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# An Annotated Bibliography of Figure in Wood

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# An Annotated Bibliography Of Figure In Wood

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THIS PUBLICATION presents abstracts of articles concerning figure in wood some of which have not been included in other bibliographies. An attempt has been made to include all references on this subject except those in Russian. Principal sources of information were major international journals in wood science and technology and personal communication with active researchers in this field. Since many references are in Scandinavian languages and some journals are obscure and generally not available in many libraries in the United States, a library source has been provided.

These abstracts indicate that the major portion of work on figure in wood in the United States was done many years ago and that little current research on this subject is being conducted. European literature indicates a concentration on the "Masur" figure, a type that has not been reported in North America.

This bibliography represents a portion of a larger study concerning figure in wood that will be published at a later date.

Anonymous. 1952. Sloping Grain in Timber. Comm. Scient. and Ind. Res. Org. Trade Cir. No. 48. Melbourne (Australia). 17 pp. 29 figs.

A nontechnical article considering various types of sloping grain and relationships of sloping grain to figure.

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Anonymous. 1939. (Rev. 1960). Figure in Timber. Comm. Scient. and Ind. Res. Org., Div. of For. Prod. Trade Cir. No. 43. Melbourne (Australia). 8 pp. 17 ill.

A well illustrated treatise on figure in non-technical language describing how various types of figure are formed. Relationships and differences among grain, texture, and figure are discussed.

Anonymous (An Old Timer). 1941. Cause of Bird's Eyes in Maple. Wood Products (Now Wood and Wood Products) 46(4):42. Univ. of Ga. Library.

Suggests several possible causes for bird's-eye figure including heredity and slow growth. Appearance of this figure in living trees is described.

Anonymous. 1929. What Causes "Birds-Eye" Maple. Lake States For. Exp. Sta. Tech. Note No. 13. 1 p.

A brief note concerning bird's-eye figure in sugar maple (*Acer saccharum* Marsh) with observations on growth rates of trees containing this figure. Mentions attempts by this Station and the U.S. Forest Products Laboratory to establish studies concerning heretibility of this figure in wood and propagation techniques started in 1928.

Anonymous. 1967. Dimpled Grain in Lodgepole and Jack Pine. Res. News, Dept. of For. and Rural Dev. (Canada) 10(4):3-4. 1 ill.

A note on dimpled grain occurring in several coniferous species. Cause of dimples is attributed to resin blisters pressing into the cambial zone, thus retarding xylem formation in the vicinity of the blisters. (See Chafe, S.C.)

Bailey, L. F. 1948. Figured Wood: A Study of Methods of Production. J. Forestry 46:119-125. 19 figs. 20 refs.

A description of several possible methods of producing figure in wood by artificial means including twisting, mutilating, and deforming practices. Several grafted trees are described.

Baumer, M. 1953. Figure in Wood. Wood (London) 18:178-181, 212-215, and 302-304. (Translated by J. L. Robertson from articles appearing in Bois et Forêts de Tropique July-August 1952). 18 Figs. 9 Refs. (Coll. of For. Library, Syracuse, N.Y.) For. Abst. 14 No. 1500.

A series of four articles concerning figure formation. Part I considers anatomical aspects of figure formation such as grain, texture, structure, and color. Part II considers figure that occurs in different parts of trees and in more detail with various figure types formed by curly, wavy, and interlocked grain. Part III is a continuation on variations in structure and effects of conversion

on emphasizing figures. Part IV discusses the more common distinctive figure classifications.

Beals, H. O. and T. C. Davis. 1966. Fiddleback and Quilted Figures in Wood. J. Ala. Acad. of Sci. 37:263.

Fiddleback figure occurs on the radial face of certain woods while quilted figures appears on tangential faces. Fiddleback figure is regular in occurrence and exhibits a corrugated appearance when woods are split radially. Quilted figures are usually irregular and appear as convex intersecting areas on one side and concave surfaces on the other.

Bennigsen, A. 1928. Uber die Karelische Maserbirke (on the curly Masur Birch) Deut. Dendr. Gesell. 41:393.

Not seen.

Berry, F. M. 1942. The Anatomy of Bird's-Eye Figure in Sugar Maple (*Acer saccharum* Marsh). Unpublished progress report. Dept. of For., Mich. St. Coll. 19 pp. 16 photos. (Copy from Author).

A preliminary study of the anatomy of bird's-eye figure in hard maple. The formation of "pegs" from the phloem into the xylem and an enlargement of rays are illustrated. "Stone cells" are a universal feature associated with the indented portion of "the eye" in phloem. Pit-like depressions in the bark of old bird's-eye trees result from the periderm following contours of the initial phloem indentation.

Bitters, W. P. and E. R. Parker. 1953. Quick Decline of Citrus as Influenced by Top-Root Relationships. Calif. Agr. Exp. Sta. Bull. 733. 35 pp. 5 figs. 58 refs.

This publication does not consider figure in wood directly but mentions numerous reports from the citrus industry where the disease known as "quick decline" exhibits stem pitting similar to that found in the Masur figure in Birch (*Betula spp.*).

Boyce, J. S. 1961. Forest Pathology. (Third Ed.) McGraw-Hill Book Co., New York, pp. 298-305.

A description of pathological aspects of gall and burl formation. No conclusions are given as to formation of burls that are utilized for figured wood. Buds are associated with some types of burls, but it is not known whether these buds initiate figure in subsequent wood formation.

Carpenter, J. B. and J. R. Furr. 1960. Wood Pitting of Undetermined Cause in Unbudded Citrus Seedlings. Plant Disease Reptr. 44(12):916-918. 1 photo. 6 refs.

Wood pitting of unknown origin was discovered in unbudded citrus seedlings. This discovery caused speculation that such pitting may not be an indication of diseases as formerly suspected.

Chafe, S. C. 1969. Dimpled Grain in Wood. For. Chronicle 45(3):1-7. 11 figs. 10 refs.

An examination of the formation of dimpled grain in lodgepole pine (*Pinus contorta* Dougl. var *latifolia Engelm.*), jack pine (*Pinus banksiana* Lamb.), ponderosa pine (*Pinus ponderosa* Laws.), and sitka spruce (*Picea sitchensis* (Bong.) Carr.). Dimpling in the pines was traced to resin blisters in the inner bark, but caused by sclerids in spruce.

Conrad, J. 1957. Plusbaumauswahl unter besonderer Berücksichtigung der Holzqualität (The choice of plus trees with particular reference to wood quality.) Forstarchiv 28(7):133-137. Text in German. 7 photos. 14 Refs. (Duke Univ. Library). For. Abst.:19 No. 112.

A discussion of the need to consider figure as one qualification in selection of superior trees for propagation. Several figure types are illustrated.

Conrad, J. 1959. Die Riegelbildung bei unseren Laubholzarten (Fiddleback figure in our hardwoods). Allegemeine Forstzeitschrift 6(5):635-639. Text in German. 6 photos. (Midwest Inter-Library Center, Chicago).

Fiddleback figure that occurs in several native species including sycamore, maple, and ash is discussed. Occurrence of figure in other species, to a lesser extent is mentioned. Photographs illustrating fiddleback figure are included.

Davis, E. M. 1961. Some Observations on Bird's-Eye Maple. USDA Forest Prod. Lab. Rept. (Unnumbered). 2 pp. 10 photos.

Observations of bird's-eye figure in sugar maple (*Acer saccharum* Marsh.) splitting blocks containing this figure. Illustrations show how indentations follow rays and progress as indentations along the same radial line over many years.

Feihl, A. O. 1964. Rotary Cutting of Curly Yellow Birch. Dept. of For. Publication No. 1086 (Ottawa) Canada. 18 pp. 5 ill. 2 tables, 2 refs.

A description of difficulties encountered in cutting curly yellow birch (*Betula alleghaniensis* Britt.) veneer by the rotary method. Emphasizes veneer lathe settings rather than figure.

Fine Hardwoods Association. No date. Veneers – Figure in Wood. Book 4, Educational Series. 11 pp. 18 photos.

A booklet illustrating the most common figure types. Brief explanations of each figure type (including development) are given.

A non-technical publication that gives good coverage of most common figures with illustrations.

Fritz, E. 1950. Redwood Burls. Redwood Region Conf. Bull. (Mimeographed). California Redwood Assoc. 2 pp.

A discussion of burl formation in Redwood. Describes how commercial burls are utilized. Typical redwood burls do not arise from injuries but are thought to originate from dormant buds.

Gardiner, A. E. 1962. A Note on the Variation of Flamy Figure in Silver Birch (*Betula verrucosa* Ehrh.). Silvae Genet. 11(5/6):161-163.

Several types of flamy figure occur in *Betula verrucosa.* Descriptions of different variations of this figure are presented.

Gardiner, A. S. 1965. "Flamy" Birch and its Frequency in some Highland Populations. Scottish Forestry 19(3):180-186.

A discussion of the occurrence of flamy (curly) figure in Scottish birch (*Betula spp.*). Tabulations of data showing correlations of figured wood with bark characteristics are given.

Ghosh, S. S. 1959. Decorative Features of some Indian Timbers. Timber Trade J., Calcutta (India). 11 pp. 33 ill.

A semi-technical article concerning figure and its formation. Some 20 or more woods are described with illustrations of the more typical figure patterns that occur.

Gruschow, G. F. 1959. Curly Pine. Southern Lumberman 193:189-190. 3 photos.

A popular article describing the figured lumber of curly pine that occurs in several species of Southern Pine.

Hamlin, M. J. 1931. Pecularities of Figured Woods. Veneers 25:16-17.

A short note on several types of figure in a number of woods citing examples of figure occurring in trees growing in rocky soil, effects of buttressed roots, and other suspected causes of figure formation.

Heikinheimo, O. 1940. Om Odling av Masurbjörk (On experiments with Masur-birch). Skogen 27:165-167. Text in Swedish. 7 photos. (Duke Univ. Library).

A review of experiments in the growing of figured birch (*Betula spp.*) in Finland starting in 1929. Propagation has been by seed and vegetative propagation. Figured trees require pruning to make them suitable for veneer.

Heikinheimo, O. 1951. Kokemuksia Visakoivun Kasvatuksesta (Experiences in the growing of curly Birch). Commun. Inst. for Fenn. 39(5):4-26. Text in Finnish. English Summary. 9 figs. 18 refs. (Duke Univ. Library).

The title of this article refers to "curly" figure but the text is concerned with the "masur" figure. It was found that this type of figure occurs most commonly in *Betula verrucosa* and about 50 per cent of trees come true from seed. In addition, environmental factors such as stand density affects figure formation and quality.

Hintikka, T. J. 1922. Die "Wisa"-Krankheit der Birkin in Finnland. (The "wisa" Disease of Birch in Finland.) Zeitschrift für Pflanzenkrankheiten und Gallenkunde 32(5):193-209. Text in German. 51 refs. (Purdue Univ. Library).

A discussion of the "Wisa" (Masur) disease as it occurs in birch and several other species in Europe. Aspects of enlarged rays, stem pitting, including bark and other characteristic features are described and many older references are included.

Hintikka, T. J. 1936. Om Masurbjörkarna (On Masurbirch). Skogsbruket 1936 pp. 28-30.

Not seen. Not available in U.S. Libraries.

Holmberg, L. H. 1933. Is Suppression a Possible Cause of Bird's-Eye in Sugar Maple? J. Forestry 31:968-970.

Statistical analysis of growth rate and presence of bird's-eye figure in maple (*Acer saccharum* Marsh.) suggest that this figure is more prevalent in suppressed trees.

Holmberg, L. H. 1934. Is Heredity a Possible Cause of Bird's-Eye in Sugar Maple? J. Forestry 32:627-628.

A reply to an article by F. K. Richter that contained criticism of the 1933 article on bird's-eye figure by Holmberg. Holmberg's 1934 article suggests that heredity might be a cause of bird's eye figure but such figure is not initiated until the tree is almost mature.

Johnsson, H. 1951. Avkommor av Masurbjörk (Experiments with Masur Birch). Särtryck ur Svenska Skogsvardsföreningens Tidskrift nr. 1. 12 pp. Text in Swedish. 9 figs. 5 tables. 3 refs. (Copy from Author). Föreningen Skogstradsforadning, Ekebo, Svalov, Sweden.

A discussion of figure in *Betula verrucosa* known as "Masur" showing illustrations of trees and figured wood. Genetic studies indicate that Masur figure is hereditary. Masur figure is found in several parts of Europe.

Klaehn, F. U. 1950. Die rindendiagnose und birken (Bark characteristics of Birch). Holz Zentralblatt 61:656-657.

Not seen.

Klaehn, F. U. 1951. Die maserbildung und der Birke. Ihre Verbreitung, Formen, und Ursachen (Masur Figure and Birch. Its propagation, form and cause). Holz Zentralblatt 77:103.

Not seen.

Klaehn, F. U. and E. Runquist. 1952. Die Birke (The Birch). Allgemein Forst-und Jagdzeitung 6:172-175. (For. Abst. 15 No. 2310).

A review of selected Swedish and Finnish literature on *Betula verrucosa* and *B. pubescens.*

Klaehn, F. U. 1954. Über die Maserbirken und die Möglichkeiten ihres Anbaues (On the Masur Birch and the possibility of its cultivation). Der Forst-und Holz(wirt) 2:29-31. 2 photos. 7 Refs. (Text in German). National Agricultural Library. (For. Abst. 15 No. 2311).

Discusses several types of abnormal figure in birch including their causes. Past investigations are discussed briefly. Some recommendations for growing figured birch are included. Cites grafting experiments in Germany.

Kohler, A. 1926. The Identification of Furniture Woods. USDA Misc. Cir. No. 66.

A general discussion of figure types occurring in several species of wood commonly used in furniture.

Lamb, G. N. 1940. Figure in Wood. Northern Nut Growers Assoc. Ann. Rept. 31:28-33.

A review of the curly figure in walnut and the possibility of propagating figured trees by grafting.

Lamb, G. N. 1950. Burl and Swirl and the Strangler Fig is a Vine. Veneers and Plywood (April issue) pp. 10-11. 5 photos. (Purdue Univ. Library).

Burl-swirl or "Drappe" figure in mahogany was traced to an influence of the strangler fig that creates a swirl figure by forcing trees to develop bulges and a burl figure by penetrating of rootlets into the wood.

Lamb, G. N. and A. Albini. 1956. Figure Types in Mahogany. Mahogany Assoc., Chicago. 31 pp. 40 plates. 15 Figs.

A trade booklet developed for designers, architects, and manufacturers showing various figures that occur in mahogany. Describes development of figure in the tree and also figures produced by different veneering operations.

Larsen, C. Muhle. 1940. Masurbirk (Masurbirch). Dansk Skovforenings Tidsskrift 25:33-72. (Text in Danish). 15 photos. 19 refs. (Duke Univ. Library).

Comprehensive descriptions of different forms of Masur figure in birch (Masurbirch) that are most common in *Betula verrucosa.* Appearance of mature trees and figured wood therein are illustrated and described. Grafting experiments and progeny testing are discussed. It appears that the Masur figure can be transferred by grafting and, to a large extent, by seed. This figure apparently is correlated with slow growth. This figure also may be caused by disease.

Linquist, B. 1947. On the Variation in Scandinavian *Betula verrucosa* Ehrh. Svensk Botanist Tidskrift 1:45-80.

Not seen.

Linquist, B. 1951. The Improvement of Birch. Qtly. J. of For. 45(3):156-160. 5 photos. For. Abst. Vol. 13 No. 956.

An account of breeding experiments in Sweden concerning several species of birch.

Linquist, B. 1954. Forstgenetick in der Schwedischen Waldbaupraxis (Forest genetics in Swedish Forest Practice). Neumann-Verlag Radebeul-Berlin, 2nd. Ed. pp. 45-80.

Not seen.

Linquist, B. 1946. Stadium über Stammrindentypen der Gattung *Betula* (Studies on bark types in the genus *Betula*) Acta Horti Bergianus 4:91-132. For. Abst. 9 No. 1468.

An illustrated account of variation of bark characteristics that occur in native and cultivated species of birch in Sweden. About 30 species of birch are considered.

Little, E. L., K. A. Brinkman, and A. L. McComb. 1957. Two Natural Iowa Hybrid Poplars. For. Sci. 3:253-262.

A hybrid poplar formed by a cross between *Populus alba* x *P. grandidenta* (designated "Sherrill" Poplar) is described. Trees of this clone possess a wavy grain and can be propagated vegetatively. This figured wood may be suitable for ornamental purposes.

Maxwell, H. 1917. Figures Due to Twisted Grain. Hardwood Record 43(3):18-19. 4 figs. (St. Univ. of N.Y., Coll. of For. Library, Syracuse).

One of a series of articles concerning figure in wood. Curly, wavy, bird's-eye, and smoky figures in wood differ among themselves but all can be traced to reflection of light from distorted fibers. Causes of distortions are known in some cases but lacking in others.

Maxwell, H. 1917. Growth-Ring Wood Figures. Hardwood Record 42(12): 13-15. 5 figs. (St. Univ. of N.Y., Coll. of For. Library, Syracuse).

Figure in wood caused by growth rings varies in occurrence and intensity from species to species. Methods used to convert logs into lumber or veneer can influence type and intensity of figure.

Maxwell, H. 1917. Figures by Quarter-Sawing. Hardwood Record 43(11): 16-17. 4 figs. (St. Univ. of N.Y., Coll. of For., Syracuse).

Primarily a discussion of quarter-sawn figures developed in certain oaks (*Quercus spp.*). Several drawings illustrate this method of converting logs into lumber.

Mayer-Wegelin, H. and J. Pieper. 1959. Die Zeichnung von Furnierhölzern und ihre Beurteilung nach Merkmalen am Rundholz (The markings of veneer woods and their evaluation by log characteristics). Holz als Roh- und Werkstoff 17(18):305:312. (Text in German – English summary). 12 photos. 10 refs. (Purdue Univ. Library) For. Abst. Vol. 21 No. 937.

An extensive discussion of figure in several different species of wood. Illustrations show representative figure types. Figure can be traced to specific tissue formations, color and pigments, and certain effects from light refraction that influence appearance of wood. Methods to determine figure in logs include fiber direction on debarked logs, shape of end cracks, and patterns produced by grooves cut in log ends.

McCrum, R. C., J. G. Barrat, M. T. Hilborn, and A. E. Rich. 1960. An Illustrated Review of Apple Virus Diseases. Maine Agr. Exp. Sta. Bull. No. 595 and N.H. Agr. Exp. Sta. Tech. Bull. No. 101. 63 pp. 31 photos. 21 refs.

Contains illustrations and descriptions of conditions in apple resembling Masur and indented ring figures found in several species of commercially important trees.

McDaniels, L. H. 1954. Some Aspects of the Problems of Curly-Grained Walnut. Northern Nut Growers Assoc. Ann. Rept. 44:72-79.

Discusses causes and formation of curly grain and some problems assocated with production of curly grained walnut logs by grafting.

McKeen, H. B. 1940. The Texture, Grain, and Figure of Wood. J. Forestry 38(8):664-665.

An attempt to clarify definitions of texture, grain, and figure. Texture is defined adequately but denotations of grain and figure overlap. There is an apparent need for a distinction between grain elements and figure for patterns on longitudinal surfaces of wood.

Menninger, E. A. 1967. Fantastic Trees. Chap. 20 entitled "Trees that Twist." Viking Press, N.Y. pp. 176-190.

Illustrates several types of figured wood and proposes some possible causes of figure formation. Suggests that bark characteristics are not reliable indicators of figured wood.

Miller, Z. and T. Jakuszewski. 1967. Niektóre wlasnósci techniczne drewna brzozy czecotowatej z Gorcow (Some technical properties of the wood of Masur Birch from Gorce. Sylwan 2(2):51-56. Text in Polish; English and Russian Summary. (The John Crerar Library, Chicago). For. Abst. Vol. 28, No. 6311.

A review of strength properties of wood from Masur figured birch. Such properties as impact, static bending, compression, and hardness were examined.

Mitchell, H. L. 1961. A Concept of Intrinsic Wood Quality, and Nondestructive Methods for Determining Quality in Standing Timber. For. Prod. Lab. Rept. No. 2233. 14 pp.

Contains suggestions that figure in hardwoods should be selected and propagated for increasing value of trees. Deformities such as crotches, burls, and swollen butts that yield decorative veneers should not be overlooked in such a program.

Mitchell, H. L. 1964. Burlwood – Royalty's Wood? Am. Forests 70:22-25. 5 photos.

A semi-popular article describing uses of burls since ancient times. States that burlwood has been more valuable than gold at certain times in history. Burls can be made into objects such as bowls, table tops, and turned articles by the use of a stabilizing treatment such as PEG.

Newall, R. J. 1958. Figure in Home-Grown Birch Veneer. Trails of Timbers for Plywood Mfg., Prog. Rept. No. 47. For. Prod. Lab., Princes Risborough, England.

A preliminary report on exploratory work with bark types and figure in *Betula verrucosa*. Essential results are contained in FPRL No. 57.

Newall, R. J. 1960. Bark Form and Veneer Figure in Home-Grown Birch. Wood 25(5):196-200. 19 photos. 1 table. (La. St. Univ. Library). For. Abst. Vol. 21. No. 4875.

Birch trees 50 years of age were peeled and veneered to investigate the relationship between bark characteristics and figure grain. Six types of figure were distinguished. No precise correlation between bark form and figure was established.

Newall, R. J. and A. S. Gardiner. 1963. Bark Form and Wood Figure in Home-Grown Birch. Spec. Rept. No. 18. For. Prod. Res. Lab., Princes Risborough, England, 28 pp. 8 plates. 18 Refs. For. Abst. Vol. 25. No. 1206.

Thirty trees were examined to determine relationships between bark characteristics, figure, and fiber length. Straight-grained wood usually occurs (but not always) within trees with thin smooth bark. Trees with thick, rough bark usually exhibit some type of disturbed grain. Such grain may be flamy or some variation of curly grain. Fiber length is usually greater in trees with thin smooth bark than in those with thick rough bark.

Newall, R. J. and J. E. Grosert. 1959. Bark Form and Veneer Figure in Home-Grown Birch. Trials of Timber for Plywood Mfg., Prog. Rept. No. 54. For. Prod. Res. Lab., Princes Risborough, England.

A further report concerning investigations of bark form and figure in birch. More extensive than FPRL Report No. 47. Essential results are reported in FPRL No. 57.

Newall, R. J. and J. E. Grosert. 1961. Bark Form and Veneer Figure in Home-Grown Birch. Trials of Timber for Plywood Mfg., Prog. Rept. No. 57. For. Prod. Res. Lab., Princes Risborough, England. 13 pp., 27 photos, 8 tables. 3 refs.

A comprehensive report on bark characteristics and figure that contains results from detailed examinations of 30 trees by peeling and cleaving. No definite correlation between bark types and particular figure types was established. However, certain bark types may serve as indicators of figure when used with other methods of figure detection.

Noskowiak, A. F. 1963. Spiral Grain in Trees: A Review. For. Prod. Res. J. 13(7)3:226-275. 119 refs. For. Abst. Vol. 25 No. 1296.

A comprehensive review of spiral grain in trees. Gives suspected causes, variations in angles of spiral grain, and other related information. Portion of a Ph.D. dissertation.

Oelkers, J. 1940. Shälfurnierbirken in Norddeutschland (Shell Veneer Birch in North Germany). Mitteilungen aus Forstwirtschaft und Forstwissenschaft 4:295-334.

Not seen.

Okazaki, A. 1963. Forestry in Japan. Hill Family Foundation For. Series, Ore. St. Univ., Corvallis. pp. 18-19. 1 photo.

A description of methods by which Japanese cedars with "crinkles" are produced artificially in the Kitayama Forest. Natural "crinkled" logs sell for as much as 100 times the price of unfigured logs. Causes of these crinkles are not known but sometimes such trees can be produced by vegetative methods from parent trees exhibiting figure. The method of producing crinkles by binding is illustrated.

Panshin, A. J. and Dezeew, C. 1964. Textbook of Wood Technology. Sec. Ed. McGraw-Hill Book Co. New York. pp. 238-250.

A general discussion of figure in wood and figure variation. This is one of the more complete coverages of figure and figure formation. A somewhat better discussion may be found in the earlier edition of this text.

Paul, B. H. 1962. Figure in Wood: Make Their Natural Beauty Pay. Hitchcock's Woodworking Digest. (August issue). pp. 27-29. 2 figs., 1 table.

A brief description of some of the more common figures occurring in several native hardwoods. Illustrations show various patterns obtained by different cutting methods.

Pillow, M. Y. 1930. "Bird's Eyes" in Maple **are not** Due to Dormant Buds. Hardwood Record 68:45-46. 3 photos. (For. Prod. Lab.).

A note on bird's-eye figure in sugar maple giving reasons why this figure cannot be caused by dormant buds as commonly thought.

Pillow, M. Y. 1955. Detection of Figured Wood in Standing Trees. USFS For. Prod. Lab. Rept. No. 2043. 3 pp. 5 photos. For. Abst. Vol. 16 No. 4490.

A report on detection of figured wood in standing trees by the use of chips cut from the trunk. Characteristics of wood chips usually indicate whether curly or wavy grain is present.

Potter, W. C. 1936. Walnut – The Varieties and Their Characteristics. Wood (London) 1(7):332-336. 7 figs. (National Agr. Library).

A general description of common species of walnut (including *juglans nigra* and *j. regia*) that produce figured veneer of the trade. Several figure types are illustrated.

Record, S. J. 1921. Figure in Wood. Am. Forestry 27:611-617. 16 photos.

A comprehensive discussion of various figures in wood and their formation. Many figures are illustrated by photographs. Contains some unusual photographs of Curly Pine.

Reyes, L. J. 1930. Characteristic Figure in Philippine Woods. The Timberman 31(12):99-100. 3 drawings. (Univ. of Ga. Library).

A discussion of various Philippine woods that exhibit figure and the most common figures that occur in each species. Sawing patterns are illustrated that are used to obtain certain figures.

Richter, F. I. 1934. On the Causes of Bird's-Eye Maple. J. Forestry 32: 626-27.

A letter to the editor suggesting that supression might not be the direct cause of bird's-eye figure in sugar maple. Suppression

is considered a contributing factor in addition to heredity and environment.

Ruden, T. 1954. Om valbjørk og endel andre unormale veddannelser hos bjørk (On speckled birch ("mazer-birch") and some other forms of curled birch). Saertrykk av Meddelelser fra Det norske Skogforsøksvesen nr. 43. 12:451-501. Text in Norwegian: English Summary. 40 figs. 13 refs. Norwegian For. Res. Inst., Vollebekk, Norway. For. Abst. Vol. 16 No. 881.

This report clarified confusion between the terms "curly" and "masur" as used to describe figure in *Betula verrucosa.* Masur figure is described in detail. Flamy figure, burls caused by bud initials and possibly by the fungus *Taphrina betulina,* and brown markings caused by larvae of *Dendromza betulae* also are discussed in relation to masur figure.

Rydeskog, A. 1949. Flammigheten hos Fanerbjörk (Flamy figure in veneer Birch). Skogen 36(17):229. Text in Swedish. 1 table. (Duke Univ. Library). For. Abst. 11 No. 1648.

Examination of a small birch stand consisting of 39 stems showed that 28 trees possessed some degree of flamy figure. In addition, several of the other 11 trees exhibited other types of figure. It was suggested that this stand should be a source of seed or breeding stock.

Saarnijoki, S. 1961. On muutakin visaa kuin koivun visaa! (Curly (Masur) Figured Wood is not found in Birch alone). Metsataloudellinen Aidadauslehti 6/7:257-259; 276. Text in Finnish; Englsh Summary. 5 photos. For. Abst. Vol. 23 No. 1123. (Yale Univ. Library).

Curly grain is found not only in birch, but in several other species such as alder, mountain ash, Norway spruce, and Scotch pine. In most of these cases, figure has been detected after trees have been converted into lumber and it has been impossible to propagate them.

Schmucker, T. and H. Meyer. 1965. Auswahl und Vermehrung einiger abnormer Former bei Laubhölzern (Selection and Propagation of Some Abnormal Forms of Hardwoods). Der Forst-und Holzwirt 11(9):175-177. 6 photos. Text in German.

A discussion of selection of propagation of figured hardwoods. Several species are discussed including ash, sycamore maple, and birch. External appearance of figured trees and stem section are illustrated. Propagation techniques are suggested.

Scholz, E. 1962. Erhöhung und qualitative Verbesserung des inländischen Aufkommens an Birkenfurnierholz durch Anwendung wissenschaftlicher Erkenntnisse (Increasing and Improving Home Supplies of Birch Veneer on Scientific Bases). Sozialistiche Forstwirtschaft 12(12):364-369. Text in German. 14 photos. 6 refs. For. Abst. Vol. 24 No. 4296. (Purdue Univ. Library).

An account of the supplies of flamy figured birch from Finland to East Germany. Only *Betula verrucosa* produces flamy figure in commercial quantities. Specifications and value comparisons of different figure types are discussed.

Scholz, E. 1963. Die rationelle Bewirtschaftung der Birke (The Rational Management of Birch). Sozialistiache Forstwirtschaft 12(12):337-343; 362-367. Text in German. 12 photos. 29 refs. For. Abst. Vol. 25 No. 3381. (Purdue Univ. Library).

An account of the establishment and management of both straight and figured grained birch stands. Recognition of figured birches is separated into flamy and brown figured trees. Soil preparation and propagation techniques are discussed.

Scholz, E. 1963. Das Verbreitungsgebiet der Braunmaserbirke (The Distribution of Brown Masur Birch). Archiv für Forstwesen 12(12):1244-1253. Text in German; English Summary. 8 figs. 19 refs. For. Abst. Vol. 25 No. 5616. (Univ. of Ill. Library).

Range of the brown Masur Birch has been traced throughout Europe. It is felt that Central Europe offers the best possibilities for successful cultivation. Several factors concerning natural and artificial cultivation of Masur figure are discussed.

Schröck, O. and E. Scholz. 1953. Einiges über Furnierbirken, insbesondere Flammbirken und deren Erkennen in Bestande (Veneer Birch, Especially Wavy-Grained Birch and how to Recognize Them in the Stand). Wald 3(6):180-183. Text in German. 14 photos. (Purdue Univ. Library).

A discussion of recognition of figured trees in stands using various techniques such as bark characteristics and wood chips. Several veneer sheets are described and illustrated.

Smith, W. W. 1954. Occurrence of "Stem Pitting" and Necrosis in Some Body Stocks for Apple Trees. Proc. Am. Soc. Hort. Sci. 63:101-113. 9 photos. 26 refs.

A discussion of "stem pitting" in apple stocks with illustrations. This type of pitting is similar to that found in the Masur birch.

Strengell, Alfred. 1936. En del praktisk erfarenhet om masur bjorken. (Empirical Practices with Masur Birch). Text in Swedish. Skogsbruket 1936 pp. 34-35.

Not seen.

Strohmeyer, G. 1965. Riegelahorne in Hessen (Fiddleback Maples in Hesse). Allgemeine Forstzeitschrift 20(38/39):610. Text in German. 2 photos. 3 refs. For. Abst. Vol. 27 No. 2764. (Midwest Inter-Library Center, Chicago).

Fiddleback figure occurs in about 1 to 5 per cent of sycamore maples (*Acer pseudoplatanus*) in the Hesse region. Occasionally

it is confined to one side of the tree. Advocates propagation of figured trees by grafting. Investigation of site conditions is also suggested.

Sweet, W. T. 1936. Figuration of Wood. Wood (London) 1(1):31-35. 19 figs. (National Agr. Library).

A discussion of several types of figure as related to growth rings and distorted grain. Several figure types are illustrated showing split blocks and finished wood. Stresses effect on figure by cutting at angles rather than cutting parallel to the grain.

Tauchnitz, E. 1960. Über Rindentypen und Furnierqualitäten der Birke im Süden der Deutschen Demokratischen Republik (Bark Types and Veneer Quality in Birch from S.E. Germany). Forst und Jagd 10(4):181-185. Text in German. 8 photos. 12 refs. For. Abst. Vol. 21 No. 4876. (Purdue Univ. Library).

Extract from a thesis involving 1,447 specimens of *Betula verrucosa* from 18 sites. Bark types appeared to be largely hereditary but showed little correlation with site, age, or diameter. Bark types proved to be an important tool for determination of curly grain when combined with chip examination.

Turnbull, R. F. 1957. Figure, Texture and Grain of Wood. C.S.I.R.O. Prod. Newsletter No. 228. pp. 1-2. Melbourne (Australia).

A non-technical discussion of relationships among figure, texture, and grain. Each factor is explained individually, showing effects on the others.

Walters, C. S. 1951. Figured Walnut Propagated by Grafting. J. Forestry 49:917. 1 photo.

An examination of figured walnut grafted by G. N. Lamb in 1929. Grafted trees (22 years of age) exhibited figured wood that was more pronounced in outer parts of boles than near the centers.

Wangaard, F. F. 1950. The Mechanical Properties of Wood. John Wily and Sons. New York, pp. 148-149. 1 ill.

A brief note on occurrence of "indented ring" figure that occurs in sitka spruce and Douglas fir with an illustration of this figure. The name "bear scratches" has been applied to this figure.

Watson, H. 1972. AFA Goodwill Tour of the Orient. Ala. For. Prod. 15(11):20-23. 7 figs.

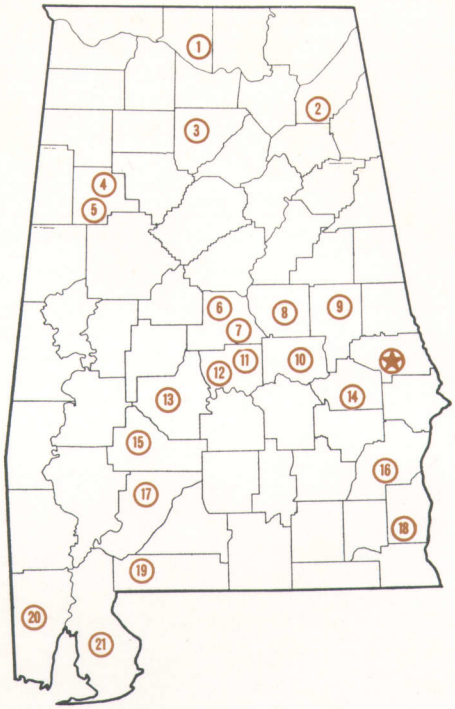
A brief description of the Kitayama forest where crinkled logs of several species are produced both naturally and artificially for use as alcove posts.

Ziegler, H. and W. Merz. 1961. Der "Hasel" wuchs (Indented Ring Growth). Holz als Roh- und Werkstoff 19(1):1-8. Text in German, English Summary. 13 figs. 36 refs. For. Abst. 22 No. 5001. (Purdue Univ. Library).

An illustrated study of the peculiar growth figure called "Hazel" but considered to be "indented rings." This condition occurs in several softwoods and to a limited extent in hardwoods. This figure was traced to localized disturbances in the cambium, resulting in lenticular indentations in annual rings.

## AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.




### Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.