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Research Report No. 24, Hyperstand 1.0: A Hypercard Computer Program for Estimating Yield of East Texas Pine Plantations

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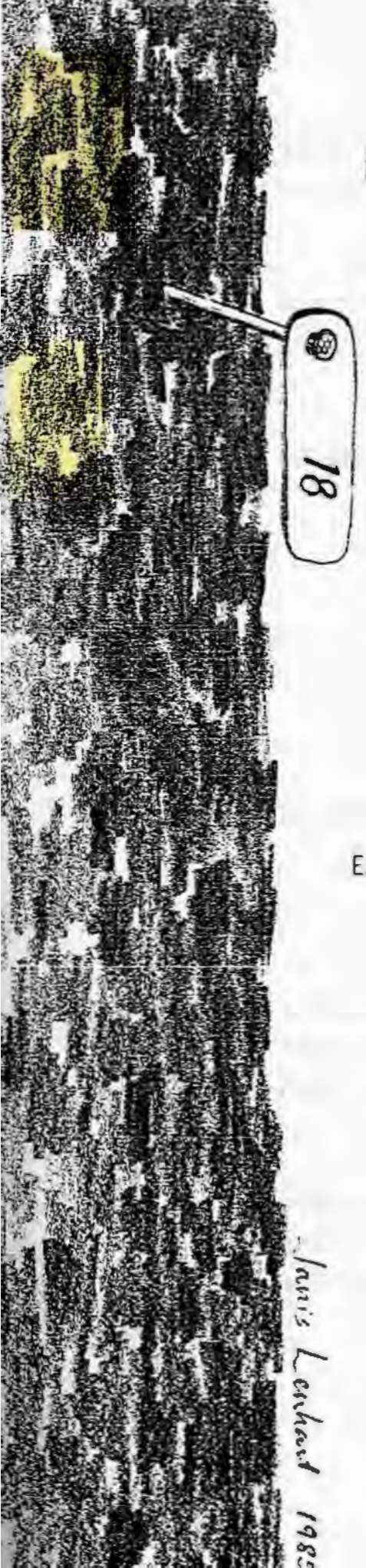

HYPERSTAND 1.0: A HYPERCARD COMPUTER PROGRAM FOR ESTIMATING YIELD OF EAST TEXAS PINE PLANTATIONS

by

Eric L. Taylor
and
A. Gordon Holley

REPORT NUMBER 24

THE

EAST TEXAS PINE PLANTATION RESEARCH PROJECT

A STUDY OF

LOBLOLLY AND SLASH PINE PLANTATIONS

IN

EAST TEXAS

CENTER FOR APPLIED STUDIES
SCHOOL OF FORESTRY
STEPHEN F. AUSTIN STATE UNIVERSITY
NACOGDOCHES, TEXAS 75962

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James Lenhart 1989

HYPERSTAND 1.0: A HYPERCARD COMPUTER PROGRAM FOR ESTIMATING YIELD OF EAST TEXAS PINE PLANTATIONS

by

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ABSTRACT. A computer program for estimating per acre yield for loblolly and slash pine plantations in East Texas is presented. The program, HYPERSTAND 1.0, is written in HYPERCARD and is designed to run on MACINTOSH computers. In order to run, HYPERSTAND requires the application program HYPERCARD 1.2.

INTRODUCTION

Yield information is useful to East Texas pine plantation managers. Data on tree production can be combined with other resource information, such as wildlife and recreation, and included in appraisal analysis to determine management plans for the pine plantations that maximize specific measures of utility.

To assist plantation managers in estimating timber production from their stands, a yield prediction program (HYPERSTAND 1.0) written for HYPERCARD 1.2 for MACINTOSH personal computers has been developed as part of the East Texas Pine Plantation Research Project. HYPERSTAND is a companion yield prediction program to DIAYLDSUR and DIADISD.BAS, which are described in

Lenhart, J. D. 1988. A FORTRAN computer program for estimating yield of East Texas pine plantations. ETPPRP No. 21. School of Forestry. SFASU. 18 p.

Hackett, T. L. and T. M. Hartz. 1988. A computer program in BASIC for estimating yield of East Texas pine plantations. ETPPRP No. 22. School of Forestry. SFASU. 5 p.

respectively. All three programs incorporate identical mensurational information and computational techniques.

HYPERSTAND is a diameter distribution yield prediction program for a current plantation. Information on species, plantation age, site index and surviving trees per acre is inputted. Output from HYPERSTAND presents stand structure (trees per acre and basal area per acre) and yield (volume and weight per acre in total stem and complete tree) by diameter class.

A free copy of HYPERSTAND may be obtained by sending a 3.5" floppy computer disk to

Dr. J. David Lenhart
School of Forestry - SFASU
Nacogdoches, TX 75962,

and he will return it to you with HYPERSTAND loaded on it.

MENSURATIONAL COMPONENTS IN HYPERSTAND 1.0

All mensurational systems were developed by the ETPPRP, using data from ETPPRP permanent plots throughout East Texas, except for the Weibull parameter recovery procedure, which was developed at VPI&SU.

SITE INDEX

Uses equations developed by Blackard as part of his MSF thesis and reported in

Blackard, J. A. 1985. Estimating site index. ETPPRP Report No. 3. School of Forestry. SFASU. 10 p.

Lenhart, J. D., E. V. Hunt, Jr. and J. A. Blackard. Site index equations for loblolly and slash pine plantations on non-old-fields in East Texas. So. J. Appl. For. 10(2):109-112.

INDIVIDUAL TREE HEIGHT

Uses equations developed by Dixon and reported in

Dixon, C. R. 1987. Predicting individual tree height of planted loblolly and slash pines in East Texas, update: 1987. ETPPRP Report No. 15. School of Forestry. SFASU. 8 p.

INDIVIDUAL TREE CONTENT

Uses equations developed by Lenhart, Blackard, Wiswell, Hackett (part of his MSF thesis) and Laman (part of his MSF thesis) and reported in

Wiswell, T. J., J. A. Blackard and J. D. Lenhart. 1986. Estimating the cubic foot volume of individual loblolly pine trees planted in East Texas. ETPPRP Report No. 5. School of Forestry. SFASU. 11 p.

Wiswell, T. J., J. A. Blackard and J. D. Lenhart. 1986. Estimating the green weight of individual loblolly pine trees planted in East Texas. ETPPRP Report No. 6. School of Forestry. SFASU. 10 p.

Hackett, T. L. 1986. Estimating the cubic foot volume of individual slash pine trees planted in East Texas. ETPPRP Report No. 8. School of Forestry. SFASU. 11 p.

Laman, C. J. 1986. Estimating the green weight of individual slash pine trees planted in East Texas. ETPPRP Report No. 9. School of Forestry. SFASU. 11 p.

Lenhart, J. D., T. L. Hackett, C. J. Laman, T. J. Wiswell and J. A. Blackard. 1987. Tree content and taper functions for loblolly and slash pine trees planted on non-old-fields in East Texas. So. J. Appl. For. 11(3):147-151.

RECOVERING WEIBULL PARAMETERS

Uses methods and equations developed by Burk, Burkhart and Lenhart and reported in

Burk, T. E. and H. E. Burkhart. 1984. Diameter distributions and yields of natural stands of loblolly pine. FWS-1-84. Div. of For. and Wild. Resources. VPI&SU. 22 p.

Lenhart, J. D. 1987. Stand structure and yield of loblolly pine plantations in East Texas, update: 1987. ETPPRP Report No. 16. School of Forestry. SFASU. 23 p.

Lenhart, J. D. 1987. Stand structure and yield of slash pine plantations in East Texas, update: 1987. ETPPRP Report No. 17. School of Forestry. SFASU. 23 p.

Lenhart, J. D. 1988. Diameter distribution yield prediction system for unthinned loblolly and slash pine plantations on non-old-fields in East Texas. So. J. Appl. For. 12(4):239-242.

OUTPUT FROM HYPERSTAND 1.0

After calculations are completed, a picture of a flip chart with tabs appears on the screen. The tabs are:

1. Squirrel - click on it and information about HYPERSTAND is listed.

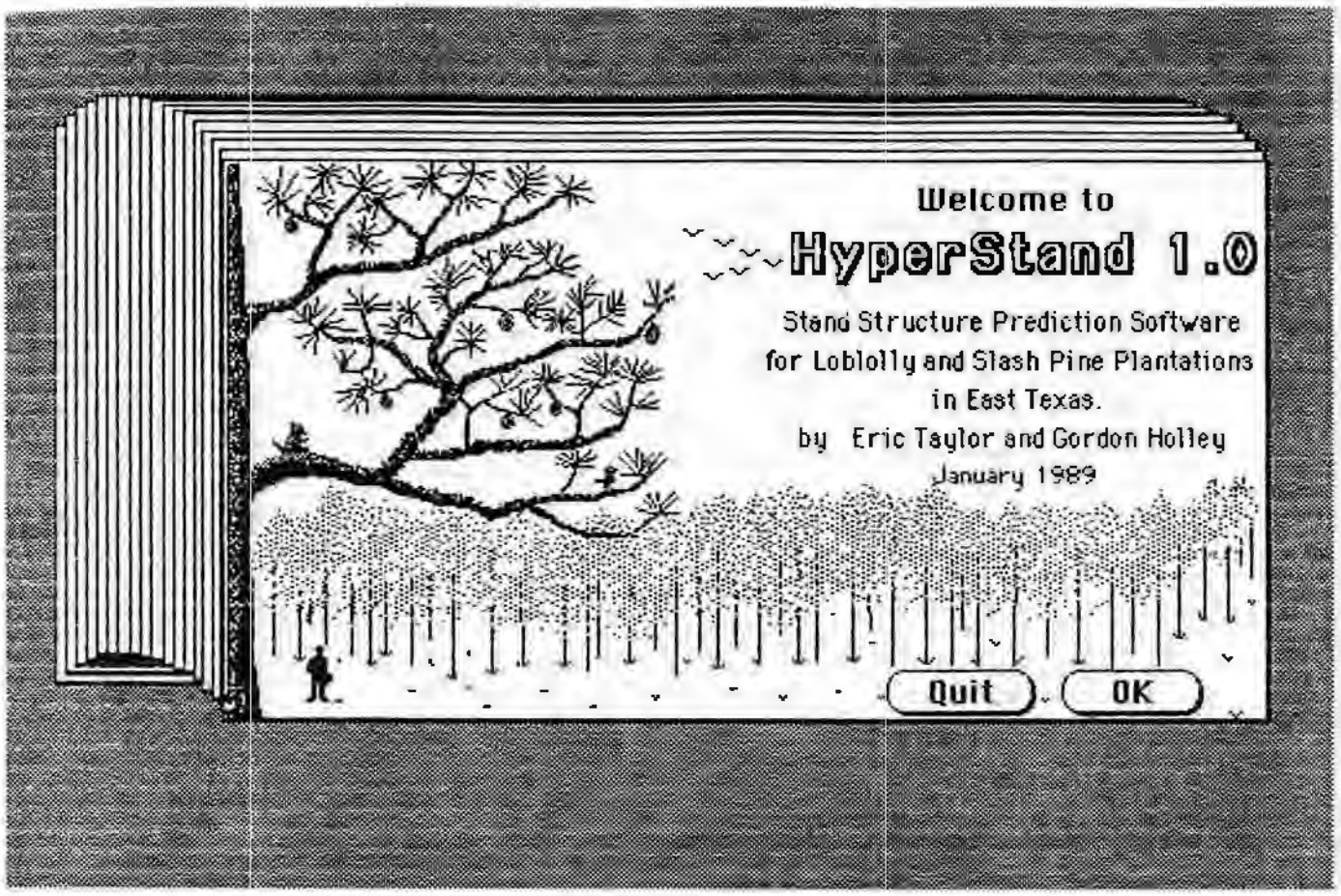
2. Characteristics - describes the parameters of the plantation.

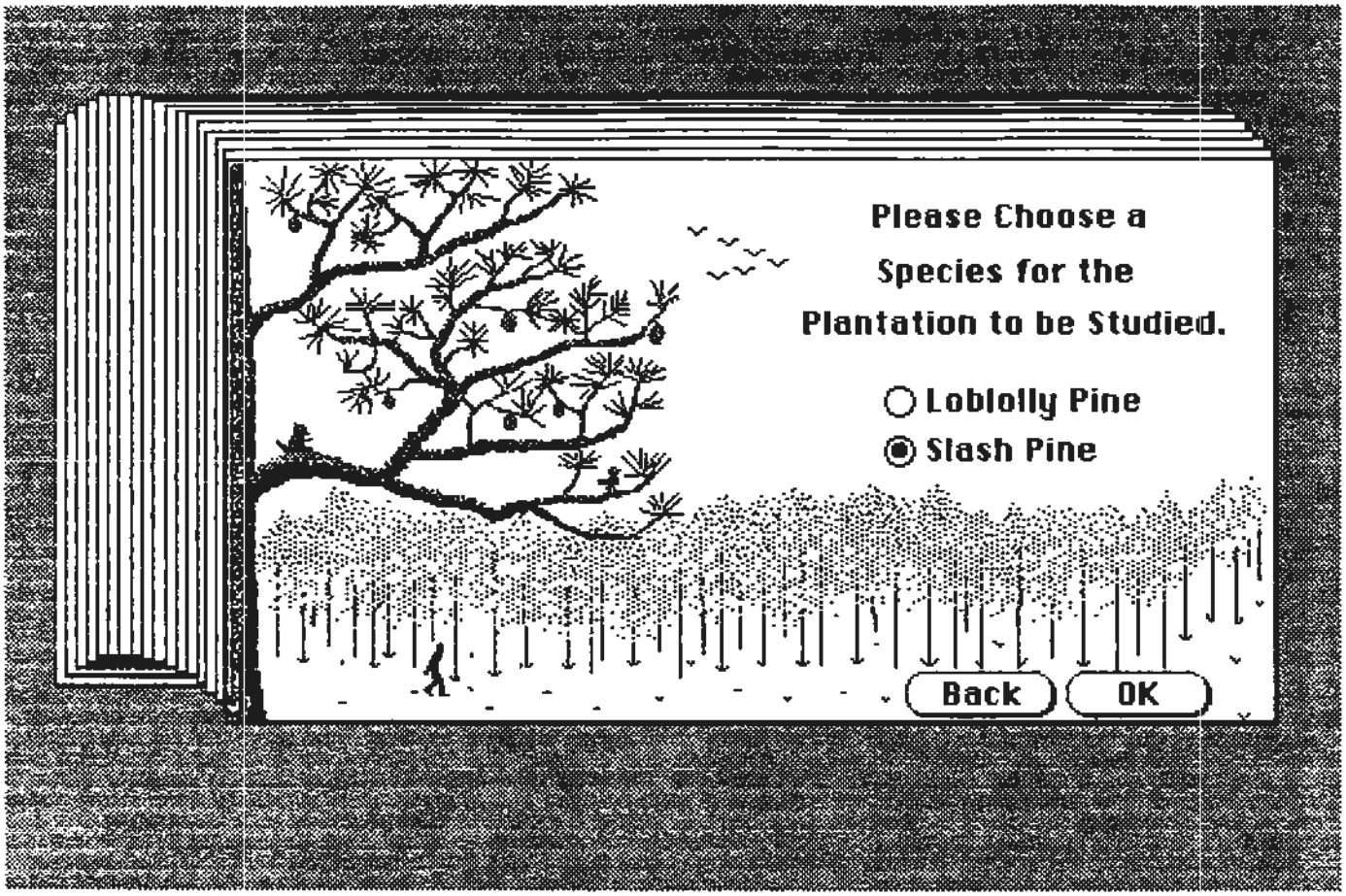
3. Stem Content - presents stand structure and the volume and weight of the content of the total stem.

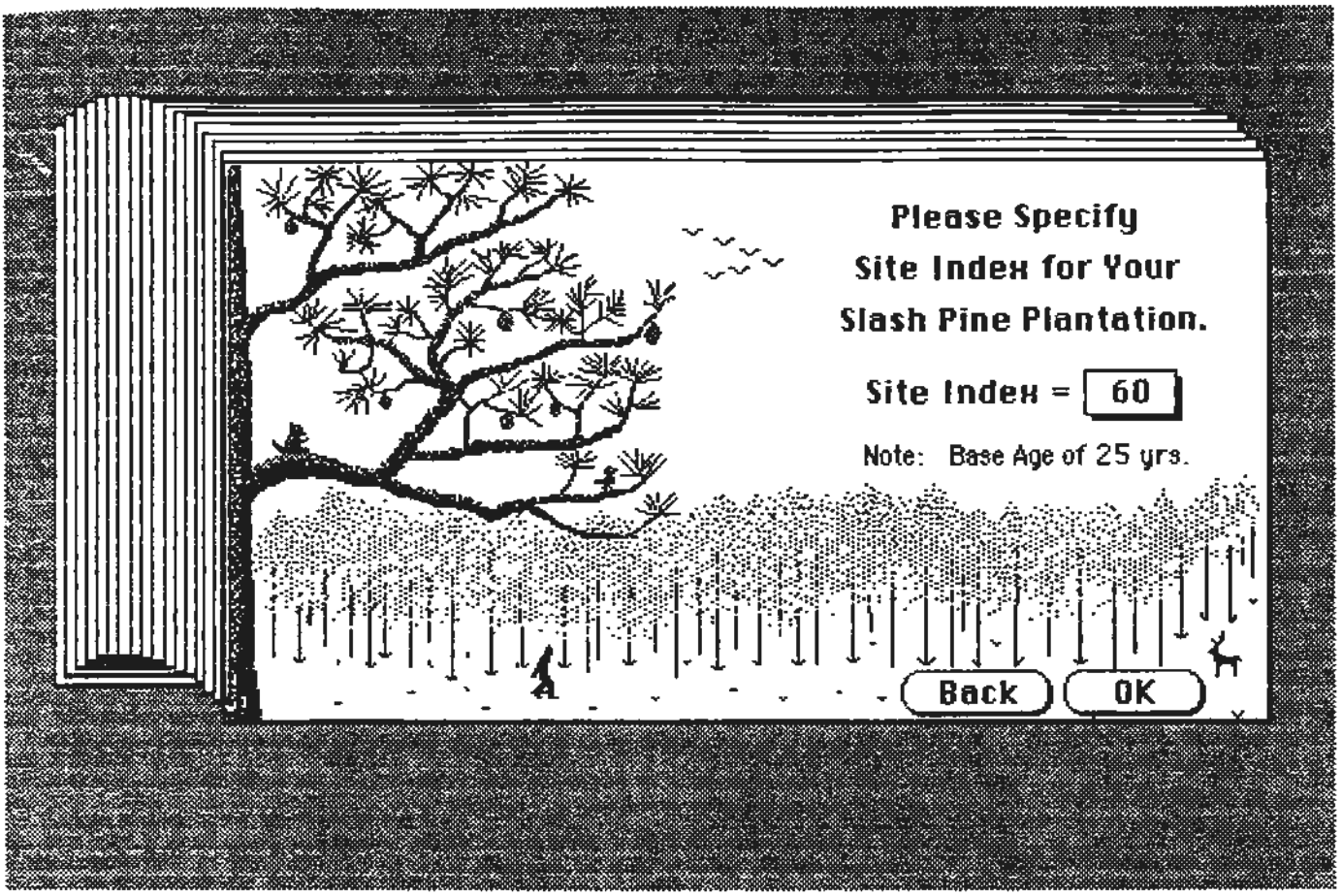
4. Complete Tree Content - lists stand structure and the volume and weight of the content of the complete tree (stem and branches).

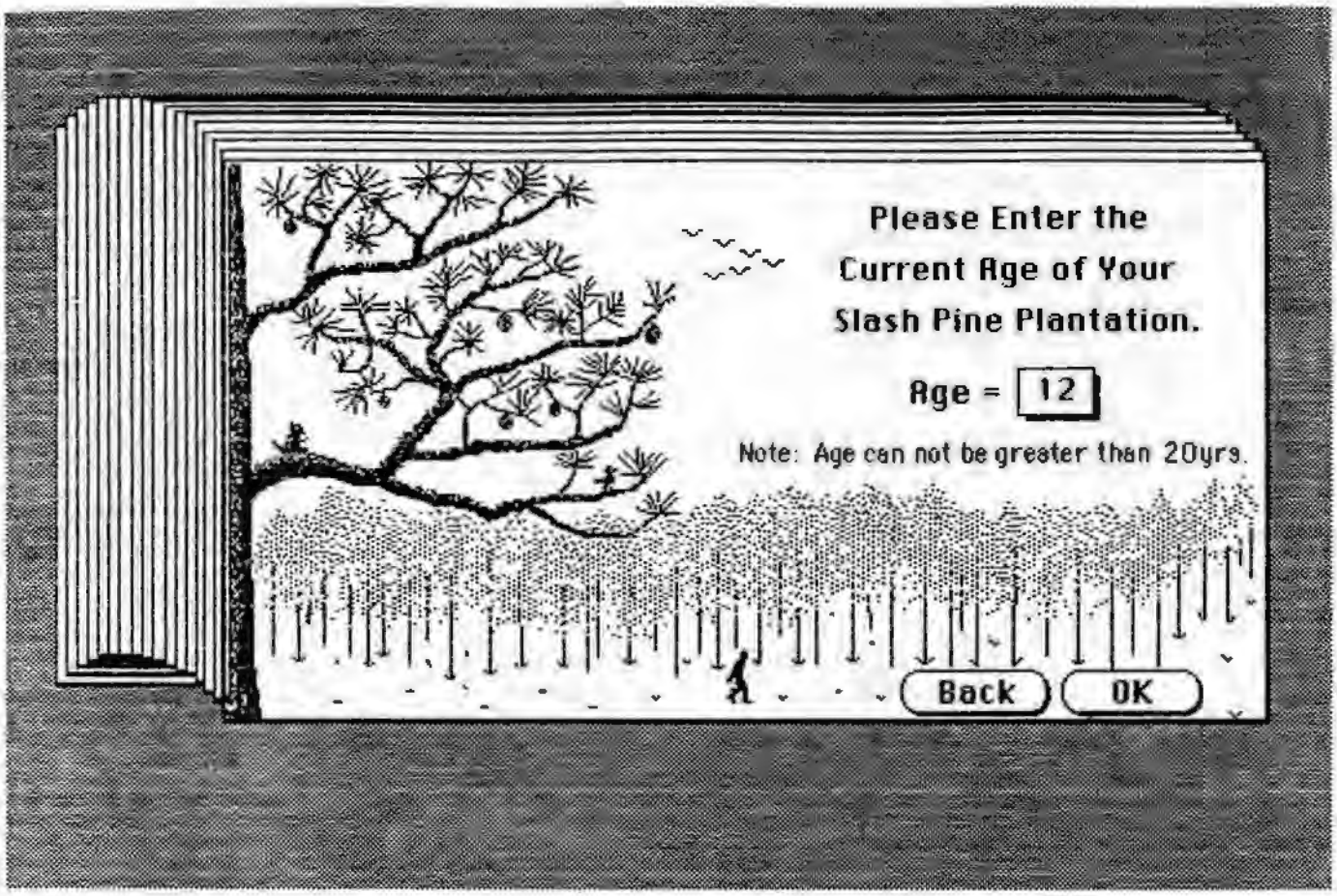
5. Exit - allows the user to leave the flip chart and compute the yield of another plantation.

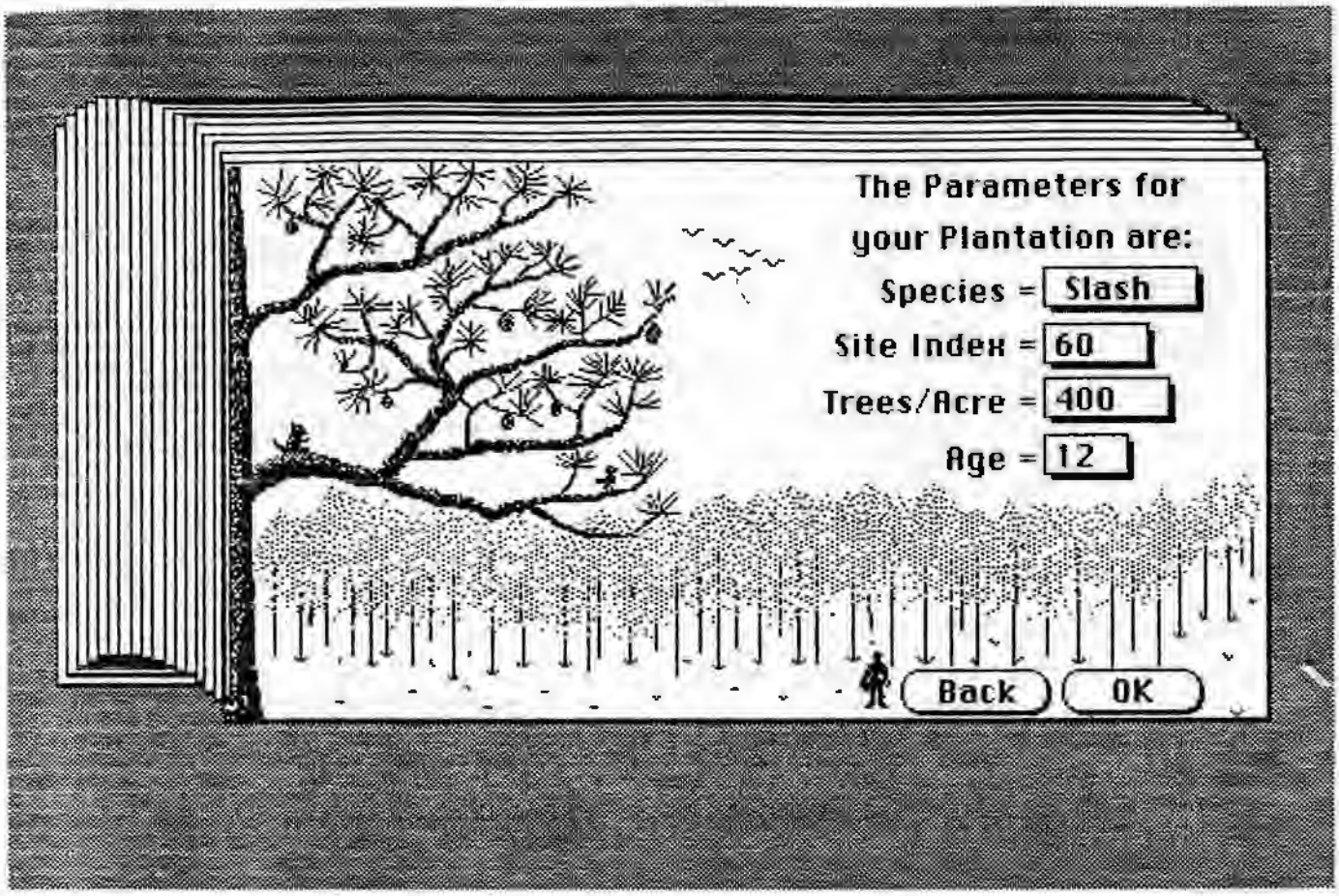
An example of the pages from the flip chart for a slash pine plantation are presented on pages 13-16 of this report.


Welcome to
HyperStand 1.0
Stand Structure Prediction Software
for Loblolly and Slash Pine Plantations
in East Texas.
by Eric Taylor and Gordon Holley
January 1989
Quit
OK

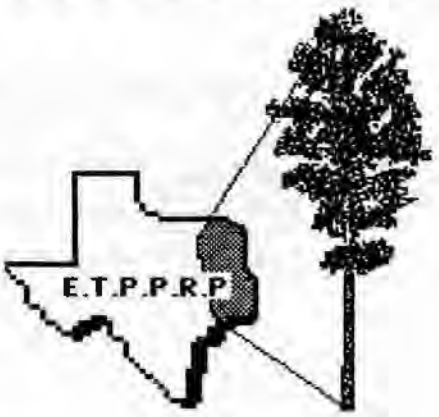

Please Choose a
Species for the
Plantation to be Studied.
Loblolly Pine
Slash Pine
Back
OK


Please Specify
Site Index for Your
Slash Pine Plantation.
Site Index = 60
Note: Base Age of 25 yrs.
Back
OK


Please Enter the
Current Age of Your
Slash Pine Plantation.
Age = 12
Note: Age can not be greater than 20yrs.
Back
OK


The Parameters for
your Plantation are:
Species = Slash
Site Index = 60
Trees/Acre = 400
Age = 12
Back
OK

Predicted Stand Structure and Volume and Weight per Acre by DBH Class for A Slash Pine Plantation in East Texas



Based on Research Conducted in the
East Texas Pine Plantation Research Project
School of Forestry
Stephen F. Austin State University
1982 - 1989

Characteristics | Stem Content | Complete Tree Cont. | Exit

Plantation Characteristics

Your Stand Parameters

Species = Slash
Age = 12
Trees/Acre = 400
Site Index = 60

Weibull Parameters

Location (a) = 1.6590
Scale (b) = 3.6599
Shape (c) = 2.9582

Predicted Plantation Characteristics

Average Height of Ten Tallest Trees = 36
Arithmetic Mean DBH = 4.93

Quadratic Mean DBH = 5.07
Minimum DBH = 1.7
Maximum DBH = 9.0

Characteristics | Stem Content | Complete Tree Cont. | Exit

Stem Content per Acre

DBH (in)	Number of Trees	Basal Area (sqft)	Avg. Ind. Tree Ht. (ft)	Wood & Bark Volume (cuft)	Wood & Bark Green Weight (lbs)	Wood Only Volume (cuft)	Wood Only Green Weight (lbs)	Wood Only Dry Weight (lbs)
1								
2	5	0.1	16.0	0.9	45.7	0.6	38.2	17.2
3	44	2.2	19.9	21.9	1105.0	14.0	939.7	431.9
4	102	8.9	23.2	101.8	5237.8	67.5	4505.9	2103.2
5	123	16.8	26.2	211.3	11036.3	144.4	9579.1	4525.3
6	86	16.9	28.9	230.0	12154.8	161.0	10627.2	5069.7
7	33	8.8	31.5	128.8	6876.4	92.0	6049.3	2910.0
8	7	2.4	33.8	37.7	2031.1	27.4	1796.4	870.3
9	2	0.9	36.1	14.4	780.7	10.6	693.7	338.3
10								
11								
12								
13								
14								
15								
Total	400	57.0		746.8	39267.8	517.5	34229.5	16265.9


Characteristics | Stem Content | Complete Tree Cont. | Exit

Complete Tree per Acre

DBH (in)	Number of Trees	Basal Area (saft)	Avg. ind. Tree Ht. (ft)	Wood & Bark Volume (cuft)	Wood & Bark Green Weight (lbs)	Wood Only Volume (cuft)	Wood Only Green Weight (lbs)	Wood Only Dry Weight (lbs)
1								
2	5	0.1	16.0	1.1	52.9	0.5	41.4	17.7
3	44	2.2	19.9	26.4	1323.7	12.4	1065.3	471.2
4	102	8.9	23.2	125.8	6433.1	61.1	5278.3	2394.1
5	123	16.8	26.2	266.1	13811.5	132.4	11503.3	5320.0
6	86	16.9	28.9	294.3	15451.0	149.2	13027.3	6121.2
7	33	8.8	31.5	166.8	8850.5	86.0	7540.2	3590.9
8	7	2.4	33.8	49.4	2645.2	25.8	2273.8	1095.5
9	2	0.9	36.1	19.0	1026.4	10.1	889.4	432.9
10								
11								
12								
13								
14								
15								
Total	400	57.0		948.9	49594.3	477.5	41619.0	19443.5

Characteristics | Stem Content | Complete Tree Cont. | Exit