SITE INDEX CURVES FOR SOME FOREST SPECIES IN THE EASTERN UNITED STATES

Prepared by
Division of State & Private Forestry
Eastern Region — Forest Service
U. S. Dept. of Agriculture
Upper Darby, Pennsylvania
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Frederick E. Hampf

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FOREWORD

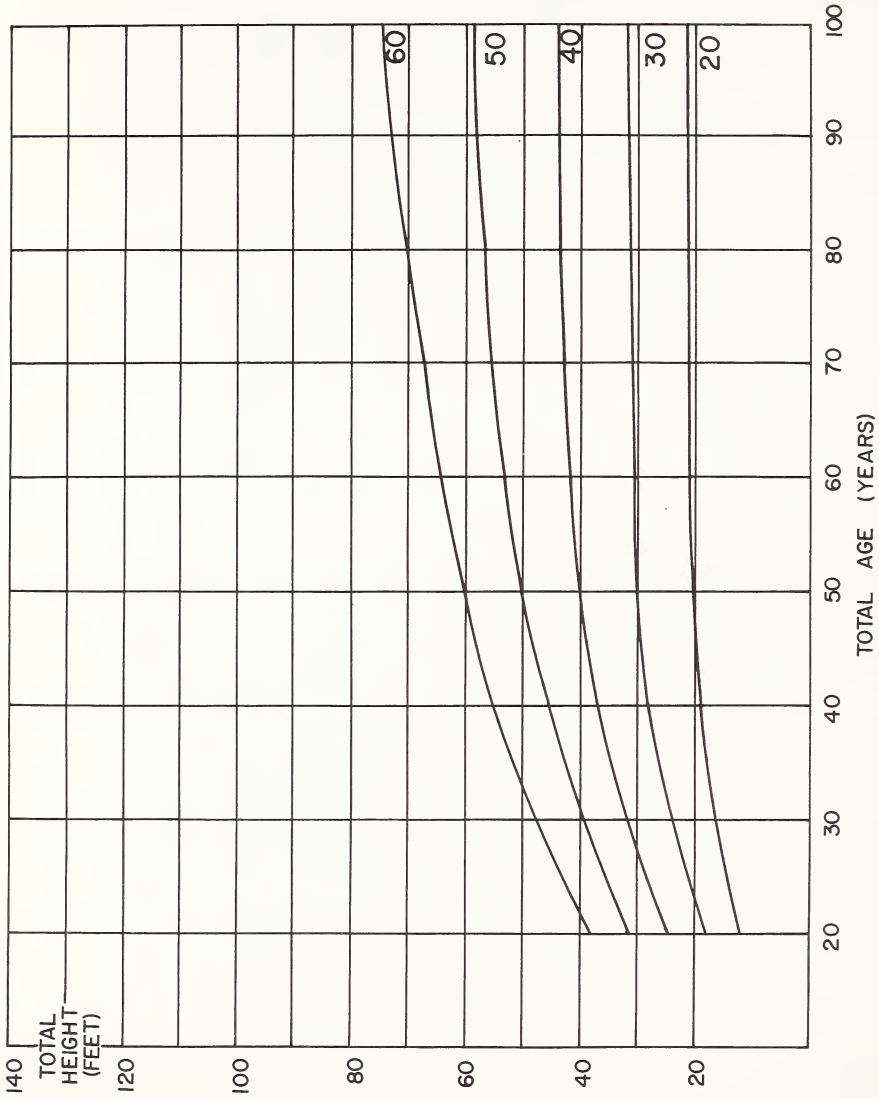
Indices of site quality are important to forest management. They indicate the relationships between productivity and the many environmental factors influencing an ecosystem. Site Index is a single, quantitative expression of the multitude of factors that make up site quality. Lesser influencing factors of tree growth, such as stand density, may be disregarded. For a single tree species, variations in height growth due to variations in the site factors have been found to be closely and positively correlated, more so than variations in diameter or volume growth. For this reason, height growth is the factor in common use in this country as an index of site. The height attained by the average dominant and codominant trees at the age of 50 years is generally used in the Eastern United States as the index of site quality and is known as Site Index.

For years, foresters have prepared tables and graphs showing the site index for a specific species, stand or area. Some of this information is therefore limited in application, and the publications are not generally available to the practicing forester. To make it possible for foresters to have curves for several species under one cover, all available data in the Regional Office was studied and correlated. Tables were prepared showing site index curves for thirty-two eastern species.

These curves are only as accurate in application as the original data on which they are based. They may not fit perfectly in all situations. However, these curves will enable foresters to come up with a good estimate of site index (total height in feet at 50 years of age) from measurements taken on trees which are more than or less than 50 years of age.

The sources of information used are shown at the bottom of each table. Some existing data may have been overlooked. Any such data, if made available, would be considered for possible revisions of the curves.

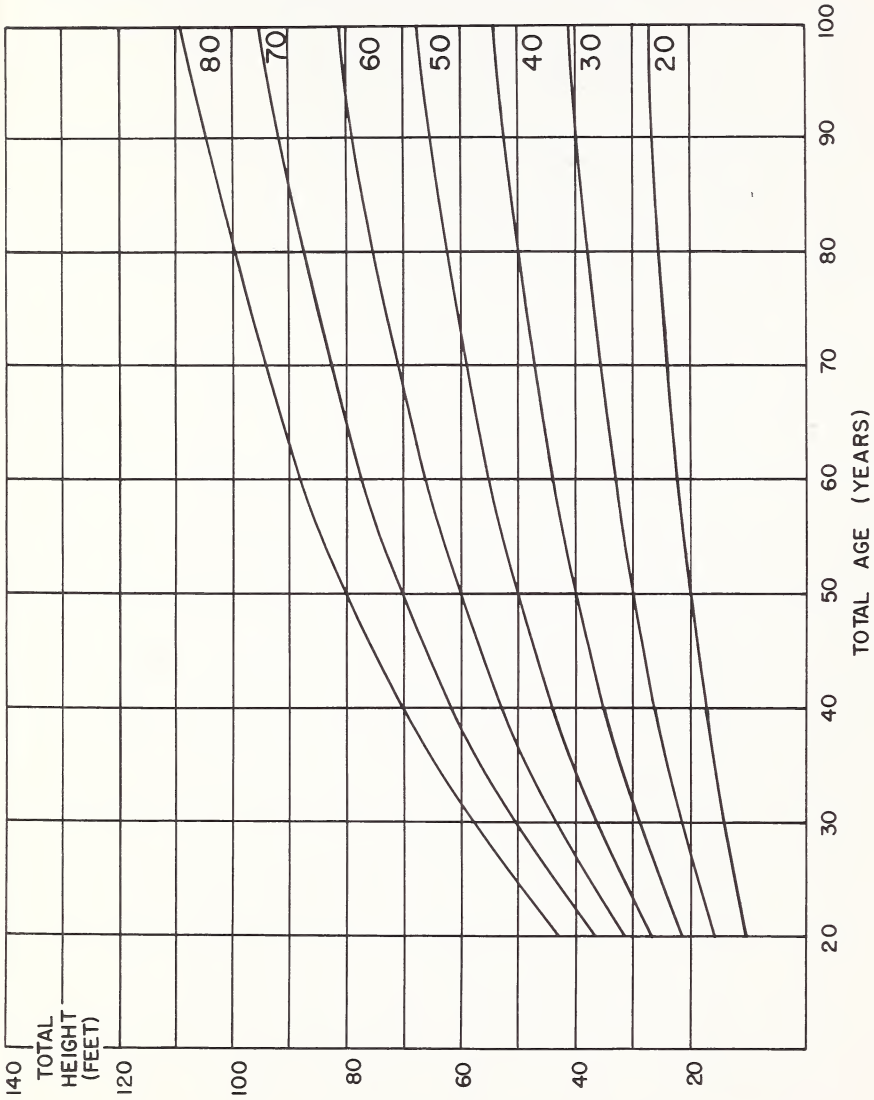
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, THROUGHOUT THE TENNESSEE VALLEY.



SOURCE: USDA-SCS-SPARTANBURG, S.C., 1956, BASED ON 271 OBSERVATIONS FROM PLOTS THROUGHOUT TENNESSEE VALLEY, SUMMER, 1948.

Figure 1.-- RED CEDAR

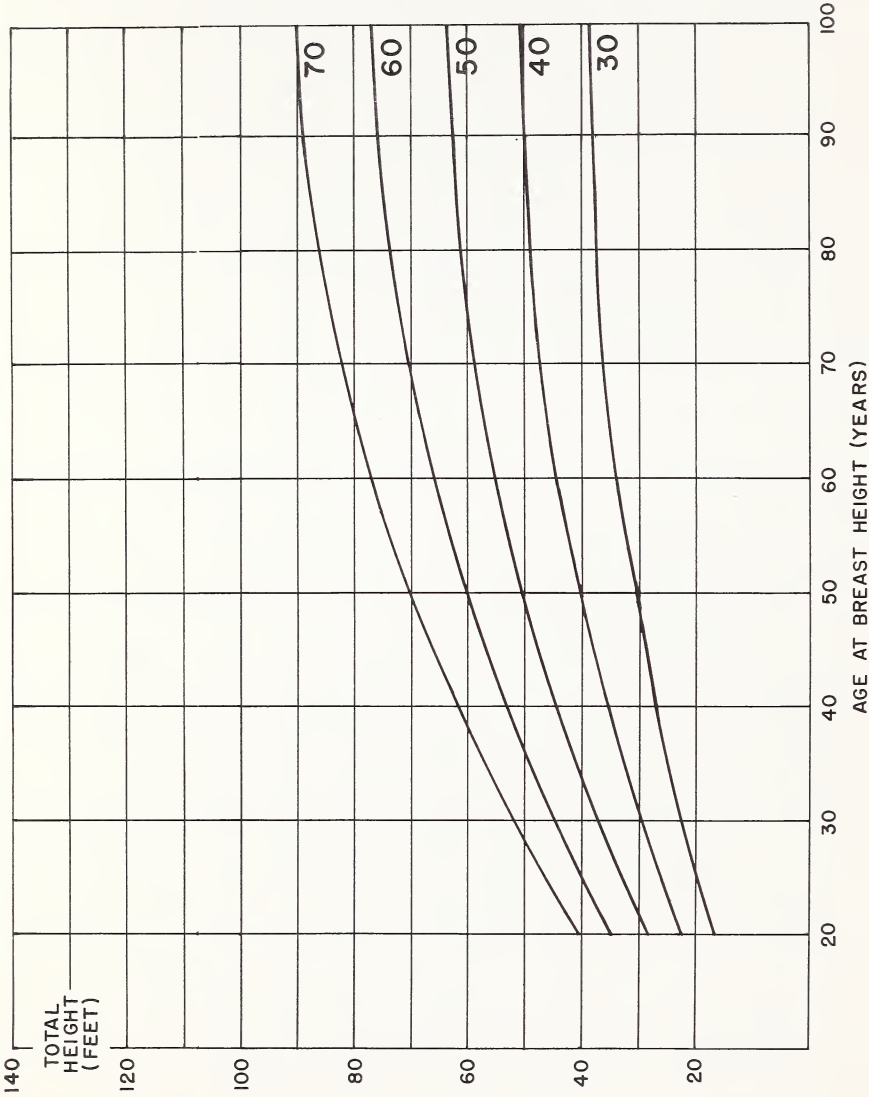
HEIGHT IN FEET OF AVERAGE SECOND-GROWTH DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: KORSTIAN, C.F., BRUSH, W.D., SOUTHERN WHITE CEDAR, U.S.D.A. TECH. BULL. NO. 251, SEPT. 1931.

Figure 2.--ATLANTIC WHITE-CEDAR

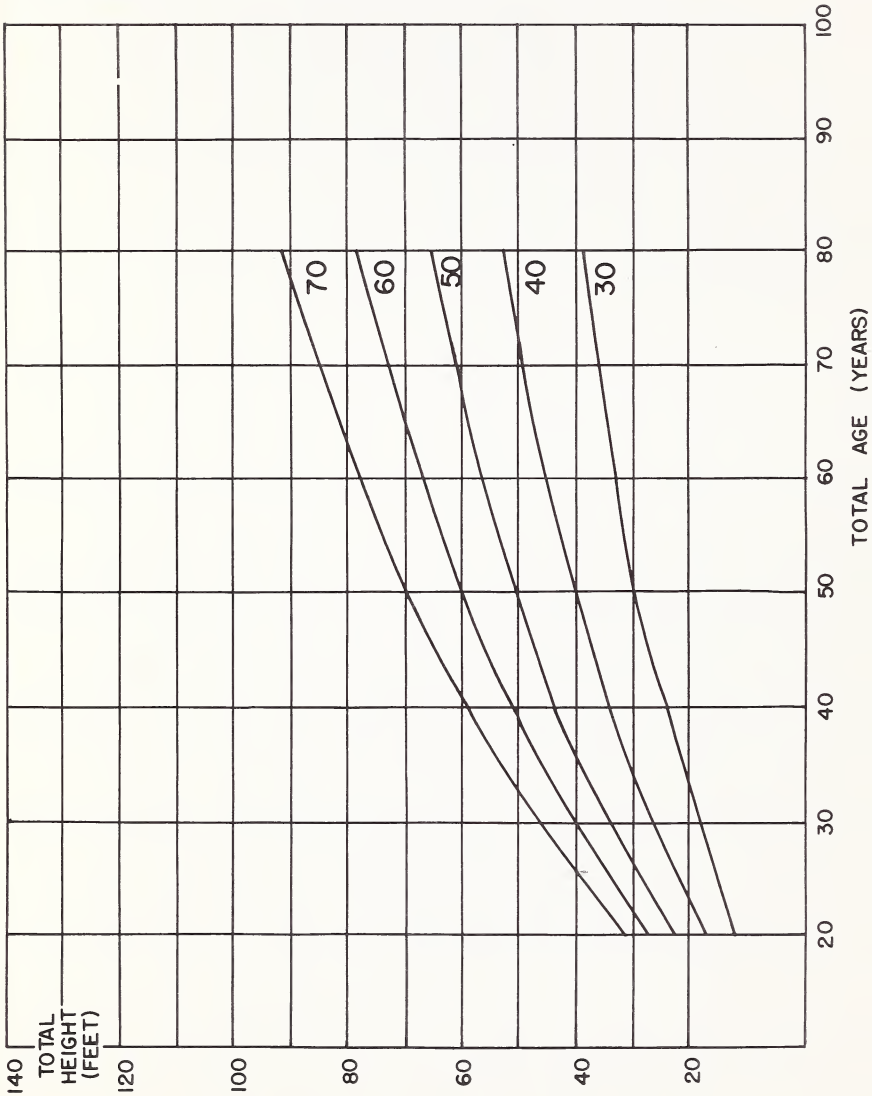
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE LAKE STATES



SOURCE: MEYER, W.H., U.S.D.A. TECH. BULL. # 142, 1929. GEVORKIANTZ S.R., LAKES STATES FOR. EXP. STA. TECH. NOTES # 465, OCT, 1956

Figure 3.--BALSAM FIR

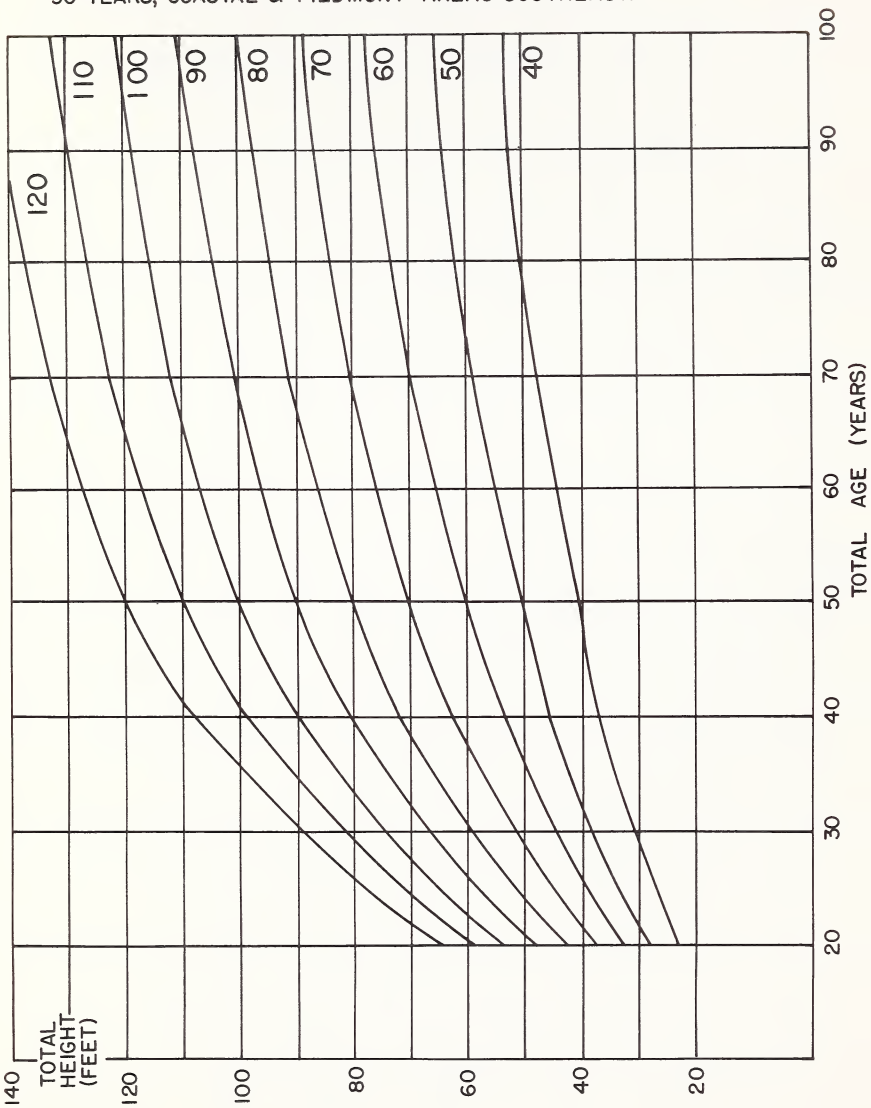
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR. EXP. STA. TECH. NOTES NO. 463, OCT. 1956. EYRE, F.H., & LE BARRON, R.K., U.S.D.A. TECH. BULL. NO. 863, 1944. STERRETT, W.D., U.S.D.A. BULL NO. 820, MAY, 1920. WACKERMAN, A.E., ZON, R., WILSON, F.G., U. OF WISCONSIN RES. BULL. NO. 90, MARCH, 1929.

Figure 4.-- JACK PINE

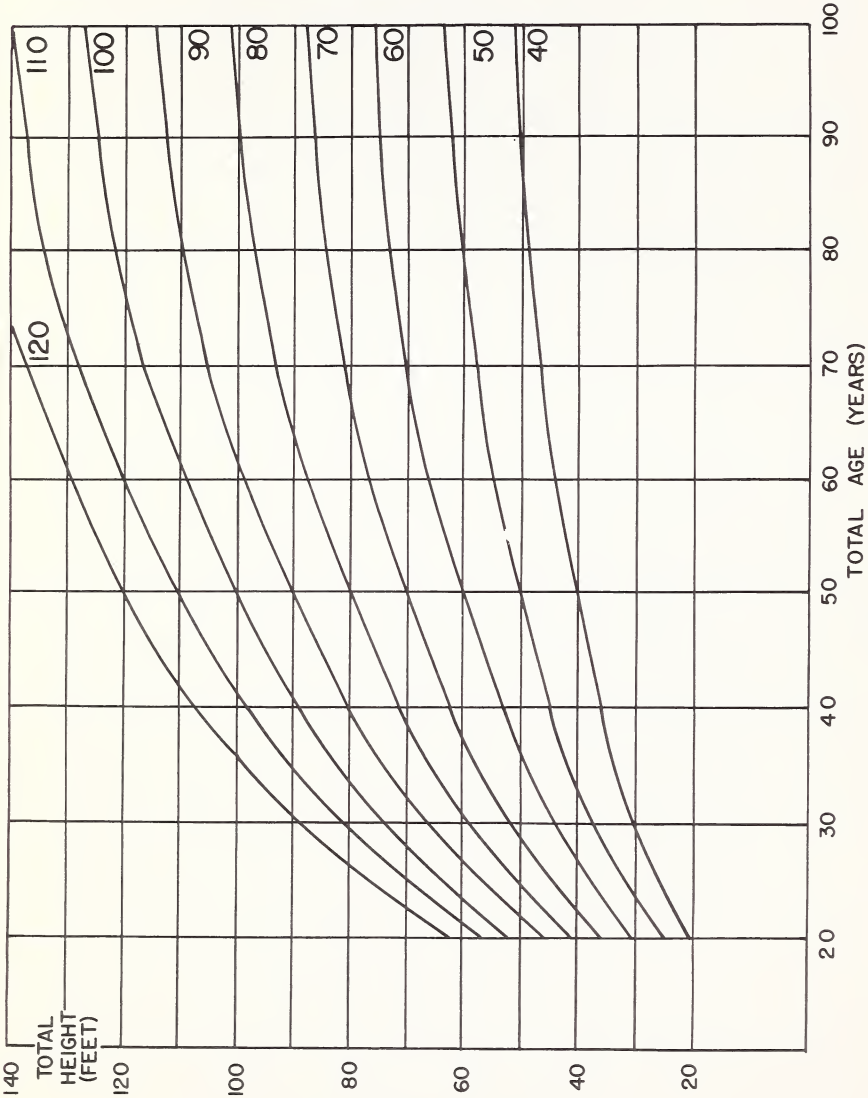
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, COASTAL & PIEDMONT AREAS SOUTHEAST.



SOURCE: VOLUME, YIELD & STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES, U.S. DEPT. AGR. MISC. PUBL. NO. 50 (1929). REVISED BY COILE & SCHUMACHER, JOUR. OF FOR., JUNE 1953.

Figure 5.--LOBLOLLY PINE

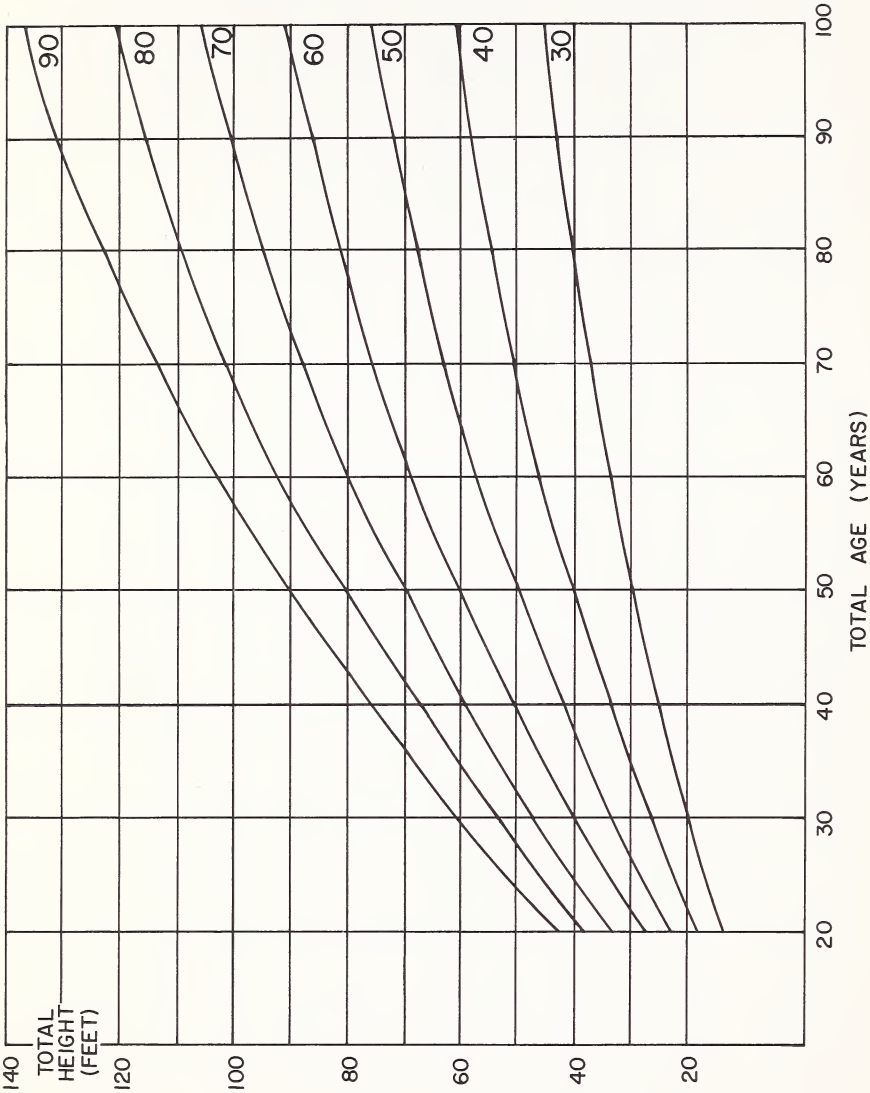
HEIGHT IN FEET OF SECOND GROWTH DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: U.S.D.A. MISC. PUBL. NO. 50, SEPT. 1929. CRUIKSHANK, J.W., S.E. FOR. EXP. STA. RES. NOTES NO. 50, JAN. 1954. (ABOVE CURVES AGREE CLOSELY WITH THOSE PREPARED BY SCHUMACHER, F.X. & COILE, T.S., PUBLISHED JAN. 1960.)

Figure 6.--LONGLEAF PINE

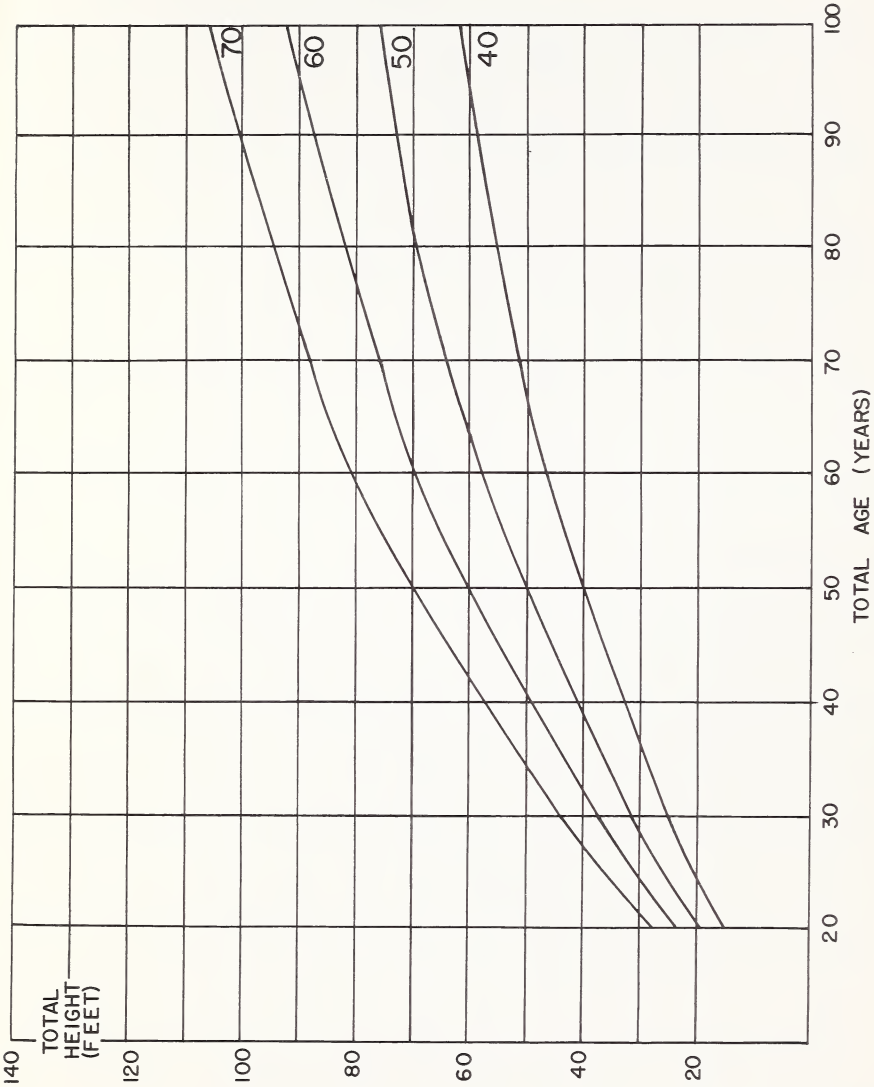
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, THROUGHOUT PENNSYLVANIA.



SOURCE: ILLICK, J.S. & AUGHANBAUGH, J.E., PITCH PINE IN PENNSYLVANIA, PA. DEPT OF FORESTS & WATERS RES. BUL. NO. 2, 1930.

Figure 7.-- PITCH PINE

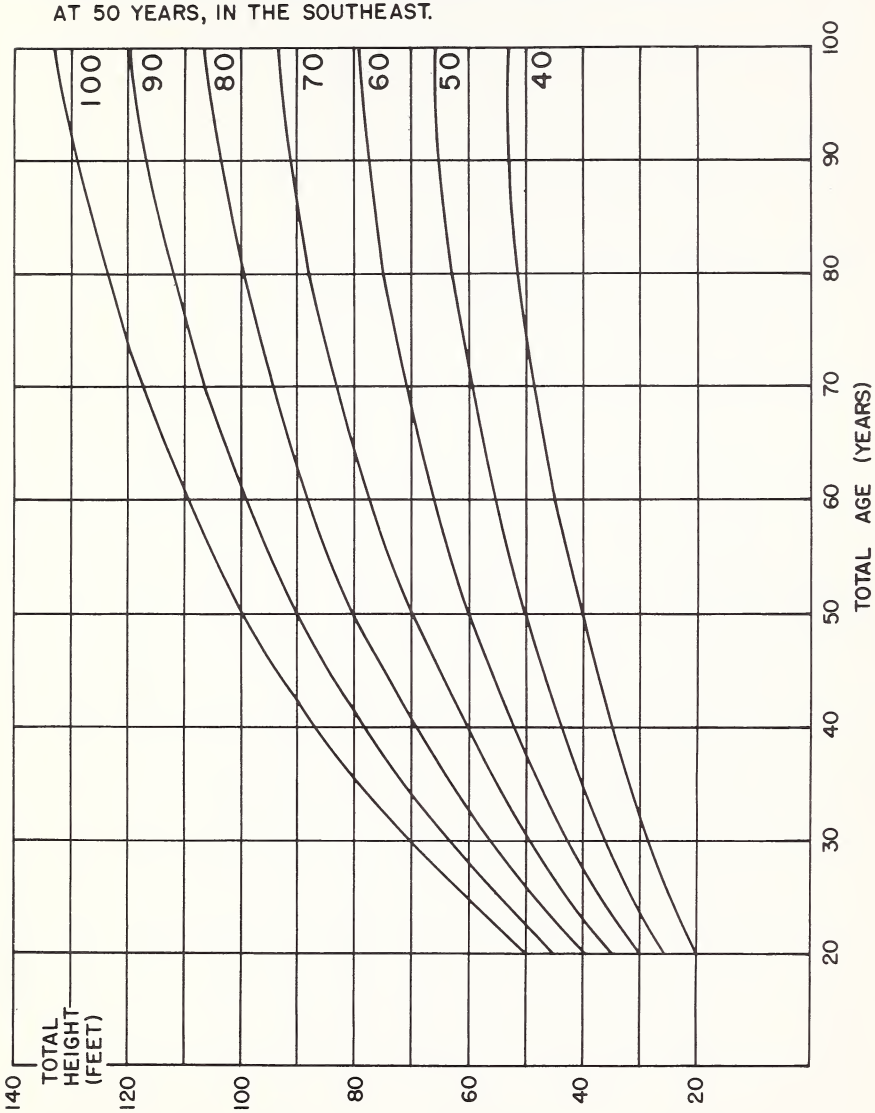
HEIGHT IN FEET OF EVEN-AGED DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR. EXP. TECH. NOTES NO. 484, APRIL 1957. EYRE, F.H., & ZEHNGRAFF, U.S.D.A. CIR. 778, MAY 1948. BUCKMAN, R.E., TECH. BULL. NO. 1272, OCT. 1962.

Figure 8 -- RED PINE

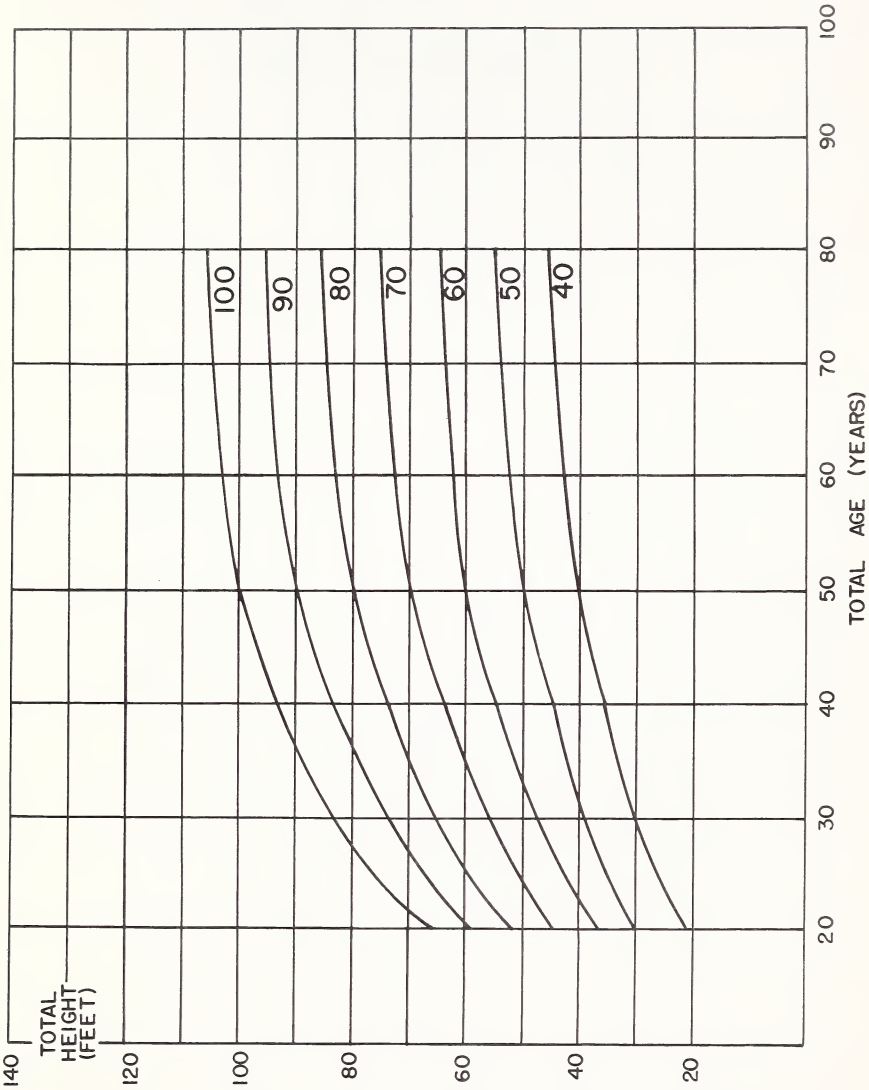
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE SOUTHEAST.



SOURCE: VOLUME, YIELD AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES, U.S.D.A. MISC. NO. 50 (1929)

Figure 9.--SHORTLEAF PINE

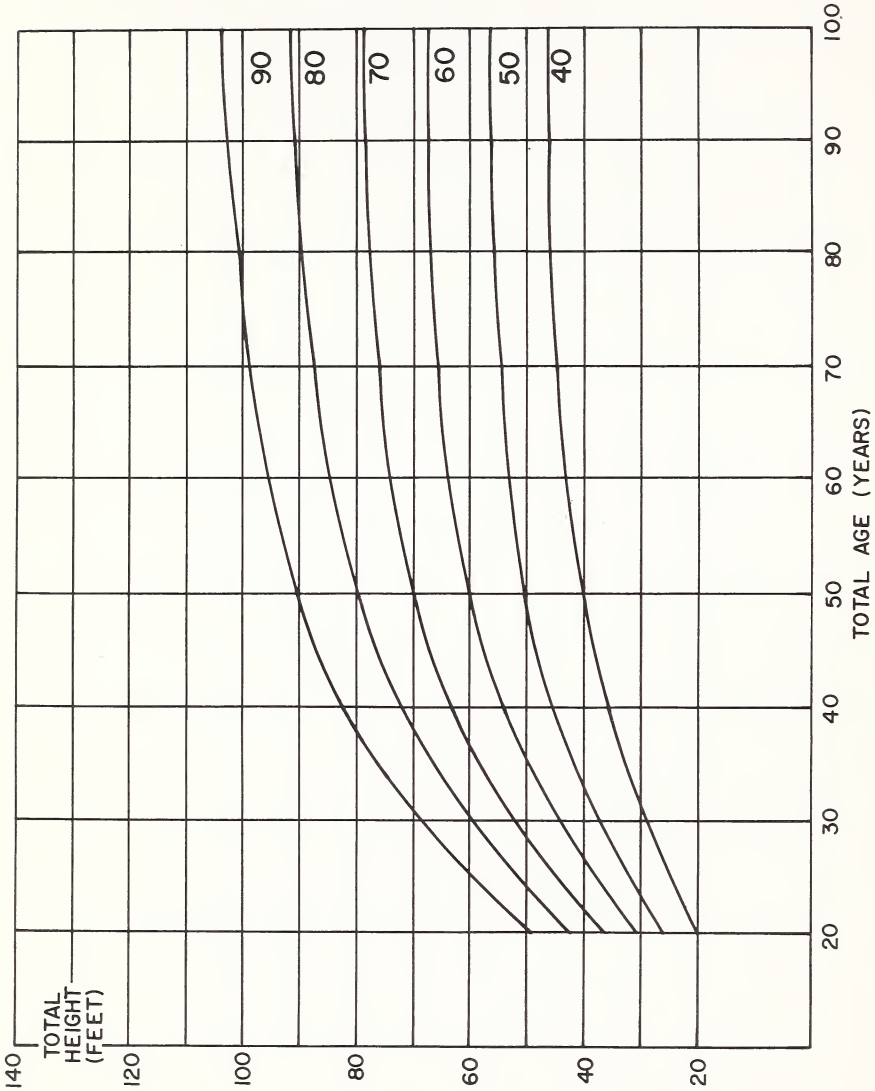
HEIGHT IN FEET OF SECOND-GROWTH DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: U.S.D.A. MISC. PUBL. NO. 50, SEPT. 1929. CRUIKSHANK, J.W., S.E. FOR. EXP. STA. RES. NOTES NO. 50, JAN. 1954. (ABOVE CURVES AGREE CLOSELY WITH THOSE PREPARED BY SCHUMACHER, F.X. & COILE, T.S., PUBLISHED JAN. 1960.

Figure 10 -- SLASH PINE

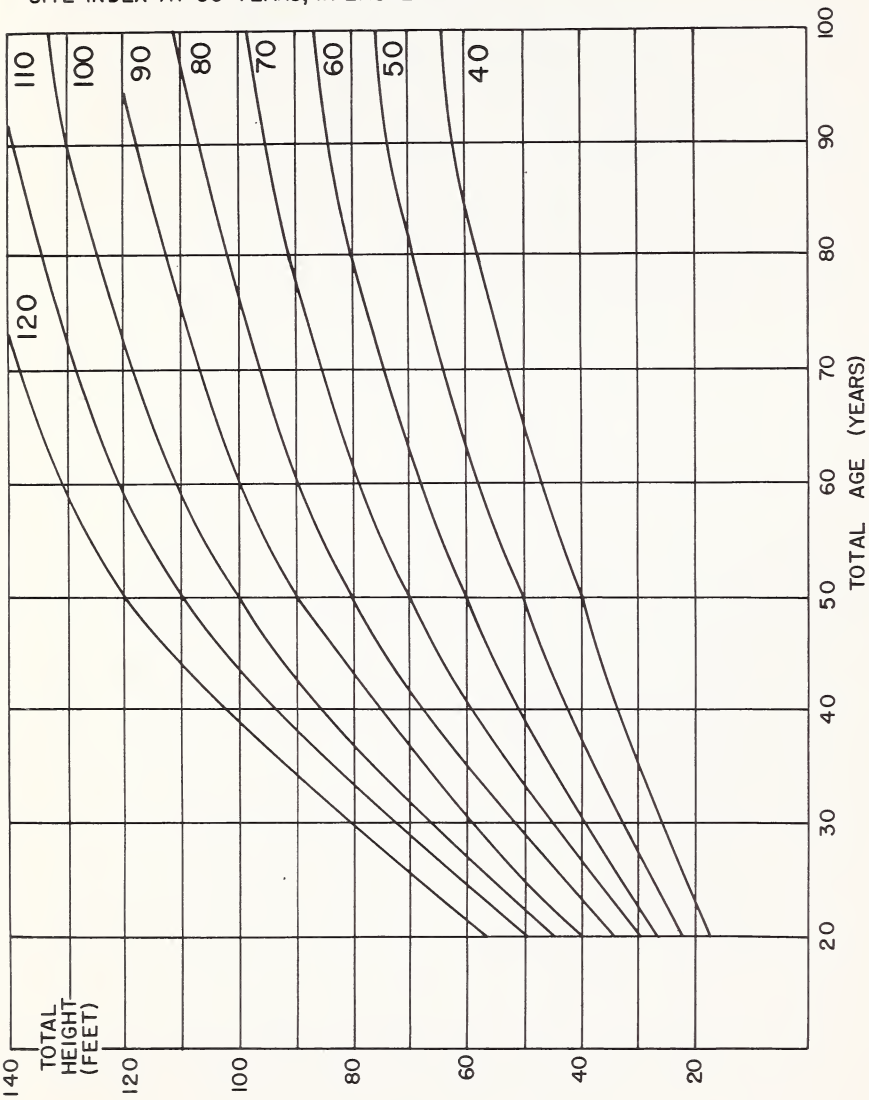
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE EASTERN U.S.



SOURCE: CHAIKEN, L.E., & NELSON, T.C., S.E. FOREST EXP. STA. RESEARCH NOTES NO. 135 NOV. 1959. N.C. STATE COLLEGE TECH. BULL. 100, '58.

Figure 11.-- VIRGINIA PINE

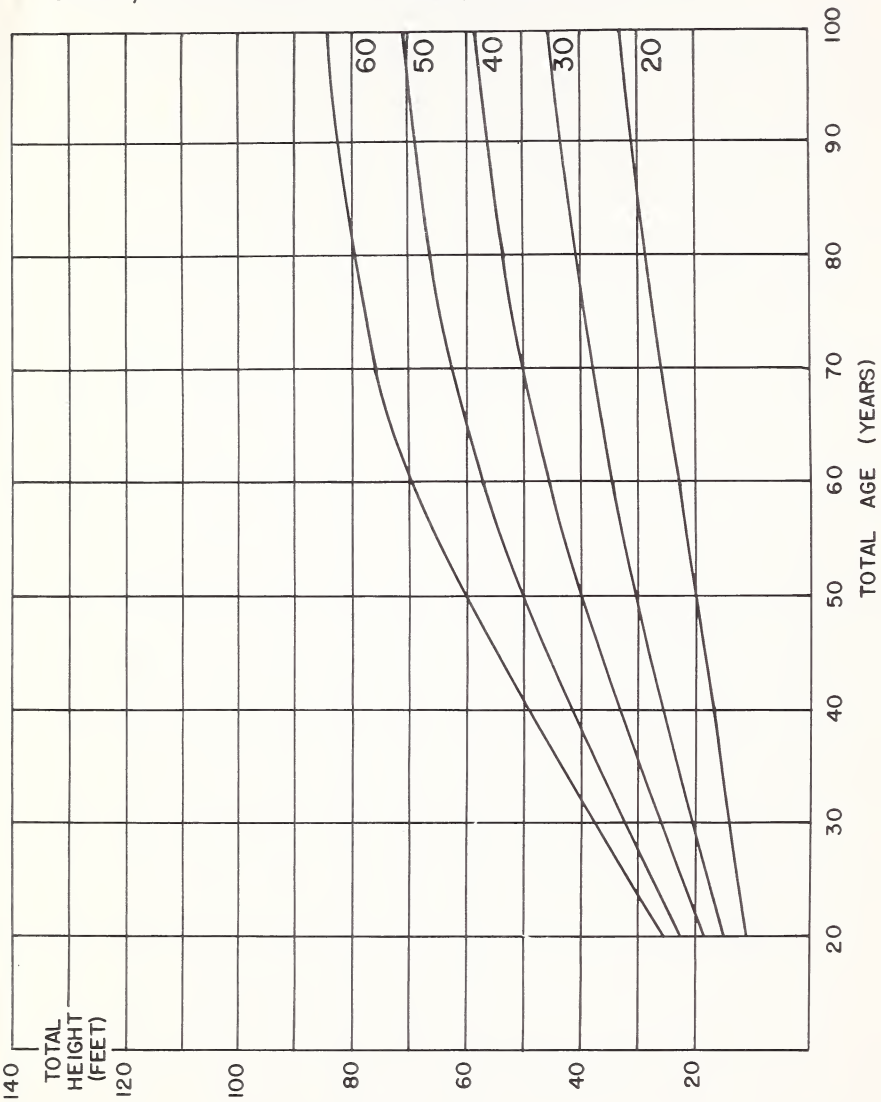
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN U.S.



SOURCE: DOOLITTLE, W.T. & VIMMERSTEDT, J.P., S.E. FOR. EXP. STA. RESEARCH NOTES NO. 141 MARCH, 1960. GEVORKIANTZ, S.R., LAKE STATES FOR. EXP. STA. TECH. NOTES NO. 483, APRIL, 1957. HUSCH, B., FORESTRY MIMEO NO. 1, U. OF N.H., SEPT. 1954. FROTHINGHAM, E.H., U.S.D.A. BULL. NO. 13, 1914.

Figure 12.--WHITE PINE

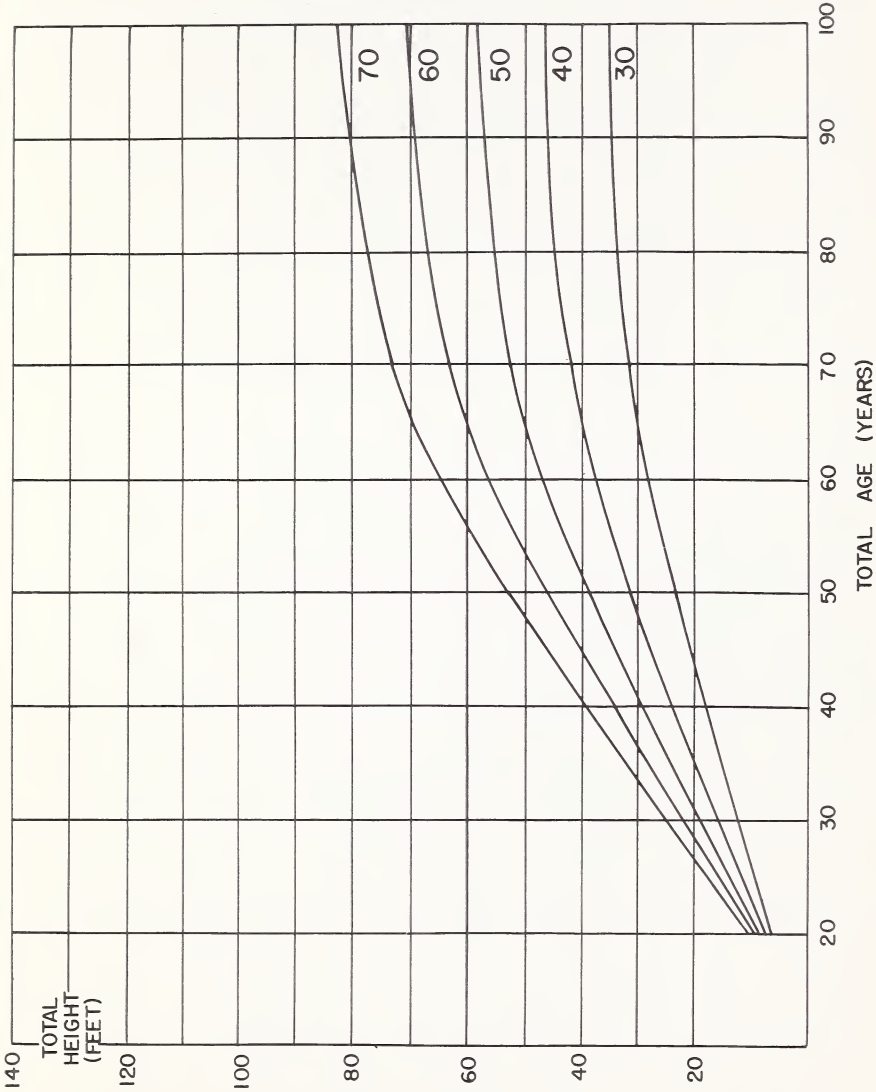
HEIGHT IN FEET OF AVERAGE DOMINANT TREES IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: BOWMAN, A.B., MICH. AGR. EXP. STA. TECH. BULL. NO. 188, 1944. FOX, G.D. & KRUSE, G.W., JOURNAL OF FORESTRY 37:565-567, 1939. LEBARRON, R.K., U.S.D.A. CIRCULAR NO. 791, OCT. 1948. MILLAR, J.B., FORESTRY CHRON. 15:93-96, 1939.

Figure 13.--BLACK SPRUCE

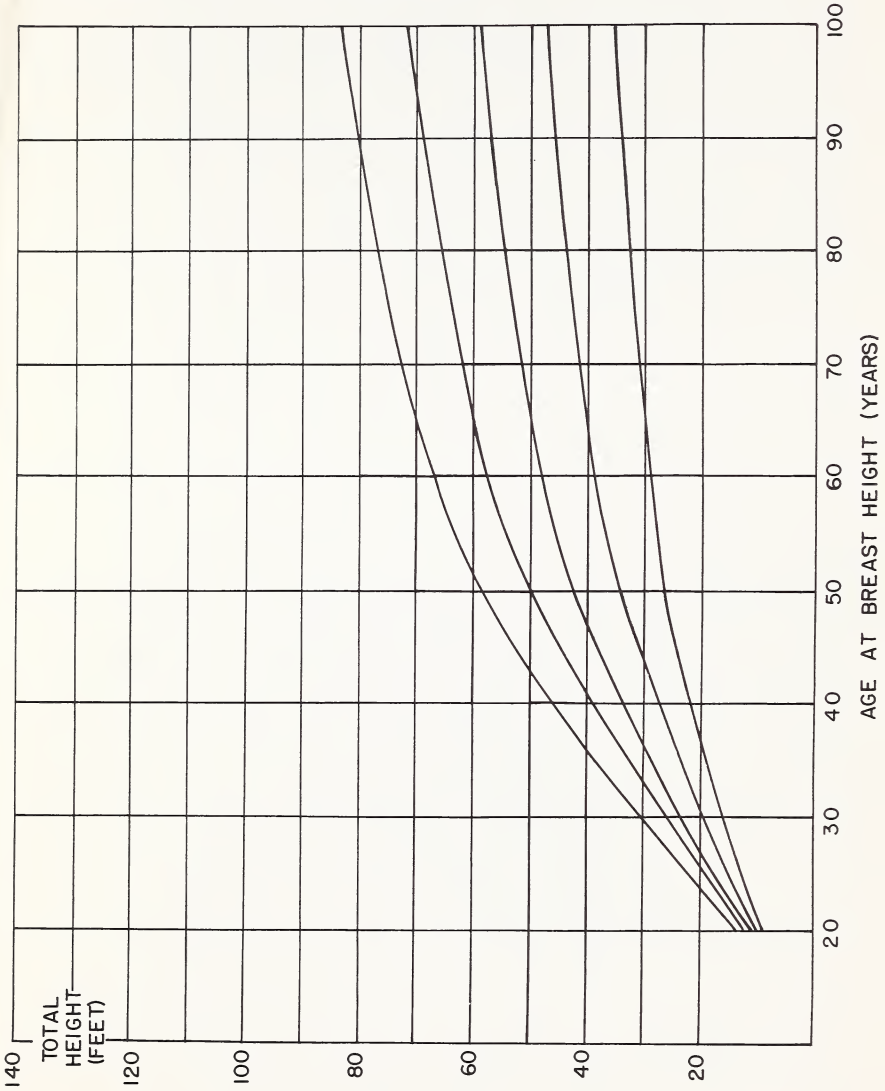
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 65 YEARS, IN NORTHEAST.



SOURCE: W.H. MEYER, YIELDS OF SECOND-GROWTH SPRUCE & FIR. IN THE NORTHEAST, U.S.D.A. TECH. BULL. NO. 142 1929.
MURPHY, L.S., THE RED SPRUCE, U.S.D.A. BULL. NO. 544, OCT. 1917.

Figure 14.-- RED SPRUCE

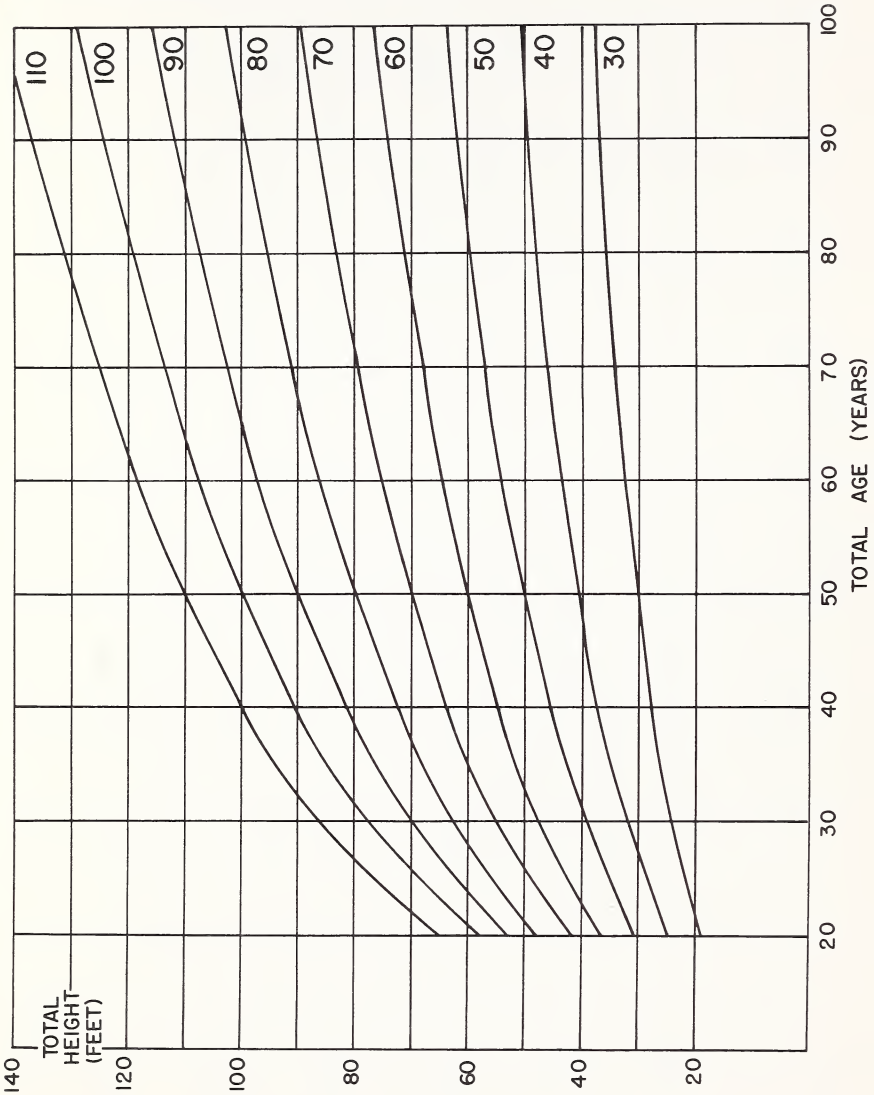
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 65 YEARS, IN NORTHEAST.



SOURCE: W.H. MEYER, YIELDS OF SECOND-GROWTH SPRUCE & FIR IN THE NORTHEAST, U.S.D.A., TECH. BULL. NO. 142 (1929).

Figure 15 -- WHITE SPRUCE

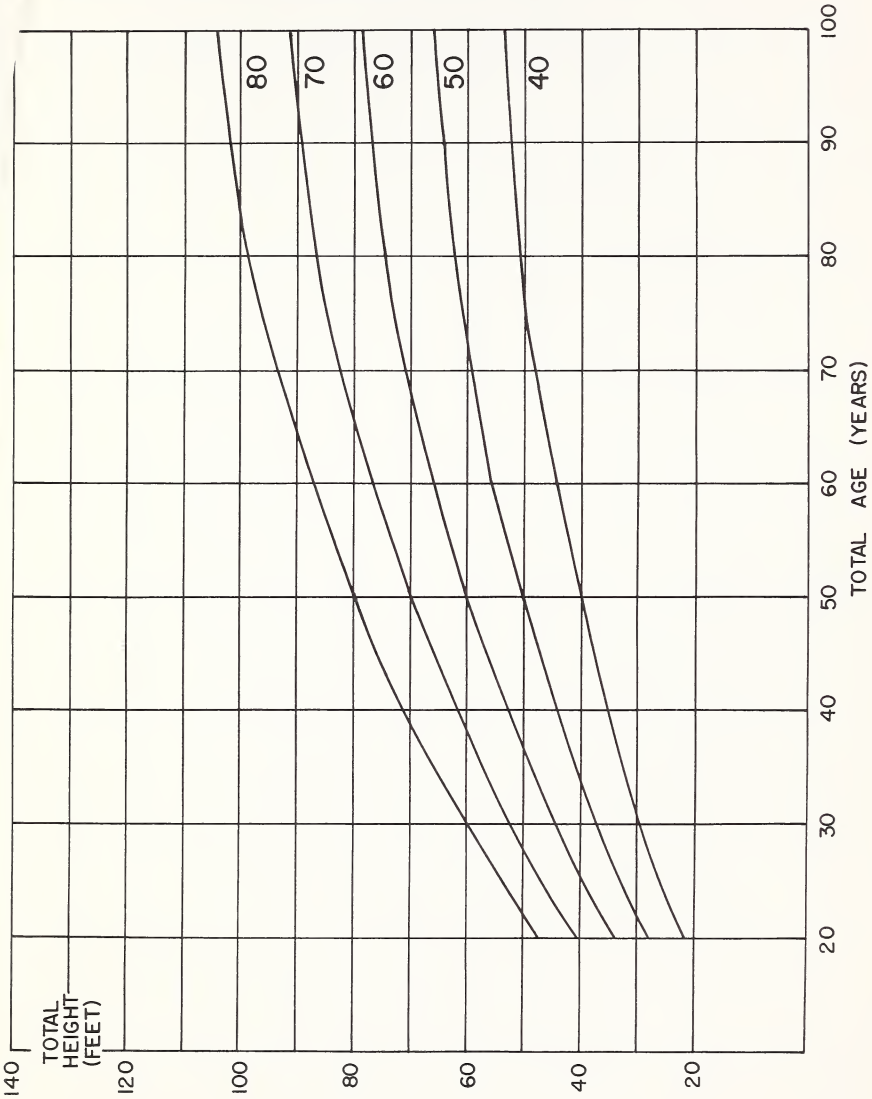
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT & STATE AGRIC. COLLEGE, AUGUST, 1962.

Figure 16.--WHITE ASH

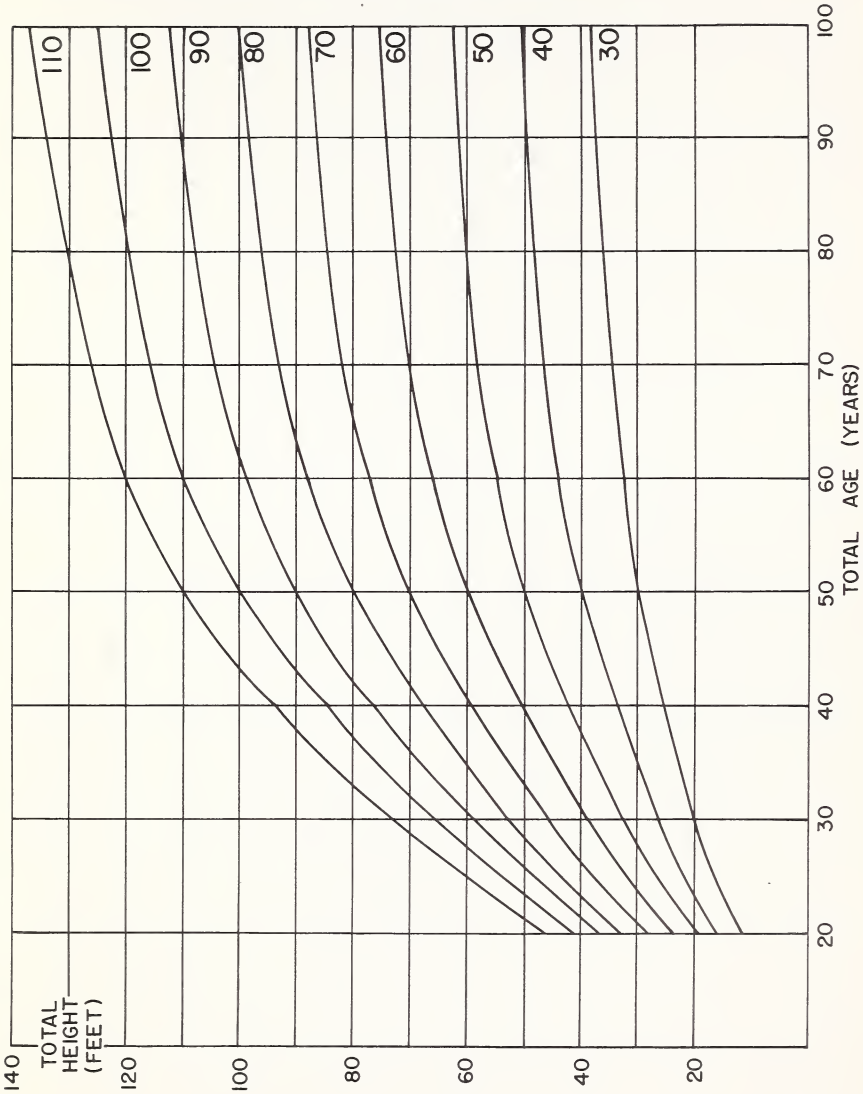
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKES STATES FOREST EXP. STA., TECH. NOTES NO. 464 OCT. 1956.

Figure 17.--ASPEN

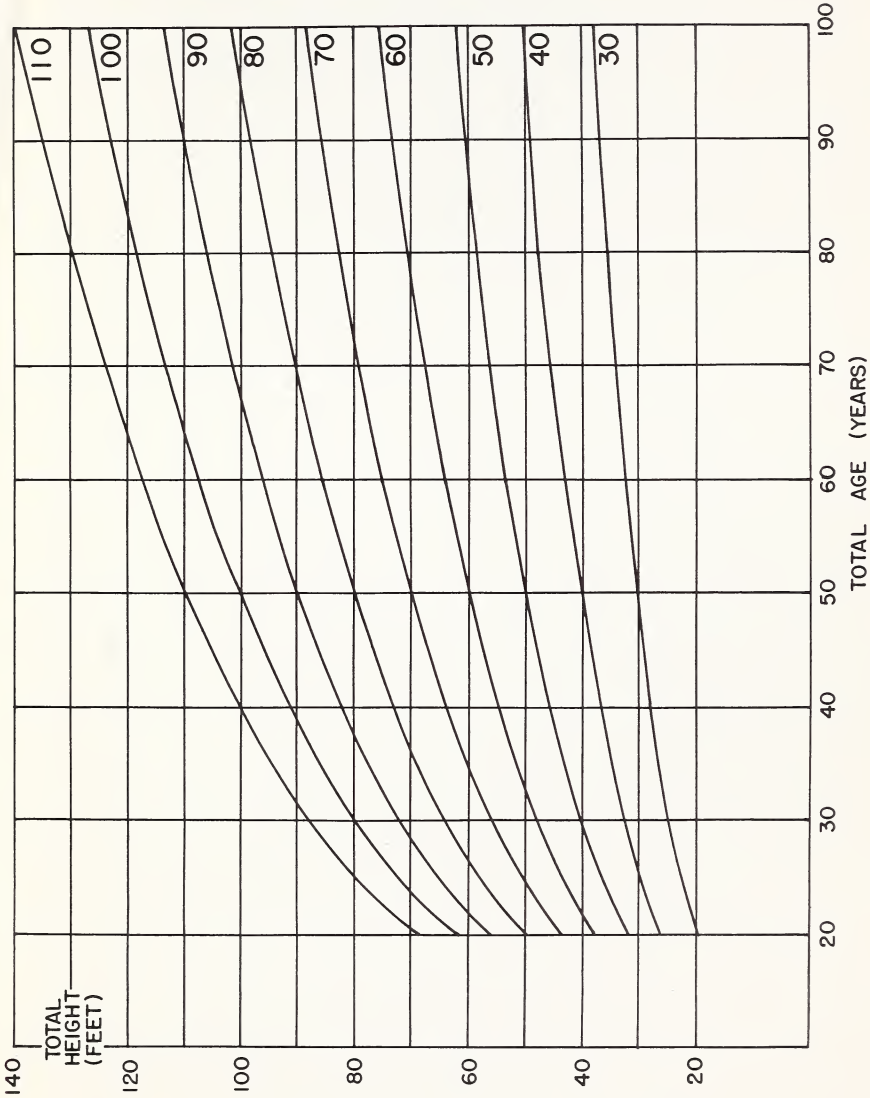
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE NORTHEAST.



SOURCE: CONSTRUCTED FROM UNPUBLISHED DATA, N.E. FOR. EXP. STA., UPPER DARBY, PA.

Figure 18.-- BEECH

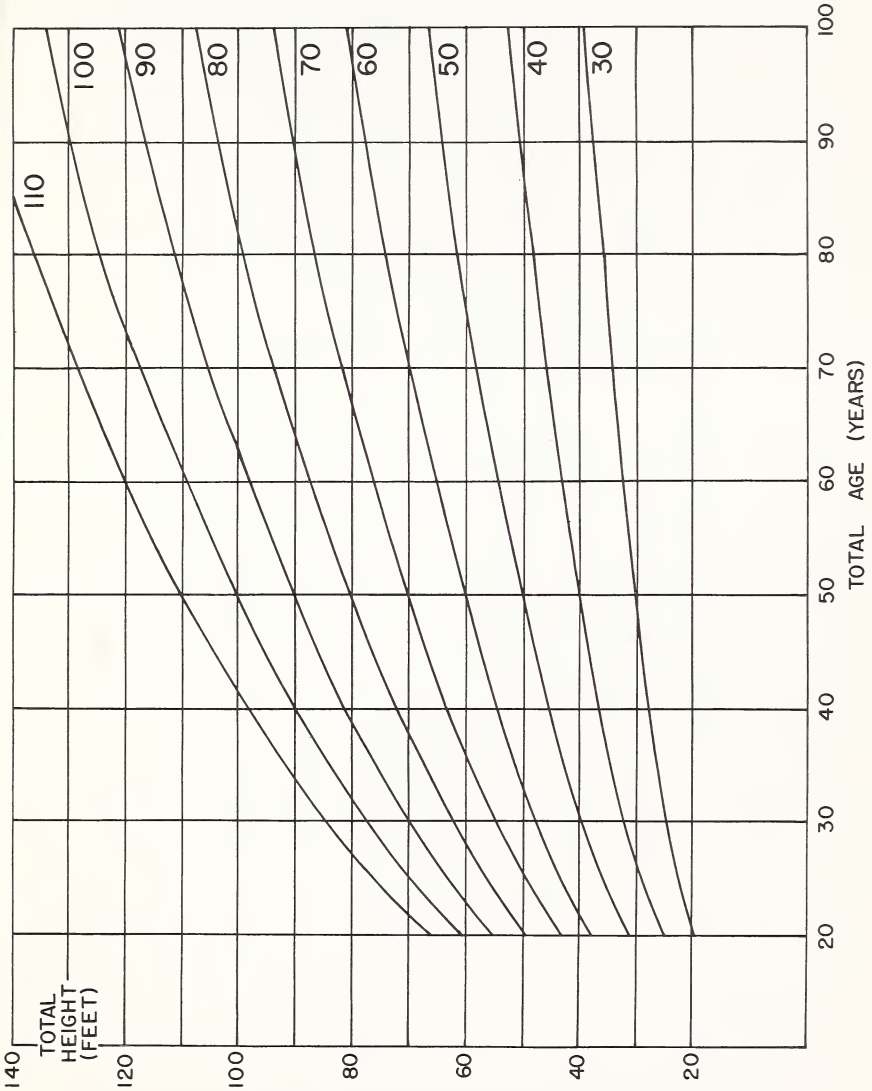
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN U.S.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT & STATE AGRIC. COLLEGE, AUGUST, 1962. COOLEY, J.H., LAKE STATES FOR. EXP. STA. TECH. NOTES NO. 541, OCT. 1958.

Figure 19.-- WHITE BIRCH

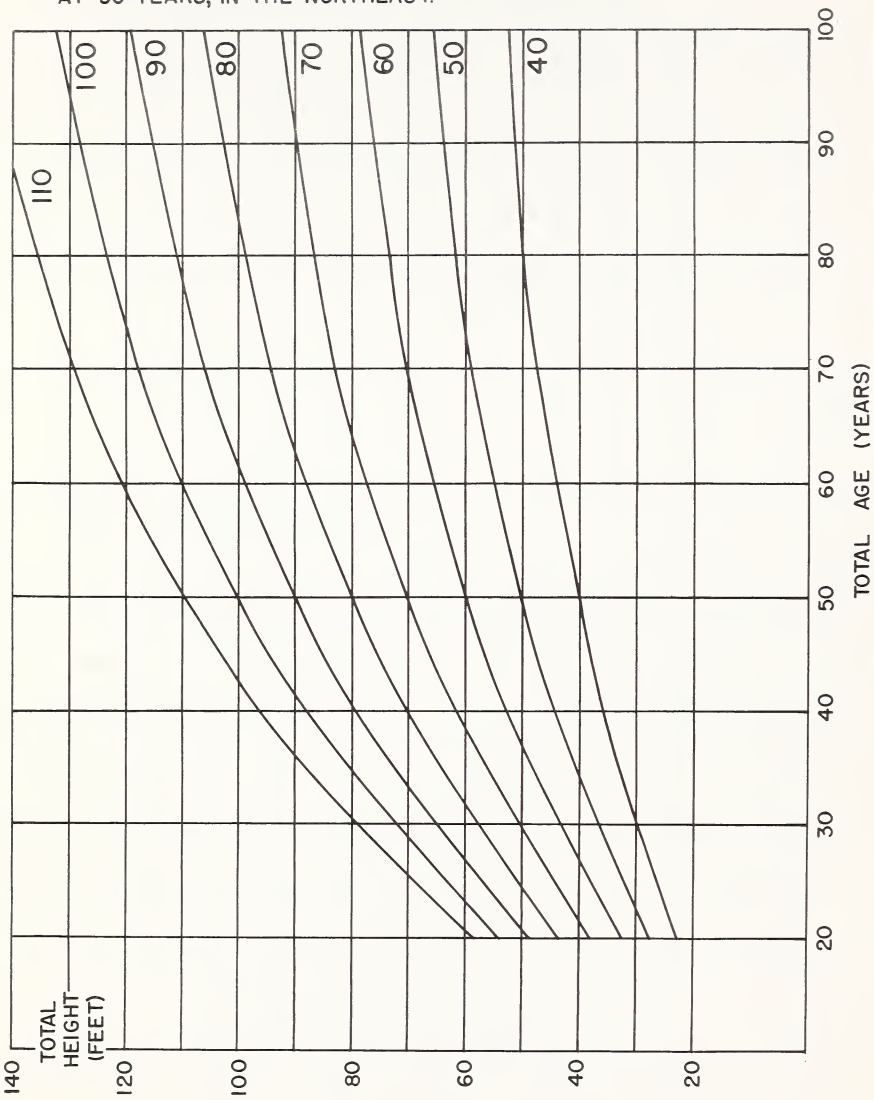
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629 AGR. EXP. STA., U. OF VERMONT & STATE AGR. COLLEGE, AUGUST, 1962.

Figure 20.--YELLOW BIRCH

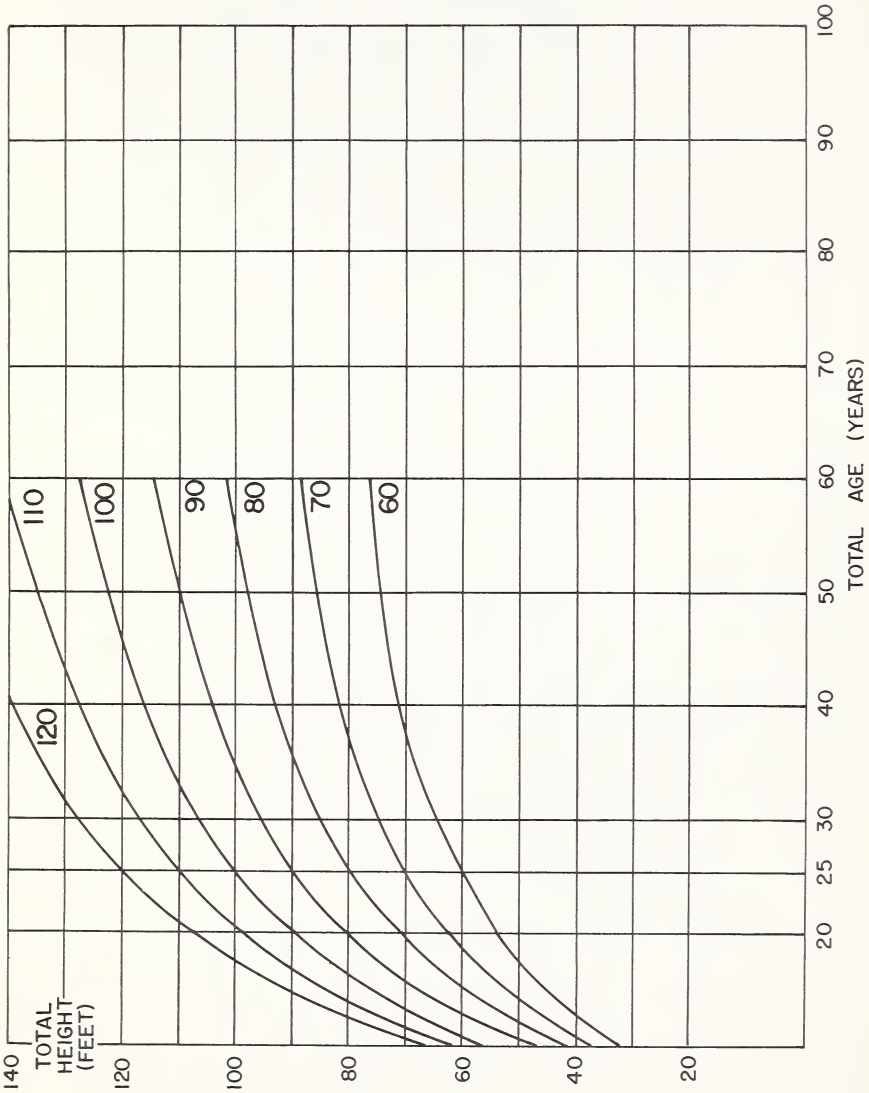
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE NORTHEAST.



SOURCE: PREPARED FROM A THESIS FOR GRADUATE DEGREE BY S.E. DEFLER, N.Y. STATE COLLEGE OF FORESTRY, 1937.

Figure 21.--BLACK CHERRY

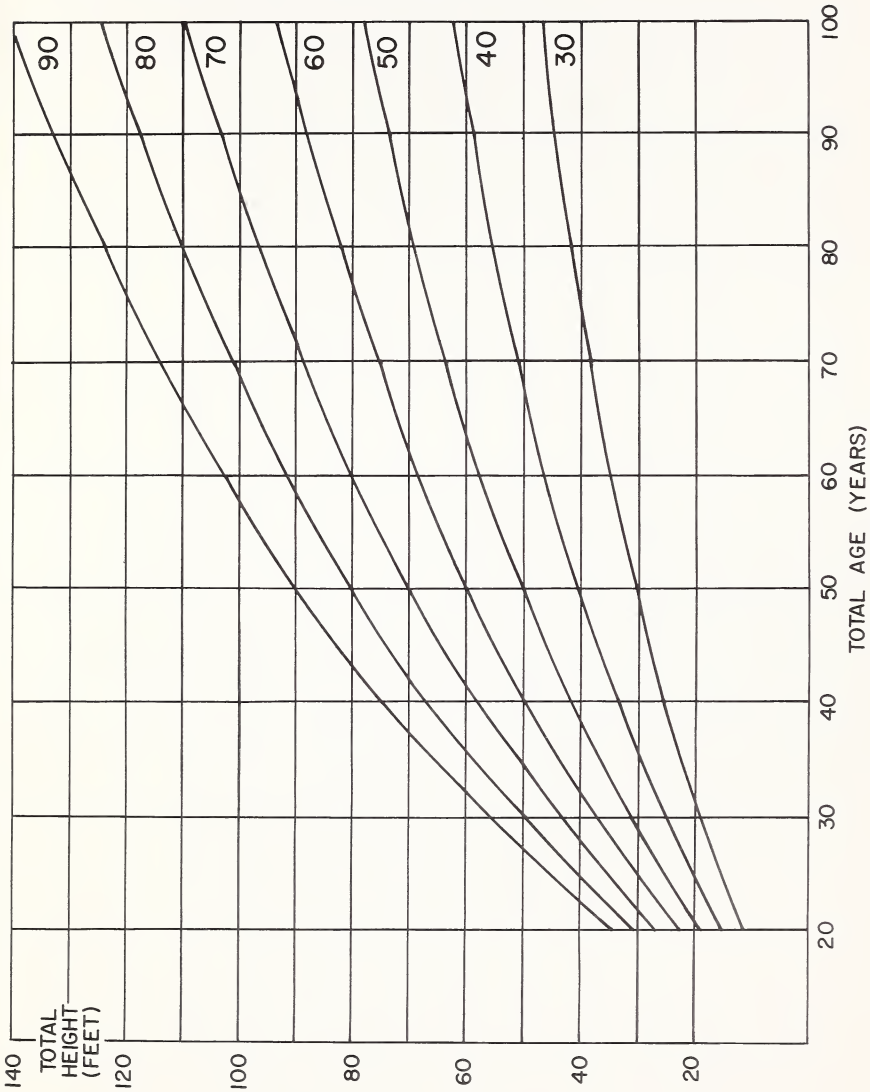
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 25 YEARS, IN MISSISSIPPI VALLEY STATES.



SOURCE: WILLIAMSON, A.W., U.S.D.A. BULL. NO. 24, 1913. NEEBE, D.J., & BOYCE, S.G., CENTRAL STATES FOR. EXP. STA., STATION NOTE NO. 126, APRIL 1959. BROADFOOT, W.M., SOUTH. FOR. EXP. STA. OCCAS. PAPER NO. 178, 1960.

Figure 22.--EASTERN COTTONWOOD

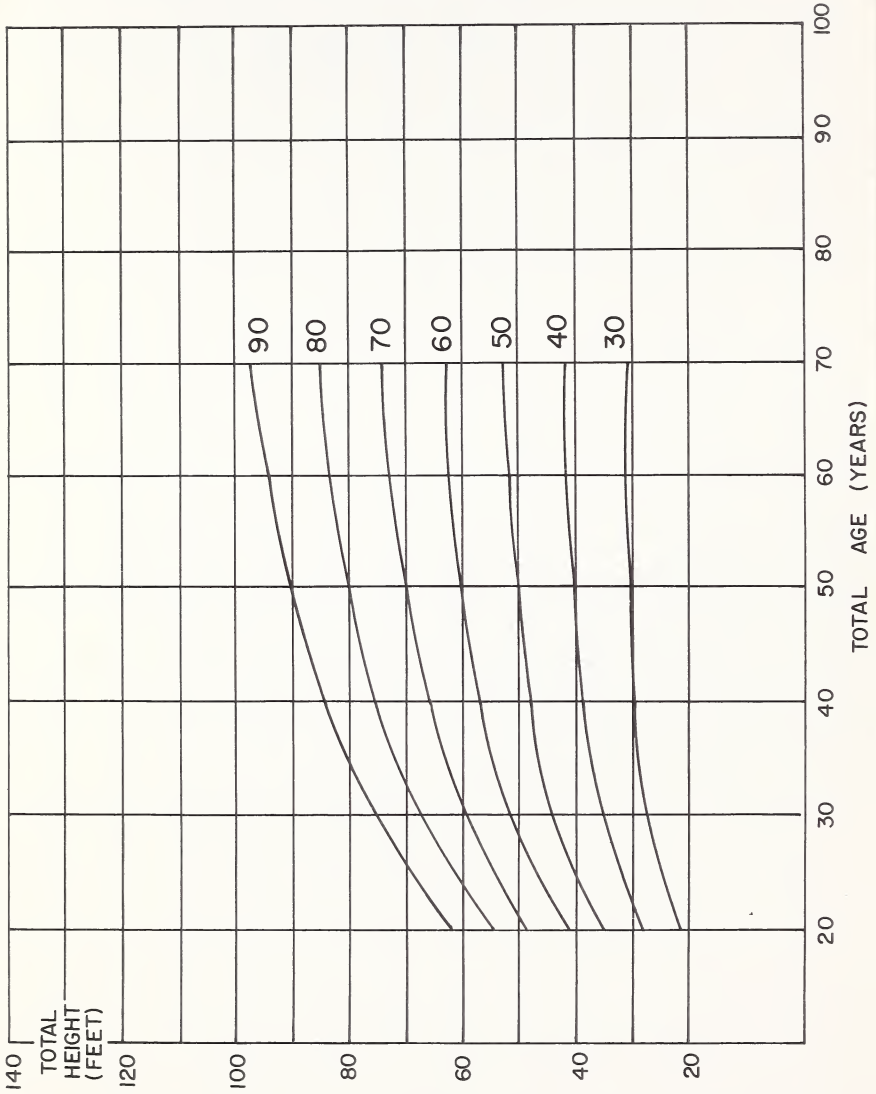
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN UNITED STATES.



SOURCE: BOISEN, A.T. & NEWLIN, J.A., THE COMMERICAL HICKORIES, USDA, FOREST SERVICE BULL. NO. 80, 1910.

Figure 23.-- HICKORIES

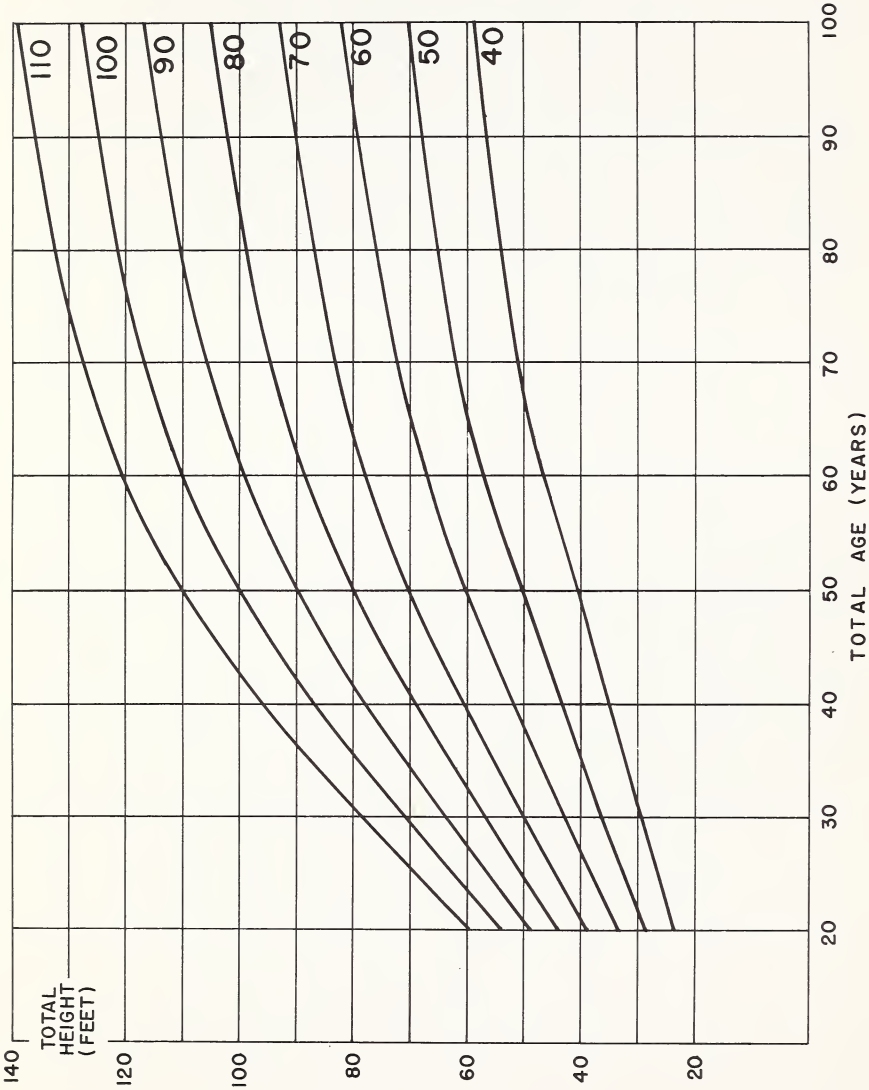
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN CENTRAL STATES REGION.



SOURCE: KELLOGG, L.F., SITE INDEX CURVES FOR PLANTATION BLACK LOCUST, CENTRAL STATES REGION, CENTRAL STATES EXP. STA. NOTE 36, 1939.

Figure 24.-- BLACK LOCUST

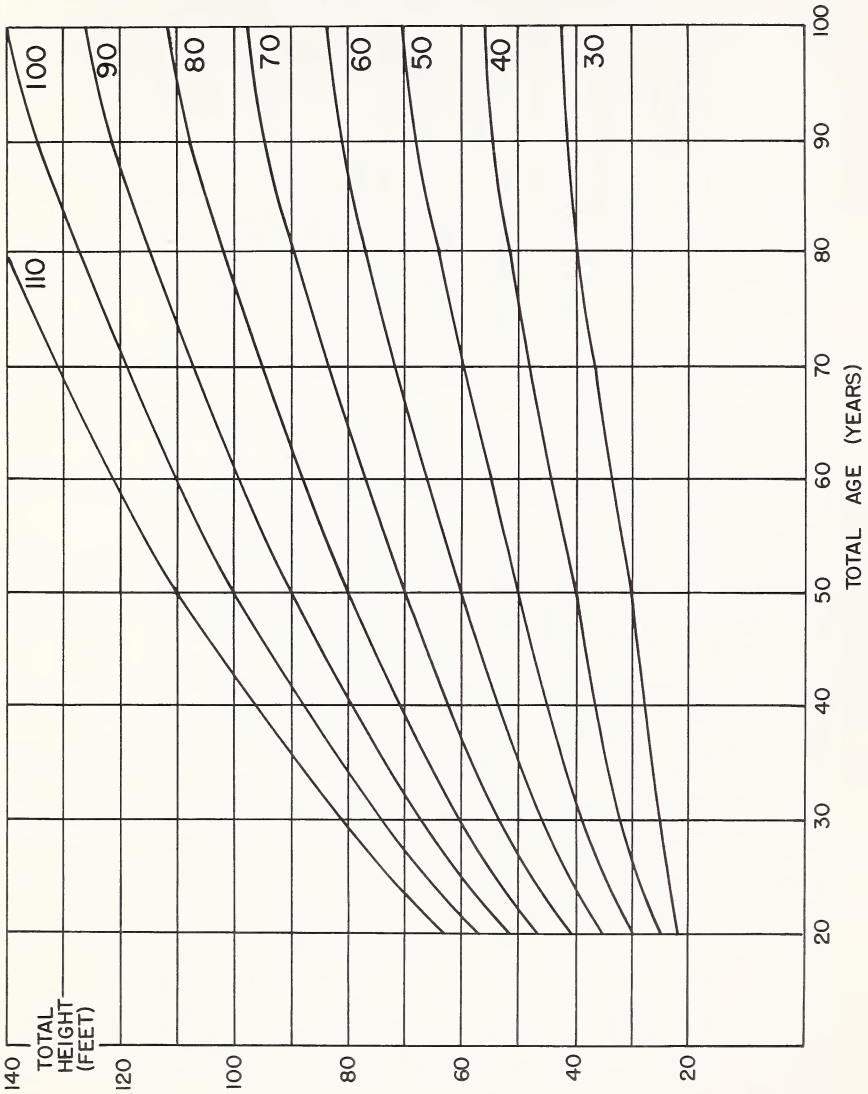
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NEW ENGLAND & N.Y.



SOURCE : CONSTRUCTED FROM DATA REPORTED BY R.W. FORESTER, FOREST SCIENCE, VOL. 5, NO. 3, SEPT, 1959.

Figure 25.--RED MAPLE

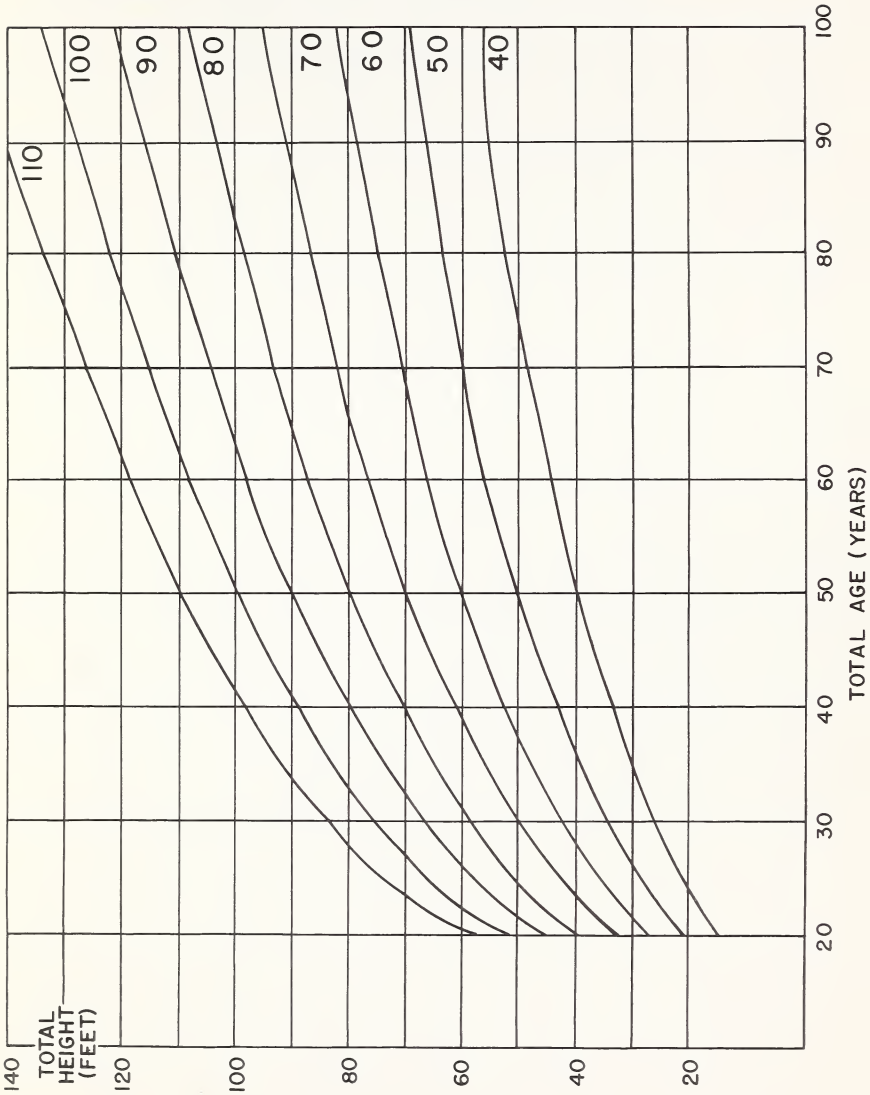
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA., U. OF VERMONT & STATE AGR. COLLEGE, AUGUST, 1962.

Figure 26.--SUGAR MAPLE

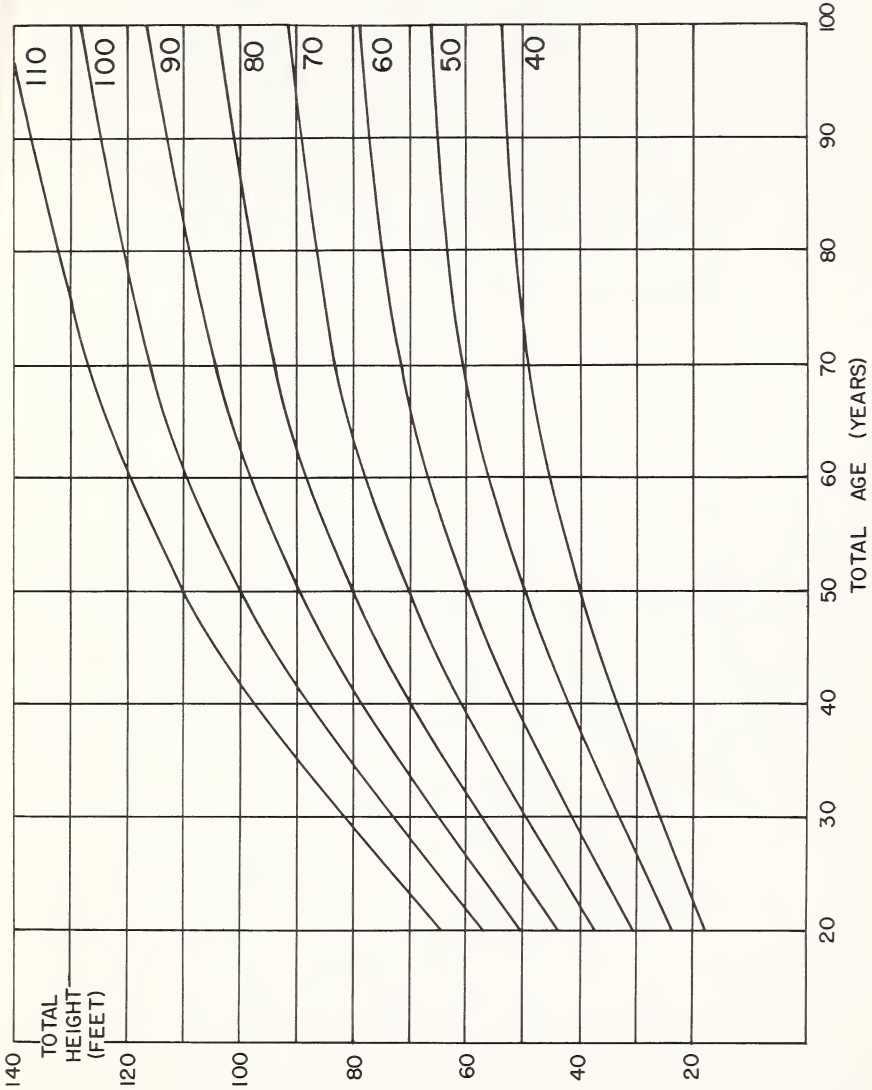
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN UNITED STATES.



SOURCE: DOOLITTLE, W.T., SOIL SCIENCE, VOL. 22, NO. 5, SEPT.-OCT., 1958
SCHNUR, G.L., U.S.D.A., TECH. BULL, NO. 560 (1937).
GEVORKIANTZ, S.R., LAKE STATES EXP. STA. TECH. NOTE NO. 485, 1957.

Figure 27.-- RED OAKS

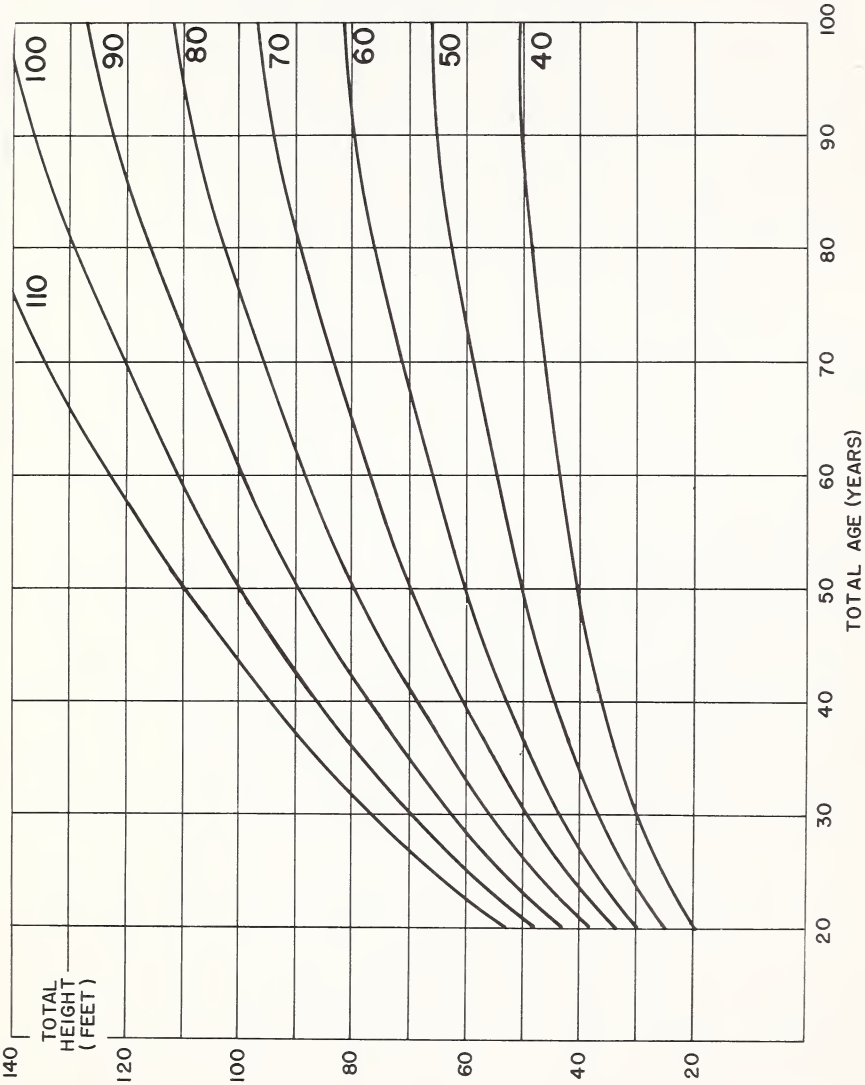
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES BY SITE INDEX AT 50 YEARS, IN OAK-HICKORY FORESTS.



SOURCE: G.L. SCHNUR, YIELD STAND, & VOLUME TABLES FOR EVEN-AGED UPLAND OAK FORESTS, U.S.D.A., TECH. BULL. NO. 560 (1937). D.J. OLSON, JR., S.E. FOREST EXP. STA. RESEARCH NOTES NO. 125 APRIL 1959.

Figure 28.--UPLAND OAKS

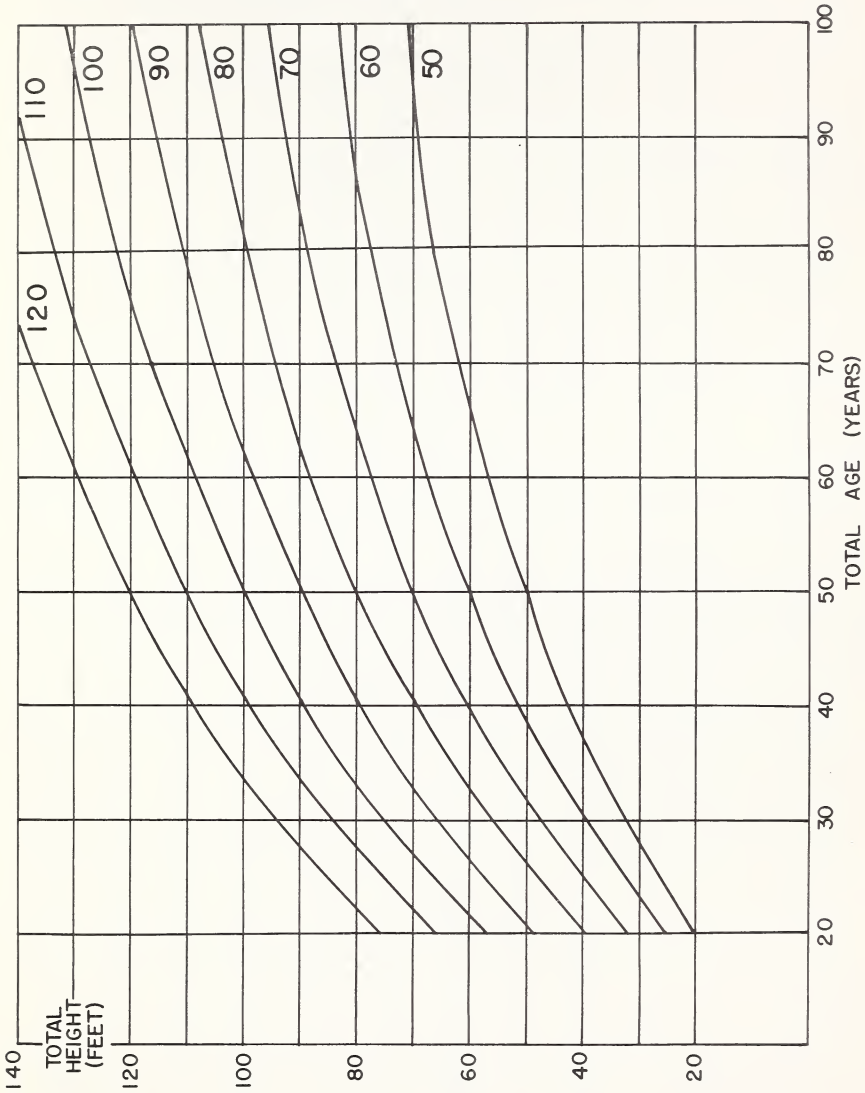
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN U.S.



SOURCE: DOOLITTLE, W.T., SOIL SCIENCE, VOL. 22, NO. 5, SEPT.-OCT, 1958.
SCHUR, G.L., U.S. DA., TECH. BULL. NO. 560 (1937).
OLSON, JR., D.J., S.E. FOR. EXP. STA. RES. NOTES No. 125, ('59).

Figure 29.-- WHITE OAKS

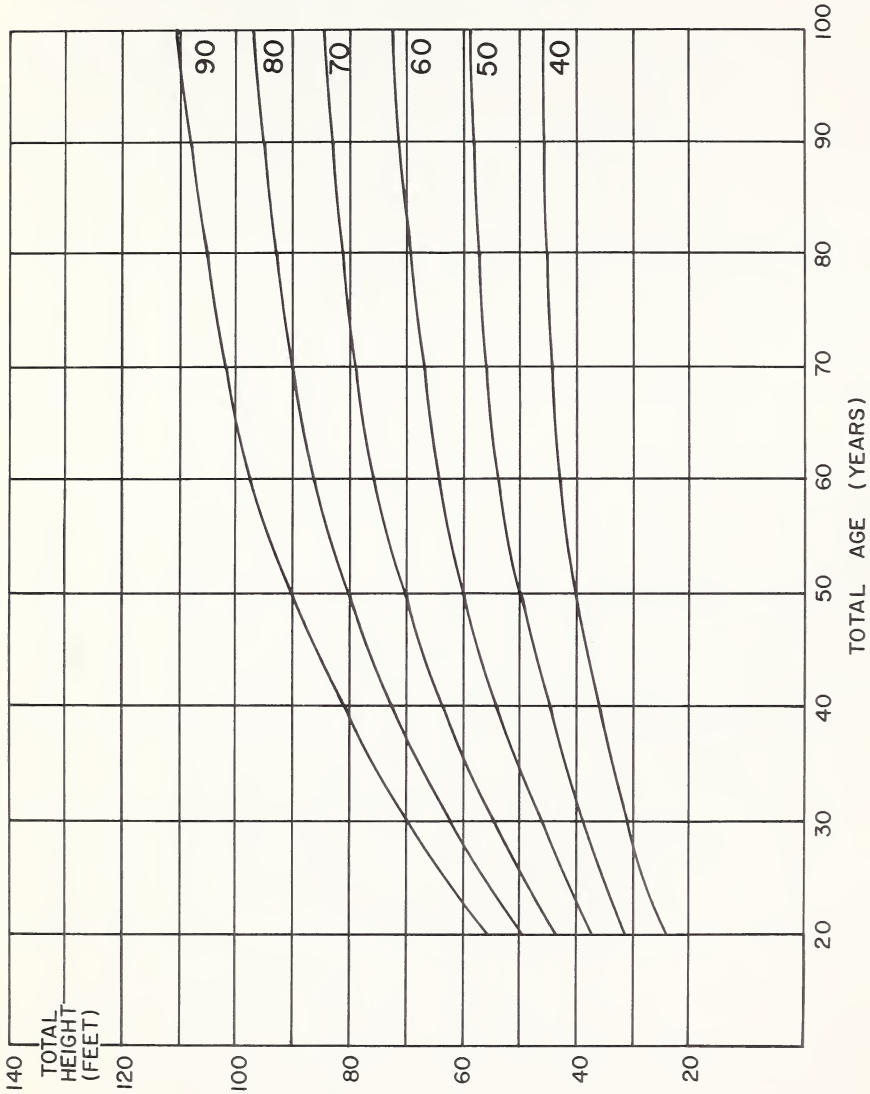
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN SOUTHEASTERN U.S.



SOURCE: ROBERT K. WINTERS & J.G. OSBORNE, GROWTH & YIELD OF SECOND-GROWTH REDGUM IN FULLY STOCKED STANDS ON ALLUVIAL LANDS IN THE SOUTH, SOUTHERN FOREST & RANGE EXP. STA., OCC. PAPER NO. 54 (1935). BROADFOOT, W.M., & KRINARD, R.M., SOUTH. FOR: EXP. STA. OCCAS. PAPER 176.

Figure 30.-- SWEETGUM

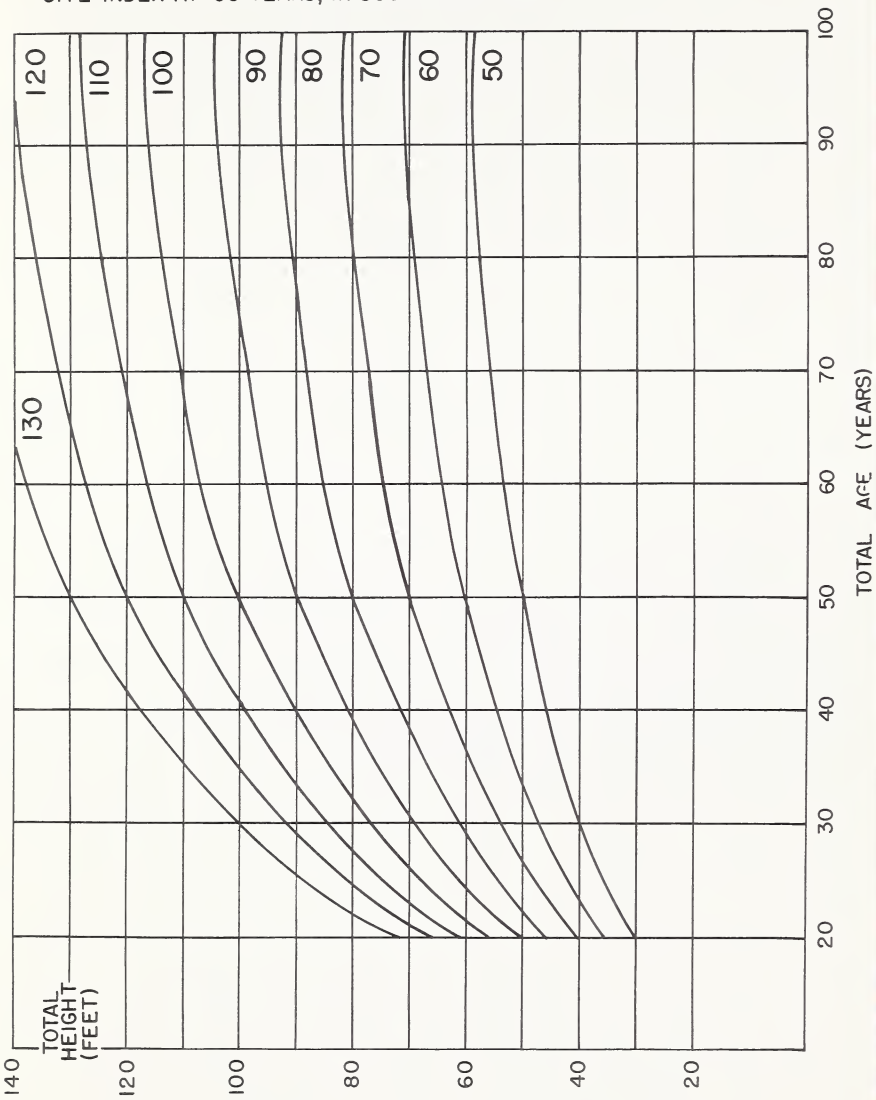
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN CENTRAL STATES REGION.



SOURCE: KELLOGG, L.E., SITE INDEX CURVES FOR PLANTATION BLACK WALNUT, CENTRAL STATES REGION, CENTRAL STATES FOR. EXP. STA. NOTE # 35, 1939.

Figure 31.--BLACK WALNUT

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN SOUTHEAST U.S.



SOURCE: DONALD E. BECK, YELLOW-POPLAR SITE INDEX CURVES, SOUTHEASTERN FOREST EXP. STA., RESEARCH NOTES NO. 180, OCTOBER, 1962. DOOLITTLE, W.T., SOIL SCIENCE, VOL. 22, NO. 5, SEPT.-OCT. 1958.

Figure 32.-- YELLOW POPLAR