Production and Sale of CHARCOAL in the Northeast

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RECENTLY we have had many requests for information about opportunities for establishing new charcoal manufacturing facilities in the Northeastern States. Unfortunately there has been little published information available to guide prospective producers. Some of the problems that new producers are likely to encounter, and suggestions for their solution, have been described by Fred C. Simmons in "Guides to Manufacturing and Marketing Charcoal in the Northeastern States."[1] Our objective in this report is to supplement Simmons' suggestions with factual information about certain characteristics of the present charcoal-manufacturing industry.

[1]Simmons, Fred C. Guides to manufacturing and marketing charcoal in the Northeastern States. Northeast. Forest Expt. Sta., Sta. Paper 95. 20 pp., illus. 1957.

This report is based on the results of a survey of charcoal production in the twelve Northeastern States. The survey was conducted by the U.S. Forest Service as part of a nationwide survey of charcoal manufacturers.[2]

CHARCOAL PRODUCTION

Manufacturing charcoal is an ancient art, practiced in many parts of the world. It has been practiced in the Northeastern States since the earliest colonial settlements.

Making charcoal is basically a simple process. Wood is placed in a chamber in which the supply of air is limited. The wood is then heated beyond its ignition temperature, causing it to break down into gases, vapors, and solids. The gases and vapors pass off as smoke, leaving charcoal and ash.

The larger pieces of charcoal are the primary product. This is lump charcoal. A natural byproduct of producing lump charcoal is fine charcoal, or "fines". Fines are produced in considerable quantities, particularly at the larger plants where lump charcoal is handled mechanically. Not all manufacturers are able to sell their fines, but briquetting plants offer a market for some. All of the six briquetting plants listed in the Appendix use fine charcoal. Three of them purchased fines from outside sources.

Quantities Produced

Charcoal production in the Northeast in 1956 amounted to 32,000 tons (table 1). Regional production was centered in the Middle Atlantic States. Connecticut was the only New England state that produced large quantities of charcoal in 1955 and 1956. Pennsylvania's production far surpassed that of any other state.

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[2]Division of Forest Economics Research, U.S. Forest Service. Charcoal production in the United States (1955 and 1956). Forest Service. 14 pp. 1957. Washington.

Table 1.--Charcoal production in the Northeast, in tons, by states, 1955 and 1956

State	1955			1956		
	Lump	Fines*	Total	Lump	Fines*	Total
NEW ENGLAND STATES						
Connecticut	2,557	80	2,637	3,034	100	3,134
Maine, New Hampshire**	308	18	326	300	15	315
Massachusetts, Rhode Island**	233	13	246	283	31	314
Vermont	--	--	--	--	--	--
MIDDLE ATLANTIC STATES						
Delaware	--	--	--	--	--	--
New York	3,925	1,003	4,928	3,697	825	4,522
New Jersey, Pennsylvania**	19,676	2,038	21,714	17,475	2,173	19,648
Maryland, West Virginia**	2,852	1,200	4,052	2,869	1,200	4,069
Total	29,551	4,352	33,903	27,658	4,344	32,002

*These data include only the quantity of fines prepared for sale.
**Combined to avoid disclosing figures for individual companies.

Charcoal production in 1956 was 6 percent below that reported for 1955 (table 1). But according to the charcoal producers interviewed, this is not an accurate reflection of current production trends. Producers cited the "cold wet summer weather of 1956, which kept the outdoor chef indoors," as being responsible for depressed markets and production in that year. Early reports of 1957 production tend to confirm their belief that regional production in 1957 will exceed that of all recent years.

Equipment Used

Producers use a wide variety of kilns and retorts. Simmons has discussed the characteristics and advantages of the most common types used in the Northeast.

Despite this diversity, we found that over 95 percent of the charcoal produced in this region in 1956 was produced in either brick beehive kilns or steel retorts. The exact proportions and the number of active operations are shown in table 2.

It is interesting to note (table 2) that those installations that represent the larger capital investments

Table 2.--Active charcoal-manufacturing enterprises in the Northeast, by type of equipment, 1956

Type of equipment	Active enterprises	Active kilns and retorts	Total production*	Proportion of regional production	Proportion of production to rated capicity for air-dry hardwood roundwood
	Number	Number	Tons	Percent	Percent
Brick beehive	9	65	13,925	44	77.4
Cinder block	30	64	1,260	4	7.2
Steel retort	6	24	16,684	52	95.7
Miscellaneous**	10	19	133	***	11.0
All types	55	172	32,002	100	71.3

*Includes 4,344 tons of fines.
**Includes 9 steel-beehive, 4 steel-box, 1 French can, 2 gas-tank, and 3 sod-kiln units. Combined to avoid disclosing figures for individual companies.
***Less than 1 percent.

were also those that produced nearest to capacity in 1956. Obviously operators of certain other types of installations produce charcoal on a part-time basis.

We also collected information from the owners of kilns and retorts that were not used during 1956. Eleven operators were idle. They accounted for twenty cinder-block kilns and one steel retort that were also inactive during the year.

The average load and carbonizing cycle did not differ significantly among localities for the same type of kiln. The regional averages were as follows:

Equipment	*Average load (cords)*	*Average cycle (days)*
Brick beehive	59.0	27.0
Cinder-block	5.2	8.8
Steel retort	7.0	2.0
Miscellaneous	2.5	4.2

Wood Used

Even as the market for his charcoal is changing, so is the form of wood the charcoal producer uses as raw material. For many years only sections cut directly from tree boles or limbs were used. In addition to this "roundwood",

sawmill residues (slabs and edgings) recently have become equally important as a source of wood for charcoal production.

The retort plants depend primarily on roundwood, but the kiln operations use mostly sawmill residues. Of the raw material used in retorts in 1956, 76 percent was in roundwood form, compared to only 22 percent roundwood used in kilns. This difference is probably caused by the better ability of the retorts to use green wood without serious reduction in yield or increase in carbonization cycle. The retorts use an outside source of heat, usually coal or natural gas. But the kilns use part of their capacity for kindling, so green wood in kilns means lower yields and longer cycles. And slabs, of course, dry out much faster than roundwood; slabs are about as dry in 3 months as roundwood is after 18 months.

Almost all of the wood used in 1956 was purchased; only 774 cords were cut by operators from their own land. Thus one of the reasons for the increasing use of mill residues is their relatively low cost (table 3).

Our survey found that the cost of obtaining sawmill residues differed widely from one location to another. Costs ranged from $4 to $15 per cord and averaged $7.50 per cord. Although most of these differences result from local market conditions, some relate to wood quality. For example, one larger producer in Pennsylvania pays a premium price for high-quality, bark-free residue blocks obtained from a woodturning plant.

Competition from fuelwood markets and the cost of transporting wood for longer distances were also reasons for higher prices in some areas. Increasing demands by pulp companies for sawmill residues may also force costs to rise in some localities in the future.

Roundwood costs were relatively stable, ranging from $10 to $15 per cord. (One small purchase was reported at $8 per cord.) Almost always the cost of roundwood was higher than the cost of residues, but the differential was much more marked in some areas than in others. The general nature of such differences is indicated by table 3.

Availability and relative cost largely determine the form of wood used. For example, in northern New England

oak roundwood was obtained from nearby land-clearing operations at low cost; thus few mill residues were used in these states in 1956 (table 4).

But changes in form have not seriously altered the particular species of wood used. Hardwood species are used almost exclusively in the Northeast. Of a total regional

Table 3.--Volume and cost of purchased hardwood, 1956*

State	Roundwood		Residues	
	Volume	Cost	Volume	Cost
	Cords	Dollars	Cords	Dollars
NEW ENGLAND STATES				
Connecticut	965	$11.20	6,055	$ 8.50
Maine, New Hampshire**	228	11.10	--	--
Massachusetts, Rhode Islandd**	300	11.10	100	4.00
MIDDLE ATLANTIC STATES				
New York	4,310	12.00	5,618	9.70
New Jersey, Pennsylvania**	30,689	12.90	13,015	8.30
Maryland, West Virginia**	--	--	12,000	5.00
Total, all States	36,492	12.00	36,788	7.50

*Delivered at the plant.
**Combined to avoid disclosing figures for individual companies.

Table 4.--Volume of hardwoods used in producing charcoal, in cords, by states, 1956

Form and species	Conn.	R.I. & Mass.	Maine & N.H.	N.Y.	N.J. & Pa.	Md. & W. Va.	All states
ROUNDWOOD							
Oak	727	190	260	17	3,538	34	4,766
Hickory	34	8	5	--	310	2	359
Beech, birch, maple	155	90	484	3,975	20,783	--	25,487
Other hardwoods*	51	12	60	404	6,118	9	6,654
Total	967	300	809	4,396	30,749	45	37,266
RESIDUES							
Oak	5,706	90	--	30	80	11,115	17,021
Hickory	55	10	--	--	10	800	875
Beech, birch, maple	331	--	--	5,252	11,110	--	16,693
Other hardwoods*	152	--	--	336	1,815	205	2,508
Total	6,244	100	--	5,618	13,015	12,120	37,097**
Total, all wood	7,211	400	809	10,014	43,764	12,165	74,363**

*Includes black cherry, elm, red maple, ash, sycamore, paper birch, and black gum.
**These totals differ from those shown in the report, "Charcoal production in the United States," (U. S. Forest Service, 1957) because of an error in basic field data, discovered and corrected after publication of that report.

consumption in 1956 of 76,000 cords, only 1,300 cords were of softwood species. And of the hardwoods, the denser species are preferred: beech, birch, and maple account for 57 percent of the hardwoods used (table 4).

Charcoal Yields

Some types of kilns make more efficient use of the wood consumed than do others. Based on actual production records, regional average yields of charcoal per cord of wood consumed in different types of kilns follow:

Equipment	*Charcoal yield (Pounds per cord)*
Brick beehive	650
Cinder-block	770
Steel retort	820
Miscellaneous	550
Average, all units	730

SALES BY PRODUCERS

In the past, most of the charcoal produced in the region was sold to industrial users in bulk sales. Such sales still account for much of the charcoal sold. In former years, the charcoal marketed in bulk sales was shipped loose. For the past few years charcoal has been shipped in bags to meet the demand of the user and the common carrier, but these are still considered as bulk sales.

Because of increased use of charcoal for cooking in recent years, increased sales are made to retail outlets and to commission houses in small bags at a fixed rate for packaging. Only a very small quantity is now peddled door to door by the producers.

Type Of Buyer

During 1956, all of the charcoal produced by the larger plants was sold directly to various industrial users, jobbers, and briquetting plants. Few small producers sold to jobbers: most sought the higher prices paid by retail stores and consumers. Nearly all the requirements for charcoal by industrial users located in the region was met by the local production, chiefly from retort plants. Half of the region's production was sold to industries (table 5). The remainder, including sales to briquetting plants was used for cooking.

Despite recent increases in production, not enough charcoal was made locally to meet the region's demands, especially for cooking. Large quantities of charcoal were shipped into the region to meet this demand.

Prices Received

Prices for charcoal vary between states and within some states (table 6). This range is because of differences in type of market available, point of sale (f.o.b. plant or delivered), size of bags used, who pays for bags (jobber or producer), quality, quantity involved in individual sales, and market conditions.

Table 5.--Quantity of charcoal sold by producers in 1956, by state and type of purchaser, in tons

State	Jobber	Industrial user	Briquetting plant	Other*	Total
Connecticut	215	2,770	50	48	3,083
Maine, New Hampshire**	376	11	10	21	418
Massachusetts, Rhode Island**	84	175	15	40	314
New York	2,644	1,543	18	202	4,407
New Jersey, Pennsylvania**	7,127	7,265	3,503	1,230	19,125
Maryland, West Virginia**	744	2,026	944	219	3,933
Total, all states	11,190***	13,790	4,540	1,760	31,280

*Retail stores, restaurants, roadside stands, and the like.
**Combined to avoid disclosing figures for individual companies.
***Approximately 15 percent of this volume was resold to industrial users.

Table 6.--Prices received by producers for lump charcoal, by states, 1956

State	Bulk sales*		Bag sales**	
	Range	Average	Range	Average
	Dollars per ton	Dollars per ton	Cents per lb.	Cents per lb.
NEW ENGLAND STATES				
Connecticut	60-72	71.16	3½-9	6
Maine, New Hampshire ***	70-100	72.41	5-8	6
Massachusetts, Rhode Island ***	60-80	73.68	3-5	4
MIDDLE ATLANTIC STATES				
New York	50-108	63.08	4-7½	6
New Jersey, Pennsylvania ***	50-65	57.27	3-7½	4
Maryland, West Virginia ***	45-80	45.02	3½-7	4½
Total, all states	45-108	56.20	3-9	4½

*Includes sales in ½ bushel and 1 bushel (20-pound) bags, in burlap bags, and loose, f.o.b. plant.
**In 2- to 5-pound bags, delivered.
***Combined to avoid disclosing figures for individual companies.

Twenty pounds is commonly considered to be the weight of a bushel of charcoal produced from dense hardwoods. The price for these sales ranges from 2 to 3½ cents per pound, f.o.b. plant.

Although there were some isolated sales to special users at high prices, the greatest volume was sold in bulk at $55 to $65 per ton at the plant. The lowest price for bulk sales in the region was in West Virginia. Sales in New England States were at prices higher than the regional average.

Increasing numbers of producers are packaging charcoal in 2- to 5-pound paper bags for sale to jobbers and retailers; 4-pound bags are the favorite. For such sales, producers realized prices of 5 to 9 cents per pound, delivered. These same bags retailed at 10 to 20 cents per pound, with 10 to 14 cents being the usual range. The wide range in prices for charcoal in small bags is also a result of some sales at high retail prices in resort areas.

Toward the end of 1956 a number of operators were forced to lower prices, on the average 1 to 3 cents per pound, in order to move the charcoal on hand. Competition from low-priced charcoal produced elsewhere also affected prices ad-

versely. Some operators encouraged retailers and jobbers to stock-pile by reducing prices on their bulk sales. However, others were able to sell their stock on hand without any loss in price.

Producers were optimistic about the outlook for 1957. To meet the expected increase in demand for charcoal, two cinder-block kiln installations have begun in the region. At least eight operators of cinder-block kilns are known to be expanding their facilities to as much as twice their former capacity. One continuous retort is under construction (25 cords per shift), and two others are operating experimentally. In addition, several new continuous retorts are in the planning stage. These new facilities will increase the regional charcoal production by several thousand tons.

APPENDIX

Charcoal Producers In The Northeast

The following list of charcoal producers is presented as an aid to forest-land owners, sawmill operators, and others interested in the sale of timber or mill residues suitable for charcoal production and as an aid to those interested in buying charcoal. Omission of producers from this list is unintentional; inclusion constitutes no recommendation or endorsement by the Forest Service.

Name	*Address*	*Type of Installation*
	CONNECTICUT	
Auslander Bros.	Durham Road, Madison	Cinder-block
Avery, Mahlan P.	Somers Corners	Cinder-block
Conn. Charcoal Co.	RFD 2, Stafford Springs	Brick beehive
Conn. Park & Forest Comn.	Hartford	Cinder-block
Donderro, Marko	c/o Wallace Wallach, Haddam	Cinder-block
Hadfield, Myron	Sterling	Cinder-block
Minor, Layton H.	Pawcatuck	Cinder-block
Park, Ripley B.	North Stonington	Cinder-block
White Memorial Foundation	Litchfield	Cinder-block
Woodward, Karl	Washington	Steel beehive
	DELAWARE	
No known producers	--	--
	MAINE	
Fowler, Luther	Round Pond	Cinder-block
Gilley, Maynard H., Sr. & Son	RFD 2, Coopers Mills	Gas-tank
Kaslaska, Peter	East Eddington	Cinder-block
	MARYLAND	
Eppler Wood Prod. Corp.	PO Box 12, Dorsey	Cinder-block
Muirkirk Products	Muirkirk	Cinder-block
Md. Dept. of Forests & Parks	State Office Bldg., Annapolis	Cinder-block

MASSACHUSETTS

Ambler Lumber Co.[3]	PO Box 93, Bellingham	Cinder-block
Howard Bros. Charcoal Co.	Star Route, Montague	Brick beehive
New England Forest Foundation	3 Joy St., Boston	Cinder-block

NEW HAMPSHIRE

Champney, Alfred	62 Church St., Concord	Cinder-block
Fenton, Paul J., Jr.	Andover	Cinder-block
Frink, Richard S.	RFD 1, Goffstown	Steel beehive
Kimball, Donald S.	Thousand Acres, West Franklin	Cinder-block and Steel beehive
Lovering, Bernard S.	Bunker Hill Rd., Auburn	Brick beehive
New Canada Farms	Danbury	Cinder-block
New England Forest Foundation	3 Joy St., Boston (Kiln at Danbury)	Cinder-block
New England Forest Industries, Inc.	3 N. State St., Concord	Cinder-block
N.H. Forest & Recreation Comn.	Hillsboro	Steel beehive and cinder-block
White Mt. Charcoal Co.	West Rumney	Cinder-block

NEW JERSEY

Payne, Herbert W. & Sons	PO Box 57, Whiting	Steel beehive and pit kiln
West American Charcoal & Coal Co.	Mays Landing	Brick beehive

NEW YORK

Adirondack Forest By-Products Co.	PO Box 92, Bloomingdale	Cinder-block
B & C Charcoal Co.	Peck Hill Rd., South Otselic	Steel box and cinder-block
Black Dome Corp.[3]	East Jewett	Cinder-block
East Walden Charcoal Co.	East Walden	Cinder-block
Gigliotti, Angelo	1118 Hammond Ave., Utica	Cinder-block
Glowell Brand Charcoal Co.	Marlboro	Cinder-block
Heartwood Products Co.	44 Hudson St., Warrensburg	Cinder-block
Hutton, William	Booneville	Cinder-block
Long Eddy Co.	Long Eddy	Cinder-block
Northeastern Fuel Co.	Warrensburg	Steel box
Redfield Charcoal Co.	63 Oswego St., Baldwinsville	Cinder-block
Smiley Brothers	Mohonk Lake	Cinder-block
Sowalski, Joseph	RFD 2, Averill Park	Pit kiln
Susquehanna Chemical Corp.	PO Box 176, Bradford, Pa. (Plant at Horton, N.Y.)	Steel-retort
Thomas, Fenimore	Star Route 2, Owego	Steel-retort
Warner, Donald F.	Speculator	Steel box
Weihneimer, Arthur J.	Old Chatham	Cinder-block
Wicks, Verne A.	Harrisville	Cinder-block

[3]Began operation in 1957.

PENNSYLVANIA

Big Sandy Charcoal Co.	PO Box 1785, Uniontown	Cinder-block
Bradford Wood Prod. Co.	304 Hooker-Fulton Bldg., Bradford	Steel retort
Charcoal Products Co.	200 Davenport St., Dallas	Cinder-block
Humphrey Brick & Tile Co.	PO Box 45, Brookville	Brick beehive
Kohl, Elmer	RFD 1, Bowmansville	Pit kiln
Otto Chemical Co.	Sergeant	Steel jumbo
Susquehanna Chemical Corp.	PO Box 176, Bradford	Steel retort
Valley Chemical Co.	Morris	Steel retort
Wyman Chemical Co., Inc.	304 Hooker-Fulton Bldg., Bradford	Steel retort

RHODE ISLAND

Hall, Edwin N.	RFD 1, North Scituate	Cinder-block
Hazard, Thomas P.	Peace Dale	Cinder-block
Peckham, James	RFD 2, North Scituate	Brick beehives
Wisniewski, Stephen	119 So. Main St., Moosup, Conn. (Kilns at Foster, R.I.)	Cinder-block

VERMONT

No known producers	--	--

WEST VIRGINIA

Allegheny Mfg. Co.	Terra Alta	Cinder-block
Bland, D.E. & Son	Thomas	Brick beehive
Roseville Charcoal & Mfg. Co.	PO Box 1188, Zanesville, Ohio (Kilns at Bentree and Swiss, W.Va.)	Brick beehive
Sanders, Ray K. & Sons	Rowlesburg	Cinder-block
Wilmoth, Roy E.	Belington	Cinder-block

Charcoal Briquette Makers
In The Northeast

Name	*Address*
American Briquetting Co.	Lykens, Pennsylvania
Conn. Charcoal Co.	RFD 2, Stafford Springs, Conn.
Humphrey Brick & Tile Co.	PO Box 45, Brookville, Pa.
Jaeger Company	Frost Bldg., Caribou, Maine (Plant at Fort Kent, Maine)
Park, Ripley B.[3]	North Stonington, Connecticut
West American Charcoal & Coal Co.[3]	238 Schiller St., Elizabeth, N.J.

Charcoal Installations Used
For Experimental Purposes Only

Name	*Address*	*Type of Installation*
Connecticut Agricultural Experiment Station	New Haven, Conn.	Cinder-block
Department of Forestry University of Maine	Orono, Maine	Cinder-block
Department of Forestry University of Mass.	Amherst, Mass.	Cinder-block
Department of Forestry University of New Hampshire	Durham, N.H.	Cinder-block
Department of Forestry University of Vermont	Burlington, Vt.	Cinder-block
Massabesic Experimental Forest U.S. Forest Service	Alfred, Maine	Cinder-block

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