}$ x 14 inches, or on regulation typewriter size, viz., $8\frac{1}{2}$ x 13 inches.

20. The following definitions shall prevail in the service:

(a) A reserve is a large contiguous tract of State land.

(b) A division is that portion of a reserve under the direction of a forester or assistant forester.

(c) A range is that portion of a division under the protection of a ranger.

(d) A block consists of a number of adjoining compartments, as for example, those within a certain watershed, or covering a certain mountain, and may be designated by the name of the stream, or mountain, or by some local historic name.

(e) A compartment shall be considered as the smallest unit of management.

1—The boundaries should be either natural features or roads and trails.

2—The area should not exceed 300 acres, and wherever possible should average much less. Uniformity in area is desirable.

(f) A sub-compartment is the area occupied by a growth of more or less even age, a pure stand, or an area exhibiting a distinct soil quality, etc.

1—A sub-compartment may be permanent or temporary.

2—There should be as few as possible.

OUTLINE FOR ANNUAL REPORT OF FORESTER.

The forester's report for each year must be submitted to the Department on or before January 10th of the succeeding year, and must conform to this outline. In the year preceding a legislative session a preliminary report must be submitted covering the main features of the outline, and must be in the Department by the 15th of November.

Deal with each item in the outline each year. Where desired information is lacking or does not exist, a statement to this effect must be made, e. g., if there have been no fires upon the reserves, say "No fires this year." When necessary, incorporate the material of the previous report. As the forester becomes more familiar with his reserve he will be able to change his statements to what is more nearly correct. As surveys progress, areas, ages, volumes, etc., will be definitely known.

1. Name of reserve, if named, and situation by counties; also subdivisions when definitely determined. See Form 37.

(a) Each year should add something to the historic record of the reserve, and whenever items of interest are obtained records should be made at once. Historic record must be revised in report of years ending in 0.

(b) A report of the following features is to be made at the end of the first full year that a forester has been on his reserve, and revised thereafter in years ending in 5.

1—Geologic characteristics, naming group or groups of rocks showing on surface, character of soil, and whether surface is of glacial deposit.

2—General topography of reserve, stating whether plateau, hilly, or mountainous, and naming approximately the proportion of each.

3—Local climatic conditions.

2. Forest Staff:

(a) Rangers.

(b) Other regular employes.

(c) Statements concerning them.

3. Status of boundary survey,—completed or not; condition of boundary line,—brushed, painted, and posted or not; statements or suggestions concerning the same; corners.

4. Interior or exterior tracts,—difficulties or advantages arising therefrom; tracts State should own and why; information of value relative to possible purchase.

5. Areas: (Tabulate and revise from year to year as the reserve is more familiarly known. Always give previous year's estimates and indicate any areas actually surveyed.) Submit whenever possible a map of the reserve showing these areas. See Forms 37, 38, 39.

(a) Total area added by years; virgin forest, if any.

(b) Area covered with mature or hypermature forests, and approximately the volume according to material it would produce; species, market conditions, and proposed meth-

ods of operations in detail, including methods of regeneration.

- (c) Area covered with stands having a density of 50 per cent. or over. Divide this area into two classes:

1—Number of acres not in need of improvement.

2—Number of acres in need of improvement.

State approximately the amount of wood product which may be removed, noting form and species and possible present markets.

State conditions under which operations may be made profitable.

State what must be done to bring the stands to normal density.

- (d) Area with scattered trees from a density of 10 per cent. up to stands having a density of 50 per cent.; species, and amount of material which should be removed, market conditions, etc.

State what must be done to bring the stands to normal density.

- (e) Area, not included in above, covered with brush or weed growth, as scrub oak, bracken, briars, huckleberry bushes, etc.

State proportion of this area which will be naturally reforested by a growth of valuable species if protected from fire and grazing: Reforesting of remaining portion; amount of fire killed timber.

- (f) Area of open ground where seed or seedlings may be planted now with little or no difficulty, as old fields, mill sites, severely burned areas, etc.

- (g) Area covered with rocks, where no cutting ought to be done, or where no regeneration can be expected.

- (h) Area covered with water;—lakes, dams, ponds, and streams.

- (i) Area used for roads and trails.

- (j) Area used for fire lanes.

- (k) Summarize areas from above where reforesting by planting is not justified at present rate of cost.

6. Springs and Streams:

- (a) Locate all springs on map.

- (b) State whether springs are cleaned, made accessible, or posted (named).

- (c) Data with reference to flow of springs. Continuous or not; unusual flow or drying up, and probable cause of same, whether due to climatic conditions, humus conditions, drainage, or other cause.

- (d) Condition of streams generally.

1—Regularity of flow.

2—Contamination.

(a) Possibility.

(b) Prevention.

7. Buildings and repairs:

- (a) Condition of all buildings on reserve.

- (b) Need of repairs or new buildings.

- (c) Fences.

- (d) Telephone lines existing on or near the reserve; service, expense, need of extension, etc.
 - (e) Other conditions necessary for comfort and efficiency of personnel of the service.
8. Roads. See Form 36.
- (a) Distinguish carefully between extension and improvement as indicated at head of form.
 - (b) Blasting, brushing, rebrushing, bridging, etc., should also be kept separately.
 - (c) Improvements should be specified on the reports and cost reported on a basis per 100 feet of total length, not simply upon the distance covered by the improvements.
 - (d) Outline of road system as planned to date, or map of the same. This can be made only after a careful consideration of markets and of configuration of reserve.
9. Easements:
- (a) Rights of way.
 - 1—Conditions relating to all such rights.
 - 2—Good or bad features.
 - (b) Other easements.

(An easement is a right to exercise a privilege adversely to the owner of the title.)
10. Leases:
- (a) Revenues, and material removed.
 - (b) Benefits or detriments.
11. Minerals and other valuable products.
12. Seed Collection:
- (a) Date.
 - (b) Species.
 - (c) Amount.
 - (d) Cost per unit of measure to time of planting or shipment.
 - (e) Quality.
 - (f) Amount to be used by self.
13. Plantations: See Forms 33, 34, 35.
- (a) Date on each form should be the date on which plantation is made.
 - (b) Planting Summary (Form 34).
 - 1—Make separate statements of seeds planted in nursery and of those placed in plantations.
 - 2—Must correspond with the totals of plantation reports.
 - 3—Indicate with red ink, seed and plants collected, raised and planted on your own reserve.
 - (c) Measurement of past plantations must be revised and kept to date. See Form 35.
 - (d) Area (total) planted to date with seeds and with seedlings.
 - (e) Amount (total) of seeds and number of seedlings by species planted to date on reserve (not in nursery).
14. Nurseries:
- (a) Date established and area at time of establishment.
 - (b) Area in current year.
 - (c) Inventory of seedlings by species and age.
 - (d) Number of seedlings available for spring planting, giving species, age, and cost per thousand.

- (e) Number of seedlings shipped to individuals during year.
 - 1—To foresters or rangers for reserve planting, giving name, place to which shipped, number of each species according to age, and price per thousand.
 - 2—To private individuals, giving name, address, species, age, number, and price per thousand.
 - 3—Number used on own reserve.
- (f) Amount of seed planted in nursery. See Form 34.
- (g) Statements concerning temporary or permanent improvements and general nursery conditions and work.
- 15. Sample Plots, Experimental Plantations, etc.:
 - (a) When established.
 - (b) Name.
 - (c) Location.
 - (d) Area.
 - (e) Object of development.
 - (f) Measurements past and present. (Tabulate all data).
- 16. Labor Conditions:
 - (a) Wages per day or per hour per man.
 - (b) Wages per day or per hour for teams, with and without drivers, etc.
 - (c) Reasons for high or low wages.
 - (d) Scarcity and quality of labor, and cause for same.
- 17. Improvement Cuttings: See Forms 13, 31, 32.
 - (a) Conditions existing previously.
 - (b) Conditions subsequently and benefits expected.
 - (c) Conditions of improvement cuttings of previous years.
- 18. Market Conditions:
 - (a) Needs of the district.
 - 1—Specifications.
 - 2—Species.
 - 3—Quantities used per year.
 - 4—Prices.
 - (b) Transportation facilities.
 - (c) Railroad rates.
 - (d) Possibilities with reference to the reserve in detail in accordance with present market conditions.
- 19. Data with reference to growth. See Forms 35, 39, 40, 41, 42.
- 20. Erosion.
- 21. Insect or fungus attacks.
- 22. Forest Fires: See Forms 17, 19, 49.
 - (a) Statements not covered by forms.
 - (b) Observatory stations.
 - (c) Fire wardens and their work.
- 23. Trespass and fines:
 - (a) Violations of forest, fish, and game laws, or reserve rules reported and disposition of cases.
- 24. Outing and Recreation:
 - (a) Camps and campers.
 - 1—Number.
 - 2—Matter with reference to their conduct.
 - 3—Hunting:
 - (a) Number of deer killed on or in the neighborhood of the reserve,

(b) Other game.

4—Fish and fishing.

(b) List of camp sites by common name and location.

(c) Other uses of reserve for outing and recreation.

25. Inventory: (Use separate sheets.)

(a) All tools on reserve, condition, and value.

(b) All other property belonging to Commonwealth:

1—Books.

2—Instruments.

3—Stock.

4—Implements.

5—Other material not before enumerated.

26. Summary of Accounts of the year. See Forms 30, 31.

27. Summary of suggestions.

28. Budget for succeeding year:

(a) Labor proposed and estimated expense in detail.

1. Road Work:

(a) New roads, Name Length.

(b) Old roads to be repaired or brushed. Length.

(c) New fire lanes Length

(d) Old fire lanes to be brushed, miles

(e) New trails to be cut.

(f) Estimated cost of (a) \$.....

(g) Estimated cost of (b) \$.....

(h) Estimated cost of (c) \$.....

(i) Estimated cost of (d) \$.....

(j) Estimated cost of (e) \$.....

Total estimated cost, \$.....

2. Improvement Cuttings:

(a) Estimated area to be improved,acres.

(b) Estimated amount of material to be derived from improvement cutting.

(c) Estimated value of product so obtained, \$.....

(d) Estimated cost of suggested improvement work, \$.....

3. Repairs to buildings:

(a) Cost of such recommended repairs, \$.....

4. Other suggested improvements:

(a) Probable cost, \$.....

(b) Seeds and seedlings required:

1. Seedlings needed for planting during the year.

Species Quantity Spring or Fall.

2. Estimated area in acres to be covered by the above planting.

3. Quantity of tree seeds needed for planting in experimental plots or nurseries.

Species Quantity

(a) Estimated cost of planting, \$.....

(c) New or altered equipment.

1. Estimated cost, \$.....

(d) Other items of expense.

INSTRUCTIONS UPON FORMS.

1 and 2.

Vouchers for expenses paid from appropriation to Department for contingent expenses. They are used only in the office of the Department.

3 and 4.

Vouchers for all Reserve Expenses.

1. Vouchers will be made up in the Department.

2. Statements for vouchers must be submitted in detail by letter, setting forth bill, by name and amount, as

Pay roll,	\$150 67
John Jones,	11 00
John Smith,	6 77

3. Railroad fare must be indicated in this manner:

Jan. 14. To railroad fare, Harrisburg to Summerville, P. R. R., 250 miles (mileage),	\$5 00
To railroad fare, Summerville to Clarion, P. S. & C. R. R., 16 miles (ticket),	65
16. To railroad fare, Clarion to Summerville, P. S. & C. R. R., 16 miles (ticket),	65
To railroad fare, Summerville to Harrisburg, P. R. R., 250 miles (mileage),	5 00
20. To railroad fare, Harrisburg to Lebanon and return, P. & R. R. (ticket),	1 05

Mileage books should be used whenever possible.

No receipt need be taken.

Pullman fare checks will be accepted as receipts.

4. Trolley fare must be indicated:

Jan. 24. Trolley fare, Mt. Pleasant to Greensburg,	\$0 20
--	--------

No receipt need be taken.

5. Livery or automobile hire should always be accounted for by receipt (Form 7) or by receipted bill on liveryman's bill head, the latter preferred.

The entry on the receipt or bill should be:

Horse and buggy, Muncy to Eagles Mere and return, 20 miles,	\$3 00
Or, Double team, and driver, Milford, to Blooming Grove, 21 miles,	8 00
Or, Automobile, Renovo to Crossfork and return, 30 miles,	9 00

6. Express and freight charges must be accounted for by submitting receipts on the respective company's receipt form.

7. Telephone charges should be entered according to date and places between which the telephone was used.

8. Charges for single meals obtained at restaurants, or on dining cars enroute, must be noted as follows:

Jan. 14. To dinner enroute, P. R. R. diner
 4447, \$0 90
 No receipt need be taken.

9. Hotel charges should always be accounted for by receipt (Form 7) or receipted bill on hotel bill head.

10. Do not fail to itemize fully each expenditure for which no itemized receipt has been taken. The terms "incidentals," "miscellaneous," and the like, are not to be used.

11. In the case of surveys, hauling and boarding may be placed on pay roll (see Form 27) together with service. Separate receipts must be furnished for all other expenses incurred in the survey.

12. All expenses other than for traveling, those incident thereto, and for surveying, amounting to more than ten dollars require a separate voucher, in which case there must be submitted a receipted, itemized bill, on individual bill head, or on Form 7, which will be attached to a voucher with the following entry:

Jan. 17. To amount paid as per receipted bill
 attached hereto, \$15 85

The voucher must be signed by the individual furnishing the supplies.

13. Pay rolls, receipts and receipted bills of all kinds must be stamped "Received-Correct-Approved," and countersigned by the forester on the line provided for signature under the above words. This, of course, implies that each item has been received and approved and the charges found to be correct.

14. Where any expense is accounted for by the piece, pound, yard, bushel, hundred, etc., the entry should be as follows:

12 Meals, at 20 cents, \$2 40
 15 lbs. butter at 30 cents, 4 50
 2 dozen lanterns at \$2.00, 4 00

15. Copies of all bills, receipts, payrolls, etc., must be kept in office of each forester, and properly filed.

16. Whenever possible, pay expenses by check, indicating clearly on the stub the items for which the check is drawn.

17. No person in the employ of the Department has any authority or legal right to sign another person's name for any purpose whatever. The person who is to receive the money must sign his own name and if unable to do so, must make his mark in the usual way. The mark must be accompanied by the signature of a witness.

The form of signature is as follows:

 his
 John X. Smith. Witness: Charles Brown.
 mark

18. The general rule of fully itemized bills prevails, and every employe must take notice. Follow the practice of getting, whenever possible, bills itemized on the printed bill heads of the person to whom the money is paid.

19. Be sure to forward all bills and receipts with the voucher to which they are to be attached.

20. All bills, receipts, pay rolls and vouchers should be forwarded

to the office not later than Tuesday previous to Commission meeting, which is on the first Friday of each month.

5 and 6.

Forest Academy Vouchers.

Used only for Academy expenses.

7.

Receipt.

1. Take receipts on this form for all expenditures possible, other than those for which receipted bills are obtained.

2. No receipt need be taken for trolley fare, railroad fare, telephone and telegraph charges, single meals at restaurants or on dining car enroute, cab or hack hire.

3. Itemize each expenditure fully.

4. Pay expenses by check whenever possible.

5. Always begin receipt by name of place where the expenditure is made and follow with date of payment.

6. If receipts are taken for lodging or meals, indicate by date; if for more than self, indicate number of men, e. g.,

Aug. 1, 1911, Supper and lodging for 7 men at 25 cents,	\$3 50
Aug. 2, 1911, Breakfast and dinner for 7 men at 25 cents,	3 50
Aug. 3, 1911, Dinner for 2 men at 35 cents, ..	70
Aug. 3, 1911, Feed for two horses,	50

7. For further information, see instructions under Forms 3 and 4.

8. Be sure to stamp "Received-Correct-Approved" and countersign.

9. Date upon which material is furnished or service rendered should always be given.

10. Postage stamps must be receipted for by postmaster.

8.

This form is used only by the Commissioner of Forestry, and is for the payment of the annual charge against the forest reserves for school purposes.

9.

This form is used only by the Commissioner of Forestry, and is for the payment of the annual charge against the forest reserves for road purposes.

10.

This form is used by the Commissioner of Forestry to accept or refuse title, for the Commonwealth, to vacant land, for which application has been filed with the Secretary of Internal Affairs, notification of which has been made to the Department in accordance with Act of May 3, 1909.

11.

Land Offer.

This form is given to individuals desiring to sell land to the State. A copy of the offer is made on a similar form and sent to a forester

or inspector with instructions to examine the land previous to purchase. The report of the examiner is written upon the back of the form and returned by him to the Department. This report should state,

1. Whether or not the land offered is the land shown, if it is possible so to determine.

2. Whether it adjoins State land.

3. Character of the growth, species present, and relative percentage of total stand; age, height, diameter, density, quality of trees.

4. Soil.

5. Roads.

6. Streams.

7. Distance from market.

8. Other data.

Then should follow an estimate of the tract's worth, judging by past purchases in the same neighborhood.

12.

Contract for Purchase of Land.

Used only by the Commissioner of Forestry.

13.

Timber Cut.

1. This form is sent to those who do any wood cutting or sawing from the stump.

2. Each forester should report his cut on this form, as well as upon Form 31, so that it may be added into the total cut of the State.

3. Each forester should do all he can toward helping the Department to obtain information of this kind. Whenever he sees or hears of any individuals doing cutting of any kind, the names and addresses should be forwarded to the Commissioner of Forestry.

14.

Tabulation of Timber Cut.

Used only in the Office of the Department.

15.

Forest Fire Report.

1. For instructions concerning this form, see the form itself.

2. Each forester should keep a copy of each report made. Form 19 may be made up, to a large extent, with the aid of these reports.

16.

Bill for Extinction of Forest Fire.

1. For instructions, see the form itself.

2. It is important that these bills be forwarded as soon as possible after the fire has occurred.

3. A copy of each fire bill must be attached to the duplicate fire report, Form 15, and filed.

Fire Loss.

1. These forms are sent out each year by the Department in order to get data on loss by forest fires.

2. Foresters should fill out one of these blanks each year for the loss on the reserve of which he has charge.

3. The statements made should be carefully figured out before being set down. The loss may be made up of actual property destroyed, whether trees are standing or not, young trees not yet marketable, humus and soil. Any special features making the forest particularly desirable should be capitalized if the forest is destroyed.

Tabulation of Fire Loss.

Used only in Office of the Department.

Summary of Fires.

1. This form is to be incorporated as a part of each forester's annual report.

2. The record of each fire should be made as soon as possible after the fire has occurred.

3. All fires at which the forester or any of his men assisted in extinction, should be reported on this form. Small fires as well as large ones must be reported.

4. In reporting damage, it is better to indicate the character of the damage rather than the value. As in the case of Form 17, reference should be made to extent of damage done to young and old trees, stating whether they have been killed, badly or slightly damaged, the species most affected, etc. Especial mention should be made of damage done to any regeneration which may have been present.

5. In reporting damage to forest floor, it should be stated whether merely the surface leaves, or a part or the whole of the humus has been destroyed; also something as to the condition of the live cover of the floor before and after the fire. Sometimes damage to the soil itself may be noted.

6. Damage to game, or birds, or other features making the forest particularly attractive should be noted.

7. It will be of great interest to keep records of the time of day when fires come to the attention of the forestry officials and the time of day at which they have been extinguished. If patrol is necessary after extinction, a note should indicate the fact, and the time elapsed before everything was considered safe.

8. Total cost of extinction should include the value of the time spent by forestry officials and employees, and expenses. If individuals assist who are not paid by the Department or from the appropriation for Extinction of Forest Fires, an effort should be made to learn what time and expense they have had and make proper report on this form.

9. Be sure the cause is known before recording it. Do not guess at it. If it is unknown, enter it as such.

State Forest Reserve Rules.

1. Each forester should see that his reserve is well posted with these cloth notices.

2. They should be placed along all roads, especially near where the line of the reserve crosses a road and where roads fork or cross, at the mouth of streams, along streams, and near camp sites.

3. When notices fade or are removed for any reason, see that new ones are posted.

4. Be careful not to place the notices on trees which are likely to become valuable timber trees. Try to find old, defective trees, or trees of little value.

5. Become thoroughly familiar with these rules.

Application for Camp Permit.

1. The important thing about the application is that each individual must subscribe to the rules and regulations of the reserve. After the application has been properly filled and received at the Department of Forestry, if there is no objection to the individuals, or if there is no previous application for the same camp site, a permit will be granted.

Camp Permit.

1. These permits must be had before any one may camp over night upon a reserve. A copy of each permit is sent to the forester in charge of the reserve upon which the camp is to be located. If any one is found to camp upon a reserve without a permit from the Department, he is liable to fine or imprisonment, or both. (See Act of May 5, 1911.)

2. Every effort should be made by the members of the forest service to keep the Department informed as to the desirability or non-desirability of granting a permit to any one of the community or to any individual having improperly or illegally conducted himself upon the reserve.

3. Each forester should report to the Department all cases in which campers fail to notify him previous to locating their camp.

4. Under no circumstance must a forest official charge or collect any remuneration for rendering assistance in the location of a camp.

5. In case of campers locating upon a reserve, where there is every reason to believe that they are ignorant of the regulations, leniency should be shown. Have each one sign an application blank and forward it with explanatory letter at once to the Department and permit will be returned to forester.

Surveyors Daily Notes.

1. Notes of final running are to be entered in ink each day on this form.

2. Sketches are to be made on right hand side of sheet.
3. Sheets are to be sent to the Department weekly.
4. Enter final courses and distances only.

24.

Daily Record.

1. The object of this report is that the Department may keep closely in touch with the work being done on the reserves.

2. For the foresters, they are of inestimable value in that at the end of each month the work of all rangers, and foresters as well, may be properly classified and charged to the proper accounts.

3. With these ideas in view, this report should become a diary of each man in the service. The exact location and character of work done should be set forth in detail for each day, as well as the amount of time in hours spent at each operation; also in red ink the account or accounts to which each days work is charged. No one should hesitate to tell exactly where he has been and what he has been doing.

4. The time of foresters and rangers costs value to the State, and consequently should be accounted for just as other expenses must be, and the time spent at each operation, or kind of service, should be charged against that operation or service at a rate per hour, determined by dividing the salary per month by 250, which rate shall be known as the "service" rate.

5. When each operation, other than distinctly administrative duties, has been properly charged for time given it at the "service" rate, the sum of the items should be taken; the difference between the forester's monthly salary and this sum should be charged to general administration. In case the sum of the items amounts to more than the monthly salary, the difference may be credited in the general administration account.

6. It must not be assumed that 250 hours is the amount of time which a forester or ranger is expected to work, no more or no less. That number has been chosen to determine the rate per hour to be charged against operations simply as a matter of convenience and uniformity. Men in the forest service do not work overtime; they are in the service of the State from the time they enter its employ until they leave it.

7. In the case of the ranger's time, each operation is charged properly and the difference between salary and the sum of separate items is charged to general protection account. If the sum of operation charges is greater than the salary, the difference may be placed to the credit of protection account.

8. Operations should be charged for rangers' and foresters' time in the same manner as charges for other time. If the forester would have to pay for time to and from the operation, in case a man were employed to do the work performed, then the time occupied by forester or ranger in getting to and from the operation should be charged against it. Otherwise an operation should be charged only for time actually spent at it. Time in transit may be omitted in reports and consequently will be made up in charge to administration or protection.

9. Absence from the reserve should be indicated by "Absent on leave." If on Department or reserve work the nature of the work should be indicated.

10. This form has to do only with the time of foresters and rangers and not with expenses of any other nature. Therefore, in the space for account charges, foresters will enter on their reports only the proper charges, determined from the report of their own time. In the proper space on each ranger's report, foresters will enter only such charges as arise from the particular ranger's time.

11. After the forester has received a ranger's report in duplicate he should examine it and if found to be satisfactory to him, he should stamp it with the "Received-Correct-Approved" stamp and countersign it under the ranger's signature. All assistance necessary should be given to the ranger so that he may make his reports in proper form.

12. Each day's record should be written in the evening of that day. Happenings will occur and observations will be made that, if not recorded at once, may be forgotten and entirely lost. When daily entries are impossible the record should be made at the first opportunity.

13. Promptness in forwarding to foresters and to the Department is expected. All reports must reach the Department by the evening of the fifth (5th) of each month. For each day of delay thereafter one dollar (\$1.00) will be deducted from the forester's or ranger's salary check. A record will be kept of all delinquencies during the calendar year, and deductions will be made from the February pay check. Foresters must not hold other reports because of a delinquent ranger, but should send within the time limit what is on hand. Foresters must see that their rangers are not delinquent, as they will be charged with the penalty in the first instance. Penalties may be removed from foresters and charged to rangers only on presentation of proper evidence.

4. Duplicate copies should always be filed in the reserve office.

25.

Time Sheet.

1. This form was adopted because it has been used successfully by large corporations desiring a record of labor in detail. It suits the needs of reserve records. However, Form 26 may be used in its stead.

2. The name of the month is to be entered after the words "Month of." Beneath the days of the week, "Monday," "Tuesday," etc., should be entered the date in figures, as

Monday	Tuesday	
25	26	etc.

3. The forester, ranger or foreman who keeps the time should enter each new name in the proper column at the time the man begins work.

4. Each day's work of each individual should be designated in such a way that there can be no possible doubt as to the operation or compartment against which a charge must be made.

5. Uniformity and clearness of terms is necessary.

6. Each day's record should be made at the end of the day.

7. Totals should be carefully checked and entered at the end of the week.

8. Transfers are made from this form to Form 26.
9. After everything has been properly transferred and the amounts checked, the form should be filed.
10. Do not file until you are sure every entry is correct and that transfers have been made correctly.

26.

Labor Account.

1. This form was devised with the idea of using it as a summary sheet.
2. The heading will appear when filled, as follows:
 Labor for the month of March, 1911.
 Account Crooker's Run Road.
3. At the end of each week, the time sheets (Form 25) are carefully gone over, and when labor has been done on Crooker's Run Road, the name of the individual is transferred, and the number of hours entered under the proper date. The rate paid is entered under its proper column.
4. Do not overload the reserve files, but at the same time, remember that crowding entries is unnecessary and should never be done.
5. Subdivisions of an account may be indicated upon one sheet, as for example, in the account above, there may be "Clearing Right of Way," "Dynamiting," "Grading," etc.
6. Two distinct accounts should never appear on the same sheet. However, a continuation of the account for another month may be satisfactory.
7. When a month's work has been properly distributed, the totals of all account sheets should agree with the totals of the time sheets for the respective month.
8. All totals should be carefully checked before making up the pay roll (Form 27).
9. All accounts for the month should be closed on Saturday previous to the Commission meeting so that the pay roll may be made up and forwarded to the Department with other bills of expense, in plenty of time for consideration on the following Friday.
10. Totals of each sheet, or of each sub-division of an account, should be transferred to the ledger account and so indicated in column marked "ledger folio."
 - (a) The above system necessitates, in many cases, a duplication of names, and for this reason a sheet has been used by some foresters for each employe. Form 25 is eliminated. The different kinds of labor are indicated in the column provided for names.
 - (b) The advantages of this method of use is that if the rates of wages differ with different work, they may be recorded without crowding any figures. Further, the total of each sheet may be transferred directly to the pay roll, whereas in the other method each individual's time must be collected from a number of sheets.
 - (c) On the other hand, unless it is desired to enter the value of each man's labor in the respective ledger accounts, and to which there can be no objection, these items must be collected from the various sheets and entered as a total for the month.
11. Either method may be adopted, but when once adopted, should

be adhered to in its entirety. If it is found to be more convenient to use the other method, a change may be made, but the change must be complete.

27.

Pay Roll.

1. The pay roll is to be forwarded to the Department as soon as possible after the closing of each month. It must be done not later than the Tuesday preceding the first Friday in each month.

2. No pay roll should be forwarded until the forester has verified its figures and found them to be correct.

3. Enter each man's name when he is first employed during the month, and he should sign his name in the column headed "Received payment" at the same time. If this idea is carried out, the forester will not be delayed at the end of the month in hunting his men for their signatures.

4. With reference to signatures, see item 22 under Forms 3 and 4.

5. Do not allow any person to receipt the pay roll for the amount due another.

6. Do not neglect to stamp the pay roll "Received-Correct-Approved" and countersign.

7. Never use $\frac{1}{4}$ hours on pay roll. Allow time to the nearest half hour only. Good judgment will determine when to give or take, and yet not be unjust to the employe or to the Commonwealth.

8. When the rate for labor is above the ordinary rate per hour for day labor, always indicate after the man's name the kind of labor which calls for the extraordinary rate, as for example, James Smith (Carpenter).

9. In case of surveys, pay for service, hauling and boarding should go on pay roll at rate per hour, or rate per meal. Total number of meals furnished entire crew each day must be entered per day in same manner as number of hours worked by each man. Receipts must be furnished for all other expenses incurred in the survey.

28 and 29.

Department Bill Heads.

1. It is good business practice to give a receipted bill for all material sold for which money has been received.

2. While all State business is expected to be a cash business, there will be transactions in which some time will elapse between the purchase of material and the payment for it. In such cases a statement, on either of these forms, should be sent at the end of each month to the individual still owing the Commonwealth.

3. When payment is made, receipt the bill as follows:

Received payment 10/12/12.

(Signed) William H. Kraft, Forester.

4. Do not use this form as a bill head for any individual.

Statement of Finances.

1. This form should be filled out and forwarded to the Department at the end of each month. The heading will then be:

Statement for November, 1912.

2. It shows all the accounts of operations, or accounts by compartments which the forester has opened in his ledger.

3. A new account will have entries first, either in the receipt or in the expense column or in both.

(a) If expenses exceed receipts, the difference is placed in Dr. column immediately following expense column, and is a debit balance.

(b) If receipts exceed expenses, the difference is entered in the Cr. column at the extreme right of the form, and is a credit balance.

4. For the succeeding month the form will appear:

(a) Statement for December, 1912.

Balances of November.

(b) The debit or credit balances will be placed in the proper column under "Balances for November."

(c) New receipts or expenses will be entered in place.

(d) Receipts are considered as a credit item. Expenses become a debit item. Add receipts to credit balance and expenses to debit balance; subtract the two amounts, and the difference is placed in the Dr. or Cr. column according as to whether the debit or credit amount is the larger. As for example: An account at the end of November shows a debit balance of \$50.49; during December, receipts to the amount of \$18.50 were collected from the sale of material produced by the operation and there was an additional expense of \$5.37. The December balance is determined by adding \$5.37 to \$50.49, which amounts to \$55.86, and subtracting \$18.30, leaving \$37.56. Since the debit side of the account is the larger, this is a debit balance and must be entered in the debit column.

5. If expenses are paid, or material furnished directly from the Department, such expenses should be entered in red ink after the proper accounts, as a separate entry.

6. If, upon authority from the Department, money received from sale of material is used to defray all or part of any expenditure, such expense should be entered in red ink, also, but as a separate entry and enclosed in parenthesis.

7. The total of all black ink entries in the expense column should equal the total of all checks received from the Department for the month's expenses.

8. When any money from receipts is forwarded to the Department, a note and explanation should be entered on the month's statement.

9. This form will be used to present a summary statement of finances to be included in annual reports of foresters. (See Item 25 of Outline.)

(a) In this case the heading will be as follows:

Statement for the Year 1912.

(b) The balances existing at the end of the previous year will be inserted in the first two columns; the total receipts and expenses for the current year will be inserted in their proper columns and the final balances should be the same as those for December.

(c) All expenses during the year paid, or material furnished, directly by the Department, should be entered in red ink.

(d) Money paid from receipts on reserve should likewise be entered separately in red ink and inclosed in parenthesis.

(e) The total of all money forwarded to the Department should be indicated, as well as the balance of receipts on hand.

31.

Forest Products.

1. In order to determine the development and possibility of the forest it is necessary to keep an accurate record of yields according to species and products.

2. The only safe basis for computation is that of solid cubic feet of wood, exclusive of bark. If bark is sold with or without wood, a separate statement of quantity and price should be given. The individual forester is the only one who can determine this volume. He knows the number and quantities of various products and can readily determine the factor for reduction to cubic feet. No fast rule of thumb can be laid down for this purpose.

3. Exact measurements should be taken whenever possible and experiments made from time to time in order to determine the factor for a particular kind or quality of produce. The results of such experiments and exact details thereof should be carefully recorded and kept on file.

4. Prices given should be those of various sizes, classes, and qualities of material when ready to be removed from the reserve.

5. Data should be kept in each operation so that the forester may easily determine the stumpage value of various species and sizes of trees when made into various products. It is only in this way that it will become possible to determine the most satisfactory rotation and species for various localities and conditions.

6. If more than one species has been cut on one compartment enter the amounts cut of each species on separate lines, in the four columns provided for species, and make separate distribution into product columns for each amount.

7. Bark may be entered in "By-product" column but mark it as such. Other by-products might be tree seed, charcoal, or anything, other than wood, that may be derived from the trees of the reserve.

32.

Financial Receipts.

1. The acreage to be given in the second column is that which can be used for wood production.

2. The third column calls for cubic feet and means solid cubic feet of wood, exclusive of bark.

3. If bark, alone or with wood, is sold by weight, some statement should be made to this effect and quantity given.

4. "Gross receipts" means the total value received for a product.

5. "Net receipts" means the receipts from a product after deductions have been made for expenses connected with the manufacture and sale of the product.

6. If material is sold on the stump and no charges except for super-

vision are made, the receipts would be entered as gross receipts and the charges for supervision, so marked, should be entered in column for cost of harvesting.

7. Minerals are usually sold on lease and consequently may be entered directly in net receipts column.

33.

Plantation Report.

1. For reserve record, one report sheet should be made for each plantation, as soon as the plantation has been made.

2. Each plantation on a reserve should be numbered consecutively and the record filed accordingly.

3. The location of the plantation should be definitely set forth.

4. Be accurate as to area planted. Make a survey when possible. The area to be entered in second column is the number of acres within the compartment which can be used for wood production.

5. Always describe in detail the method of making the plantation. If seed be used, indicate whether spot, strip, or broadcast sowing.

6. Give planting distance.

7. Specify for each plantation, age, species of plants used, or species of seeds.

8. Give data concerning soil conditions, condition of growth present, etc.

9. Describe the preparation of the soil, if any, fencing, or other protection necessary.

10. Give detail account of expenses connected with making the plantation, including forester's and ranger's time, as well as the items of expense indicated on the form.

11. In summing up total expense and determining cost per acre, make sure the figures are correct before placing them on the form.

12. For annual report to Department, one sheet may be used for several plantations.

13. If two or more species have been planted in mixture or if each species is planted on a small area, the areas adjoining each other, one plantation record is sufficient. If, however, large contiguous areas are planted pure with different species, it will be better to make a plantation record for each area and species.

34.

Annual Planting Report.

1. This form is intended as a summary of seeds and seedlings planted on reserves.

2. The figures on this form must correspond with the totals of Plantation Records for the year.

3. Seeds collected and planted on the same reserve should be indicated in red ink so as to distinguish such from seed furnished by another forester or purchased by the Department.

4. Seedlings raised and planted on the same reserve should be indicated in red ink so as to distinguish them from seedlings furnished by other nurseries.

5. Do not place on this form the amount of seed collected but not

planted on the reserve. Such a statement should appear elsewhere in the Annual Report (Item 12 of Outline).

6. Be sure to distinguish and place in the proper columns seeds planted in a nursery and those planted in permanent plantation.

7. If seeds or seedlings, the botanical names of which are not found in the list on the form, are planted, indicate the proper name in the blank spaces. The nomenclature of Gray's New Manual of Botany, Seventh Edition, is to be used.

8. Any plant raised from a seed is a seedling. The age of a seedling is determined by the number of growing seasons through which it has passed. A seedling having completed its first season of growth is designated as "a one year old seedling," irrespective of when the seed was sown. It remains a one year old seedling until the second season's growth begins, when it may be said to be in its second summer, but it does not become a two year old seedling until the second season's growth is completed.

Even though seedlings may have a new season's growth started in the spring when they are planted or transplanted, they are still designated by their age of the previous winter.

9. The age of transplants is determined by the number of growing seasons through which they have passed.

A seedling transplanted at the end of the first season's growth or at the beginning of the second and remaining in the transplant bed throughout the second season of growth, is two years old and may be designated as a two-year old transplant, or represented by the figures 1-1.

A seedling two years old, transplanted at the end of the second season's growth or at the beginning of the third and remaining in the transplant bed throughout the third and fourth seasons of growth, is four years old and may be designated as a four year old transplant, two years transplanted, or represented by the figures, 2-2.

35.

Plantation Growth Record.

It is absolutely necessary that the Department of Forestry collect uniform data with reference to the growth of trees in artificial plantations, upon which may be based future silvicultural and financial plans. This form will serve for such purpose.

1. One sheet should be used for each plantation or for each species in the plantation.

2. This record sheet should be related to Form 33 by entering upon it the consecutive number of the plantation which it concerns.

3. Cross out "Seeds" or "Seedlings," according to what was used in making the plantation.

4. "Age of Seedlings" refers to the age of the plants when they were set in plantation.

5. In planting seeds, there may be spot, strip, or broadcast method of sowing, and various details connected with each. In planting seedlings, there may be hole, mound, split sod, and various other methods and details connected therewith. These details should be set forth either on the back of this sheet or on Form 33.

6. The second column, "Age of Trees," should give the age of the trees from seed.

7. During the first ten years of a plantation, height growth may be measured annually or biennially.

8. From the tenth year, measurements of both height and diameter may be taken at five year intervals, preferably when the trees are 10, 15, 20, 25, and so on, years of age.

9. Measurements should be made during the resting period of growth.

10. Diameter measurements should be made at the same height, and at approximately the same temperature. (Breast height is four and one-half feet above ground.)

11. Height growth should be given in feet and tenths of feet; diameter growth should be given in inches and tenths of inches; volume growth should be given in cubic feet and to three decimals.

12. Maximum current height growth is the greatest growth in height of any one tree during the season of growth just passed.

13. The average current height growth is determined by adding the lengths of the past year's shoots of all the trees in the plantation and dividing the sum thus obtained by the number of trees.

14. The mean annual height growth of a plantation is determined by adding the total heights of all trees in the plantation and dividing the sum by the number of trees to obtain the average height at the time of measurement. This average must then be divided by the number of years the trees are old.

15. The mean annual diameter growth is determined by adding the sectional areas of all trees in the plantations, as found from diameter measurements, and dividing the sum by the number of trees in the plantation. The result will be the average sectional area at the time of measurement. From this may be found the average diameter. The average diameter is then divided by the number of years the trees are old to obtain the mean annual diameter growth.

16. Having the average height and diameter of the trees in a plantation at any time, the volume of such a tree is determined by finding a tree of such size and making careful volume measurements of it. The volume of such a tree, called the "mean sample tree," multiplied by the number of trees in the plantation, will give the volume of the whole plantation. (See Graves' Mensuration, pp. 228 and 229.) This volume divided by the number of years the trees are old will give the mean annual volume growth.

17. When material is removed, the date should be given.

18. Explanation of Crown Classes:

Predominant—When the crown of the tree is partially or wholly above the general level of the top of the canopy.

Dominant—When the crown has light from above and very little from the side, being one of those making up the more or less even canopy height.

Intermediate—When the crown has no light from side and only a small amount from the top.

Suppressed—When the crown receives no light from top or side and the tree is in a weakened condition by reason of insufficient light.

Roads, Trails and Fire Lanes.

1. A road shall be considered as a way of travel wide enough for the use of wagons, having been so used or to be used, and is supposed to be made bare of growth for at least 6 feet, especially if it is to be a part of the permanent road system.

2. A trail shall be considered as a narrow way for foot travel, or for horse-back riding, and is supposed to be made bare for from one to three feet.

3. A fire lane shall be considered as a way cleared through brush or forest, where a road or trail would never likely be built, and from which the brush and loose debris are removed. The width may be from 4 to 20 feet, of which at least one foot should be made bare.

4. When a road or trail has been laid out and the right of way cleared of brush only, it should not be reported as a fire lane.

5. A trail may, at some time, become a road, or a road, by discontinued use, may become a trail. Either or both may be abandoned.

6. Any changes in conditions should be noted, and reasons for them given.

7. Brush may be removed from either side of a road or trail to any distance permitted, but not change the character of the way. The brush removal should extend no farther than is necessary. Bare soil is better than great width of open space.

8. Distinguish carefully between extension and improvement.

(a) Extension refers to an entirely new road, trail or fire lane, where none has existed previously.

(b) Improvement refers to work done upon old roads or trails now existing, or upon new roads after having been considered completed and repairs become necessary.

9. Each road, trail, or fire lane should be designated definitely and its termini definitely determined from time to time.

10. Grading refers to the establishment of the general grade of a road or trail, as indicated by its rise or fall in length and includes the cost of survey.

11. Ditching refers to the accomplishment of good drainage by ditches on inside of road, cross-drains or sub-drainage.

12. Surfacing refers to rounding up the road after it has been graded and ditched, either with earth, gravel, stone or other material necessary to complete the work and make a finished road.

13. The cost of extension should be indicated by the rate per 100 feet of distance extended.

14. All improvements and repairs should be reported on the basis of cost per 100 feet of total length of road.

15. Notice that the column headed "Length" is under "extension" and in it should be placed the length of extension of new road, trail, or fire lane, and not the total length of the road. The latter may be indicated in small figures in the column headed "Roads, Trails, or Fire Lanes."

16. In summary to Department in Annual Report, use one sheet for roads, one for trails and one for fire lanes.

17. Brushed boundary lines should be so indicated and not classed as fire lanes, although they may be reported upon this form as well as under item 3 of report outline.

18. All roads, trails, streams, and open boundary lines are fire lanes in effect but should not be reported as such.

37.

Descriptions of Compartments.

Forms 37, 38 and 39 are very important as a basis of future forest management. It is not expected that exact data can be recorded upon them at present, but an effort should be made to cover the whole reserve and make proper entries on these forms, recording everything as far as possible at present. From time to time proper revisions may be made. In no case should the preliminary sheets be destroyed.

1. It should be remembered that the compartment is the smallest unit of management, should be bounded by geographic features, roads, or trails, as far as possible, and should not exceed 300 acres.

2. For the time being, warrants may be used in place of compartments, if their locations are definitely known.

3. A "blank" is a portion of the timber producing area, having no trees or but a few, hence necessitating a complete restocking. It does not include any areas not intended for wood production. In some cases the latter areas may have a thin stocking which may give a small return from time to time.

4. Under "Sylvicultural System" may be given any past history with reference to the growth.

5. "Quality of Locality" may be indicated by Roman numbers.

6. "Quality of Growing Stock" may be indicated by decimals and should comprehend density and condition of trees.

7. Under "Remarks" may be stated something descriptive of present conditions and of suggested future treatment.

8. Do not be afraid to use paper in giving details.

38.

Table of Areas.

This form is self explanatory and requires only a careful estimate or survey of areas.

39.

Tables of Qualities of Locality.

By "Quality of Locality" is meant the yield capacity as expressed by the quantity of produce which can be derived from the locality.

1. Under "Species and Sylvicultural System" should be noted conditions at present.

2. The following table shall determine the quality class.

I. (Best) Areas capable of producing per acre per annum 100 solid cubic feet of wood or more.

II. Areas capable of producing over 75 and less than 100 solid cubic feet of wood.

III. Areas capable of producing over 50 and less than 75 solid cubic feet of wood.

IV. Areas capable of producing over 30 and less than 50 solid cubic feet of wood.

V. (Poorest) Areas capable of producing over 10 and less than 30 solid cubic feet of wood.

3. Remarks should cover any matters which will set forth present conditions in any clearer light.

Valuation Survey.

There are many methods of making a valuation survey, but this form is adapted to most of them.

1. Each sheet should be dated on the day the notes are entered.
2. "Locality" refers to quality of locality.
3. "Area" refers to the area which is being worked, as either the total area or the unit or area.
4. "Number" is that of the sheet covering the area indicated.
5. Calipering should be done carefully, paying attention to
 - (a) Position of calipers. They should be at right angle to the axis of the tree.
 - (b) Uniform height of measurement should be maintained.
 - (c) Swellings, knots, vines, etc., should be avoided.
 - (d) Average diameter should be read.
6. Except in case of very exact work, diameters may be entered in two-inch classes.

Tree Analysis.

"The measurement of a felled tree to determine its growth is called a tree analysis." H. S. Graves.

1. Date should be entered, the day the analysis is made.
2. "Type" refers to type of tree, as predominant, dominant, or suppressed, etc.
3. "Locality" refers to quality of locality.
4. "Height of Cross Section" refers to the number of feet above ground at which the annual rings are counted and measured.
5. To determine the age of the tree, determine the number of years required for the tree to reach the height of the cross section, by examination of small seedlings or sprouts in the neighborhood; e. g., if the tree is cut at one foot from the ground and is a white pine, it may have required five years to reach that height. Then count the number of rings from centre to bark; add five for the total age.
6. If the cross section is one foot above ground and it took five years to reach that height, the radius at one foot when five years old was 0. At ten years the radius was the distance from centre to outside of the 5th annual ring; at 15 years the distance from centre to tenth annual ring, and so on.
7. Suppose the tree is 87 years old and the cross-section is 40 feet high. We determine first where the annual ring laid on in the 80th year of growth is by counting seven rings from the bark. The radius at 80 years at this height is the distance from centre to the outside of the ring, outside of which there are still seven rings.

Counting ten rings toward the center determines the annual deposit of wood made in the 70th year of the tree's life, and so on.

There may be a number of rings from the place of last measurement to center, say, 8. It would mean, if in all there were 25 rings on the cross-section, that it required 62 years to reach a height of 40 feet; in other words, 87 minus 25 equals 62.

8. "Diameter B. H." refers to diameter at $4\frac{1}{2}$ feet above ground, outside of bark.

9. "Merchantable Length" refers to the total length of stem that might possibly be used, if taken to the lowest diameter which can be utilized in any market.

10. When analysis is made for accurate results, the tree should be cut into sections not longer than four feet.

(a) The tree must be cut off as close to the ground as possible.

(b) The next cut must be at exactly two feet above stump cut.

(c) The last two cuts must be made two feet apart.

(d) In computing volume the portion of the tree above the last cut must be considered as a cone.

11. The name of the person making the analysis must be on each sheet.

42.

Tree Volume.

This sheet is to be used for recording the final figures in working up tree volume from data on Form 41.

1. Date should be the day upon which the calculations are made.

2. "Species," "No. of Tree," "Type," and "Locality," should correspond with the entries on Form 41, from which the necessary data are taken.

3. "Type" again refers to type of trees.

4. "Locality" refers to quality of locality.

5. The first computation will be to calculate the volume of the whole tree, including bark (branch wood may or may not have been considered in the analysis).

(a) The stump will be regarded as a cylinder.

(b) Each log shall be regarded as a truncate paraboloid the volume of which equals one-half the sum of the sectional area of top plus the sectional area of the base, multiplied by the length. Represented

in formula $V = \frac{S+s}{2} \times L$

(c) What is left above the last log is considered as a cone.

6. The second computation is to find the volume of the whole tree without bark.

7. The next computations are for the volume of the tree, without bark, at specific ages, as seventy, sixty, fifty, forty years, and so on.

8. In the case of special analysis as under item 10, Form 41, the second cross-section is regarded as the sectional area in the middle of a four foot truncated paraboloid, the volume of which is found by multiplying the sectional area in the middle by the length, which in each instance in this case is 4. Refer to Vol. III Schlich's Manual of Forestry, 3rd Edition, page 30.

43.

Application for Examination for Admission to the State Forest Academy.

This form must be used by all who desire to take the examinations. They may be had by writing to the Department.

Academy Contract—Major.

To be entered into by those who receive appointments to the Academy as students, and who are past their majority.

Academy Contract—Minor.

Same as above, except to be entered into by those who have not yet reached their majority.

Academy Bond.

To be entered into by all who receive appointments as students at the State Forest Academy.

Nursery Certificate Shipping Tag.

1. One of these shipping tags, with the certificate properly filled up, must be attached to each package of seedlings sent from any of the inspected nurseries. This is required by law.

2. Do not use this form for the address card when it must be attached to a box. Use an ordinary plain shipping tag.

Application for Forest Tree Seedlings.

This form will be sent from the Department to all private individuals (not to foresters on reserves) who desire seedlings from the Department nurseries.

Lightning Report.

1. This form is to be filled up by foresters, rangers, and any other observers the forester may be able to interest in the work.

2. Definite areas will have to be designated where two observers might be likely to make duplications.

Nursery Operation Sheet.

The purpose of this form is that the forester may tabulate nursery expenses, so as to be able better to determine the cost of raising seedlings of various ages and species.

Nursery Shipment Card (green).

1. The nurseryman must fill up this card at the same time as Form 52, and send it to the individual to whom seedlings are shipped as

soon as shipment is made. (In case of private individual, card is sent to Commissioner of Forestry.)

2. The forester receiving seedlings will retain this card, and as the seedlings are planted make note of their number, size, and quality upon the back of the form.

3. If seedlings are received in the fall and some have to be heeled in over winter for any reason, a statement concerning the matter should also be placed on the back of this form.

4. If any seedlings have been lost or destroyed, a statement should be made giving whatever information is available.

5. As soon as the shipment is checked by forester receiving it and the proper memoranda made upon the back of the form, it must be sent to the Commissioner of Forestry.

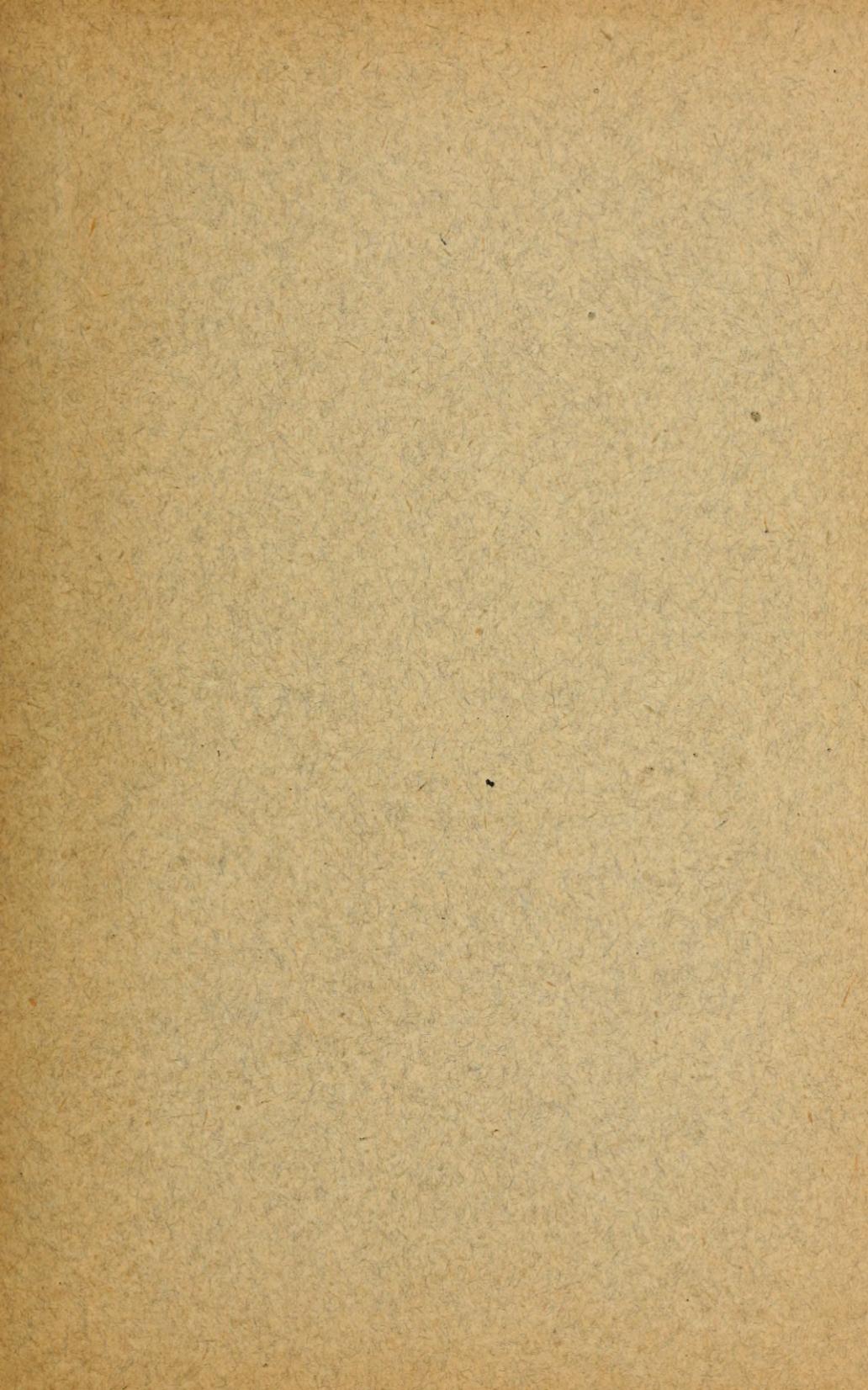
6. Nurserymen should call the attention of express agents to the fact that seedlings have a special low rate.

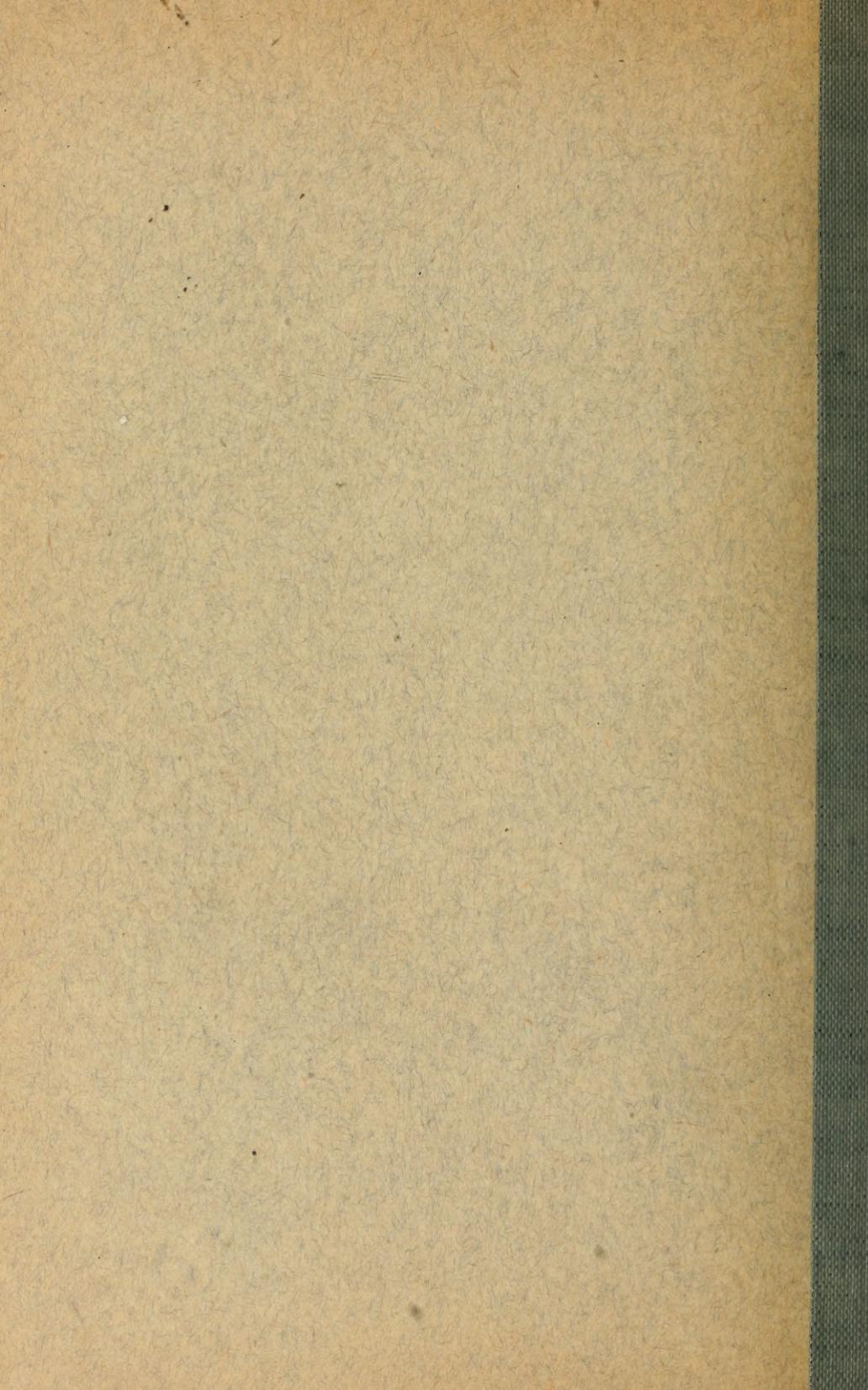
52.

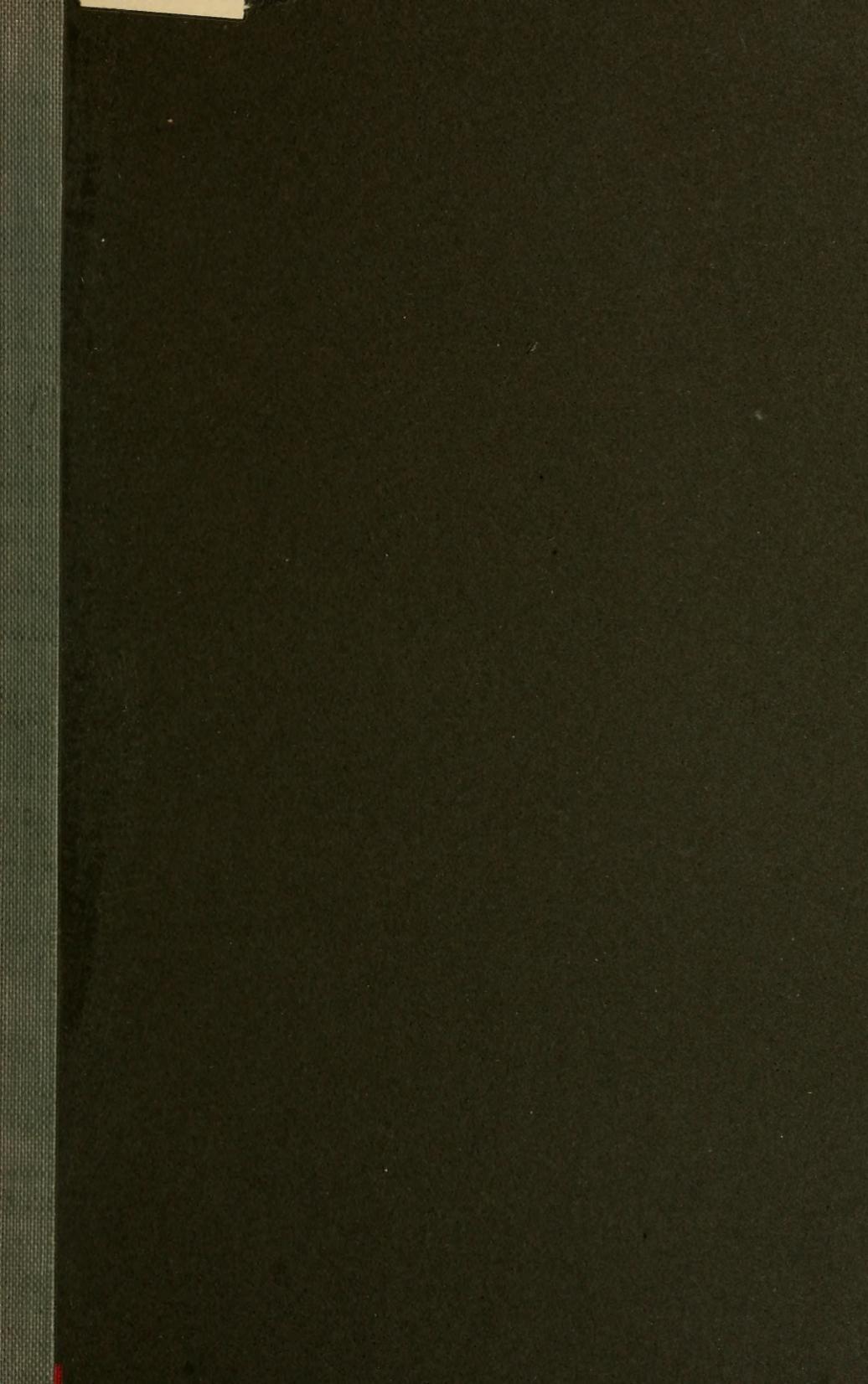
Receipt for Nursery Stock (yellow).

1. One of these cards must be filled up by the nurseryman for each shipment and sent to the individual to whom the seedlings are sent together with Form 51. (In the case of private individuals both forms for each shipment must be forwarded promptly to the Commissioner of Forestry, who will then notify the person to whom seedlings have been sent.)

2. After seedlings have been received and checked carefully, the forester will place his signature upon the card, and upon the back of it note whether the shipment was correct, condition in which seedlings were received, general condition and quality of seedlings, and any other information of value to the nurseryman. Then the card must be returned promptly to the nurseryman from whom it was received.







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