LABORATORY PROFICIENCY TESTING PROGRAM

REPORT NO. 19

WOOD EXAMINATION

THE FORENSIC SCIENCES FOUNDATION, INC.

11400 ROCKVILLE PIKE • ROCKVILLE, MARYLAND 20852 • (301) 770-2723

FOREWORD

The analysis summarized in this report is the nineteenth of a series that will be made in conjunction with this proficiency testing research project.

In the course of this testing program participating laboratories will have analyzed and identified different samples of physical evidence similar in nature to the types of evidence normally submitted to them for analysis.

The results for Test Number Nineteen are reflected in the charts and graphs which follow.

The citing of any product or method in this report is done solely for reporting purposes and does not constitute an endorsement by the project sponsors.

Comments or suggestions relating to any portion of this report or of the program in general will be appreciated.

May 1977

TABLE OF CONTENTS

LABORATORY PROFICIENCY TESTING PROGRAM

REPORT NO. 19

WOOD EXAMINATION

Statistical presentations prepared by:

COLLABORATIVE TESTING SERVICES, INC.
Vienna, Virginia

Prepared for the Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, under Grant 76-NI-99-0091.

BACKGROUND

This laboratory proficiency testing research project, one phase which is summarized in this report, was initiated in the fall of 1974.

This is a research study of how to prepare and distribute specific samples; how to analyze laboratory results; and how to report those results in a meaningful manner. Information is being collected for research and statistical purposes only. Such information will not be revealed or used for any other purpose. Information furnished by any person or agency identifiable to any specific person or laboratory will not be revealed or used for any purposes, other than the research and statistical purposes for which it was obtained.

Participation in the program is voluntary. Accordingly, invitations have been extended to 240 laboratories to share in the research. It is recognized that all laboratories do not perform analyses of all possible types of physical evidence.

Additional evaluations of individual tests will be published in a separate report.

The Project is under the direct control of the Project Advisory Committee whose members' names are listed on the Title Page. Each is a nationally known criminalistic laboratory authority.

Supporting the Project Advisory Committee in their efforts is the Forensic Sciences Foundation with additional support from the Collaborative Testing Services, Inc., Vienna, Virginia in the area of statistical presentation.

SUMMARY

In this test, each of 238 laboratories were sent three wood samples which were referred to as Items A, B and C. Participants were asked: Could Items A, B or C have a common origin? Please provide species origin for each wood sample. Please specify the methods used to answer Question 2.

Of the 238 laboratories, 64 laboratories responded with data, 85 indicated they do not perform wood analysis, and 89 did not respond. This represents a participation rate of 42%.*

The information contained in the tables consists of the following:

Table 1 - Supplier's Characteristics
Table 2 - Summary of Responses to Question 1
Table 3a- Summary of Responses to Question 2 for Item A
Table 3b- Summary of Responses to Question 2 for Item B
Table 3c- Summary of Responses to Question 2 for Item C
Table 4 - Frequency of Reported Methods
Table 5 - Summary of Laboratory Results

*Note: $\frac{\text{Response with data}}{\text{\#Samples sent - "Do not do" replies}} \times 100 = \text{Participation rate}$

ANNEX A

FIGURE 1.

LAB CODE _____

☐ CHECK HERE (AND RETURN) IF YOU DO NOT PERFORM WOOD EXAMINATION

DATE RECEIVED IN LAB_____

DATE PROCESSED IN LAB_____

DATA SHEET
PROFICIENCY TESTING PROGRAM

TEST #19
WOOD EXAMINATION

Items A, B, and C represent wood samples submitted in connection with a criminal case.

1. a) Could Items A and B have a common origin?

☐ Yes
☐ No
☐ Inconclusive

b) Could Items A and C have a common origin?

☐ Yes
☐ No
☐ Inconclusive

c) Could Items B and C have a common origin?

☐ Yes
☐ No
☐ Inconclusive

2. Please indicate species for:

Item A _____

Item B _____

Item C _____

3. Please indicate methods used:

- ☐ Simple magnifier Magnification_____
- ☐ Compound microscope Magnification_____
  - ☐ Transmitted light
  - ☐ Reflected light
- ☐ Other (please specify) _____

_____

4. Additional comments:

Table 1

Characteristics of the Wood Samples
as Characterized by the Manufacturer

Item A - Abies grandis. Fir

Whitish to yellowish brown, straight grained, with no characteristic odor or taste. Growth rings distinct. Parenchyma not apparent with unaided eye. Rays very fine, not distinct with unaided eye. Resin canals absent (cross section). Tracheids average 30-50 microns in diameter. Diffuse porous vessels (cross section). Intervessel pits linear. Pit apertures markedly elongated in the horizontal direction across a vessel element (tangential section, pulp). Parenchyma arrangement apotracheal. Parenchyma arranged independently of vessels, appearing as several white lines within growth ring, and running in a direction parallel to the growth ring (cross section). Rays exclusively uniseriate and variable in height (tangential section).

Item B - Acer saccharum. Maple

Growth rings distinct. Sapwood white with a reddish tinge. Heartwood light redding brown. No characteristic odor or taste. Uniform pores, apparent only with magnification, distributed evenly throughout the growth ring (cross section). Parenchyma not visible without magnification. Rays of two distinct widths. Rays unstoried and essentially homogeneous, 1 to 8 seriate (tangential section). Rays unicellular, composed entirely of procumbent or upright cells (radial section). Vessels 70-90 microns in diameter, numbering 40-80 per square mm. Spiral thickening apparent (radial or tangential section, pulp). Perforation plates simple (radial section, pulp). Alternate intervessel pits orbicular to hexagonal, 6-10 microns in diameter (tangential section, pulp).

Item C - Pinus monticola. Pine

Sapwood nearly white to pale yellowish white. Heartwood cream colored to light brown. Slight resinous, non-characteristic odor. No characteristic taste. Growth rings distinct. Parenchyma not visible with unaided eye. Rays very fine, not ordinarily visible with unaided eye. Normal longitudinal resin canals present. Intercellular spaces scattered throughout growth rings (cross section). Thin-walled resin canal epithelium. Cells immediately surrounding resin canal are thin-walled and frequently badly torn in sectioning (cross section, tangential section). Average diameter of longitudinal resin canal about 135-150 microns, measured in direction parallel to growth rings, and including epithelium (cross section). Ray tracheids regularly present. Cells often confined to margins of the rays and may be recognized by their small bordered pits (radial section). Ray parenchyma end walls smooth (radial section, pulp). Fenestriform cross-field pits. 1 to 2 rectangular window-like pits per field (radial section, pulp).

Table 2

Summary of Responses to Question 1*

Response	Number of Labs Giving Response	Percentage of Labs Giving Response
NNN	50	78.1
NIN	8	12.5
NYN	4	6.3
NNRN	1	1.6
NNI	1	1.6
	64	100.1

*Question 1:

a) Could Items A and B have common origin?

b) Could Items A and C have common origin?

c) Could Items B and C have common origin?

Note:

N represents a response of No for the corresponding part of Question 1.

Y represents a response of Yes for the corresponding part of Question 1.

I represents a response of Inconclusive for the corresponding part of Question 1.

NR represents No Response for the corresponding part of Question 1.

Table 3a

Responses to Question 2 for Item A

Question 2: Please indicate species for Item A

Response	Number of Labs Giving Response	Percentage of Labs Giving Response
Softwood	7	10.9
Fir	16	25.0
Pine	8	12.5
Cedar	2	3.1
Spruce	2	3.1
Redwood	1	1.6
Hemlock	1	1.6
Chaemaecyeris	1	1.6
Not determined	26	40.6

Table 3b

Responses to Question 2 for Item B

Question 2: Please indicate species for Item B

Response	Number of Labs Giving Response	Percentage of Labs Giving Response
Hardwood	8	12.5
Maple	20	31.3
Beech	2	3.1
Lithiocarpus Tanbark Oak	1	1.6
Birch	1	1.6
Basswood	1	1.6
Walnut	1	1.6
Mahogany	1	1.6
Oak	1	1.6
Not determined	28	43.8

Table 3c

Responses to Question 2 for Item C

Question 2: Please indicate species for Item C

Response	Number of Labs Giving Response	Percentage of Labs Giving Response
Softwood	7	10.9
Pine	23	35.9
Cedar	2	3.1
Fir	1	1.6
Redwood	1	1.6
Not determined	30	46.9

Table 4

Frequency of Reported Methods

Method	Number of Labs Reporting Use of Method	Percentage of Labs Reporting Use of Method (Total # 64)
Compound microscope	54	84.4
Simple magnifier	37	57.8
Stereobinocular microscope	4	6.3
GC pyrolysis	3	4.7
Polarized microscopy	2	3.1
Reference material	1	1.6
Stereo zoom scope	1	1.6
Specific gravity	1	1.6
Phase microscopy	1	1.6
Macroscopic exam	1	1.6

Table 5

Summary of Laboratory Responses

Lab Code / Resp. to Question 1*	Question	Response
005 NIN	2.	A - softwood, B - hardwood, C - softwood
	3.	Simple magnifier (25X), compound microscope (trans. light 100X)
009 NNN	2.	A - cedar, B - hard maple, C - white pine
	3.	Compound microscope (trans. and reflected, 10X and 440X)
014 NYN	2.	No response
	3.	Compound microscope (reflected, 7-30X)
028 NNN	2.	A - pine, B - maple, C - fir
	3.	Compound microscope (transmitted, 100X and 430X)
031 NNN	2.	A - fir, B - beech, C - pine
	3.	Reference material
033 NIN	2.	Did not determine
	3.	Simple magnifier (25X), compound microscope (100X)
117 NNN	2.	A - white pine (coniferous), B - non-coniferous, C - yellow pine (coniferous)
	3.	Simple magnifier (15X), compound microscope (reflected, 100X)
129 NIN	2.	No response
	3.	Compound microscope (transmitted, 50X)
135 NNN	2.	Did not determine
	3.	Compound microscope (transmitted and reflected, 80X and 100X)
168 NNN	2.	Not determined
	3.	Stereo zoom scope (reflected, up to 45X)
170 NNN	2.	A - western fir, B - hard maple, C - sugar pine
	3.	Simple magnifier (2-3X), compound microscope (transmitted, up to 400X)
180 NNN	2.	No response
	3.	Simple magnifier (7X), GC gas pyrolysis
185 NIN	2.	No response
	3.	Compound microscope (reflected, 7-42X)
206 NNN	2.	No response
	3.	Compound microscope (reflected, 15X)
207 NNN	2.	No response
	3.	Simple magnifier (20X), compound microscope (transmitted and reflected, 40X-200X-400X), stereo binocular microscope
225 NNN	2.	A - softwood, B - hardwood, C - softwood
	3.	Compound microscope (transmitted)
259 NIN	2.	No response
	3.	Compound microscope (transmitted, 100X), variable power stereo scope
265 NNN	2.	Unknown
	3.	Simple magnifier (50X), compound microscope (transmitted and reflected, 150X)
283 NNN	2.	Not specified
	3.	Compound microscope (transmitted and reflected, 150X), stereo microscope, GC pyrolysis
289 NNN	2.	No response
	3.	Compound microscope (transmitted, 100X)
291 NNN	2.	A - cedar, B - birch, C - pine
	3.	Compound microscope (10X, 30X reflected, 100X transmitted), polarizing microscope, specific gravity
292 NNN	2.	A - softwood, B - hardwood, C - softwood
	3.	Simple magnifier (3X), compound microscope (25X)
294 NNN	2.	No response
	3.	Compound microscope (transmitted, 150X)
295 NNN	2.	A - softwood, B - hardwood, C - softwood
	3.	Simple magnifier (10X), compound microscope (transmitted, 100X, 400X)
346 NNN	2.	A - fir, B - maple, C - cedar
	3.	Compound microscope (transmitted and reflected, 15X, 45X, 100X, 400X, 800X)
383 NNN	2.	A - fir, B - maple, C - soft pine
	3.	Simple magnifier (10X), compound microscope (transmitted, 100X-400X)
404 NNN	2.	A - fir, B - maple, C - cedar
	3.	Simple magnifier (7X), compound microscope (transmitted and reflected, 100X-400X), low-power stereo, 6-50 diameters
415 NNN	2.	A, B, C - inconclusive
	3.	Simple magnifier (7X-42X), compound microscope (transmitted and reflected, 100X), phase microscopy, polarized microscopy
440 NIN	2.	Undetermined
	3.	Simple magnifier (7X-25X), compound microscope (transmitted and reflected, 100X-600X)

*See Note in Table 2 for an explanation of response to Question 1

Table 5 (continued)

Lab Code	Resp. to Question 1*	Question	Response
457	NYN	2.	A - softwood pine, B - hardwood, C - softwood pine
		3.	Simple magnifier (15X), compound microscope (transmitted, 100X-340X)
463	NNN	2.	A - white fir, B - maple, C - pine
		3.	Simple magnifier (10X), compound microscope (transmitted and reflected, 100X-400X)
492	NNN	2.	No response
		3.	Compound microscope (reflected, 40X), microscopic
526	NIN	2.	A - fir, B - hardwood, C - softwood
		3.	Simple magnifier (5X-240X)
569	NNI	2.	A - softwood (possible pine) B and C - No response
		3.	Compound microscope (transmitted and reflected, 10X-70X)
574	NNN	2.	A - fir, B - sugar maple, C - white pine
		3.	Simple magnifier (10X), compound microscope (transmitted, 200X-400X)
584	NNN	2.	A - softwood (pine), B - hardwood, C - softwood (pine)
		3.	Simple magnififer (5X), compound microscope (transmitted and reflected, 40X, 200X, 450X)
588	NNN	2.	A - spruce, B - basswood, C - white pine
		3.	Simple magnifier (10X)
589	NNN	2.	A - pine (hard), B - maple, C - pine (soft)
		3.	Compound microscope (transmitted, 100X and 400X)
603	NYN	2.	A - redwood, B - walnut, C - (redwood)
		3.	Stereo microscope
660	NNN	2.	No response
		3.	Compound microscope (reflected, 10X-70X) microscopic
662	NNN	2.	No response
		3.	Simple magnifier (30X-60X), compound microscope (transmitted and reflected, 100X)
680	NNN	2.	No response
		3.	Simple magnifier (14X), compound microscope (transmitted, 40, 100, 200, 400X)
682	NNN	2.	B - beech
		3.	Compound microscope (transmitted and reflected, 10X-70X)
733	NNN	2.	A - fir, B - maple, C - pine
		3.	Simple magnifier (5X), compound microscope (transmitted and reflected, 100 and 400X)
736	NNN	2.	A - fir, B - maple, C - pine
		3.	Compound microscope (transmitted, 100 and 250X)
757	NNN	2.	Did not determine
		3.	Simple magnifier (40X), compound microscope (transmitted and reflected, 100X)
764	NNN	2.	A - spruce
		3.	Simple magnifier (5X)
774	NIN	2.	No response
		3.	Compound microscope (transmitted, 200X), hardness tests
776	NNN	2.	Not determined
		3.	Simple magnifier (30X), compound microscope (transmitted and reflected, 1425X)
800	NNN	2.	N/A
		3.	Simple magnifier (14X), compound microscope (transmitted and reflected, polarized, 80X and 100X)
810	NNN	2.	A - fir, B - hard maple, C - white pine
		3.	Compound microscope (transmitted and reflected, 63X-400X)
816	NNN	2.	No response
		3.	Simple magnifier, GC pyrolysis
818	NNN	2.	A - fir, B - maple, C - pine
		3.	Compound microscope (transmitted, 100X)
821	NNN	2.	A - B - acer species, C - picea species
		3.	Simple magnifier (10X), compound microscope (transmitted and reflected, 400X)
851	NNN	2.	A - pine, B - mahogany, C - pine
		3.	Simple magnifier
885	NNRN	2.	Not determined
		3.	Simple magnifier (10X, 30X, 60X), compound microscope (transmitted, reflected, 52:5 and 150X)
903	NNN	2.	A - fir, B - maple, C - spruce or pine
		3.	Simple magnifier (7-20X), compound microscope (transmitted, reflected, 140X)

*See Note in Table 2 for an explanation of response to Question 1

Lab Code Resp. to Question 1*	Question	Response
904 NNN	2. 3.	A - softwood, B - hardwood, C - softwood Simple magnifier (7X-30X)
914 NNN	2. 3.	A - fir, B - maple, C - pine Simple magnifier (25X), compound microscope (transmitted, reflected, 160X and 400X)
918 NNN	2. 3.	A - fir, B - hard maple, C - pine Simple magnifier (10X), compound microscope (transmitted, 200X)
922 NYN	2. 3.	A - pine, B - maple, C - pine Simple magnifier (10X), compound microscope (transmitted, 50X, 100X)
944 NNN	2. 3.	A - fir, B - maple, C - pine Compound microscope (transmitted - 400X, reflected - 20X)
957 NNN	2. 3.	A - pine (or fir) B - oak, C - not determined Compound microscope
966 NNN	2. 3.	A - softwood, B - maple, C - softwood Simple magnifier (3-5X), compound microscope (reflected, 7-40X)

*See Note in Table 2 for an explanation of response to Question 1

END