

NORTH CAROLINA
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
R. BRUCE ETHERIDGE, DIRECTOR

BULLETIN 44

**Economic Opportunities For Producing
Semi-Porcelain Dinnerware
In North Carolina**

**DIVISION OF
COMMERCE AND INDUSTRY**

PAUL KELLY, Chief Industrial Engineer
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RALEIGH, N. C., 1944

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LETTER OF TRANSMITTAL

Raleigh, North Carolina
June 1, 1944

To his Excellency, HON. J. MELVILLE BROUGHTON,
Governor of North Carolina,
United States of America.

SIR: I have the honor to submit herewith, as Bulletin 44, a report on the "Economic Opportunities For Producing Semi-Porcelain Dinnerware in North Carolina."

This report points out the economic feasibility of producing dinnerware in North Carolina, utilizing raw materials from the kaolin, feldspar, and flint deposits in the State.

It is hoped that this publication will be instrumental in helping to establish the Dinnerware Industry in North Carolina.

Yours respectfully,

R. BRUCE ETHERIDGE,
Director.

FOREWORD

This Bulletin 44, "Economic Opportunities for Producing Semi-Porcelain Dinnerware in North Carolina" consists principally of economic estimates stemming from technical ideas of the kind of plant required to fill known market and production needs. It has been made possible through the collaborative efforts of many experts. Much of the factual information was obtained from the Tennessee Valley Authority; Dr. Jasper L. Stuckey, N. C. State Geologist, of the Division of Mineral Resources; the Department of Ceramic Engineering of N. C. State College; and the North Carolina State Department of Tax Research.

North Carolina State College, Raleigh, N. C., Department of Ceramic Engineering, is fully equipped to test dinnerware and undertake research, with a trained staff of ceramic engineers who are at the service of producers.

Services of the Division of Commerce and Industry, of the Department of Conservation and Development, are available to anyone interested in this or any other type of industry. Reports pertaining to labor or other data will be furnished promptly upon request.

PHILIP SCHWARTZ,
Industrial Analyst.

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ECONOMIC OPPORTUNITIES FOR PRODUCING SEMI-PORCELAIN DINNERWARE IN NORTH CAROLINA

SUMMARY

PURPOSE

The primary purpose of this report is to point out the economic feasibility of producing dinnerware in North Carolina, utilizing raw materials from the kaolin, feldspar, and flint deposits of the State.

In the September 1943 issue of "Domestic Commerce," Edward J. Detgen, Specialties Unit, U. S. Bureau of Foreign and Domestic Commerce, wrote in part, as follows, "We estimate that sales of table and kitchen pottery in a post-war period of high levels of employment might reach in the neighborhood of \$196 million, or 51 per cent more than in 1941."

SCOPE

The analyses in the report are limited to the principal factors in semi-porcelain manufacture which vary with location.

ASSUMPTIONS

Annual Capacity—Dozens Equivalent (9000 tons) 2,500,000

Annual Production Value \$2,000,000

Plant Investment \$1,200,000

Type of Plant—The type of plant contemplated is a modern, highly mechanized manufacturing unit, containing, in addition to conventional equipment, an automatic jiggering and drying machine and five continuous kilns.

Distribution— To the 10 southeastern states according to state population and retail trade. Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

VARIABLE COSTS (ESTIMATED)

Fuel, Power, Taxes, Raw Materials, and Transportation of the Finished Product are included.

Location	Variable Cost Per Ton of Product	Annual Variable Cost
Charlotte, North Carolina	\$52.19	\$469,710
Atlanta, Georgia	\$53.10	\$477,900
Memphis, Tennessee	\$54.23	\$488,070
Asheville, North Carolina	\$54.88	\$493,920
Wilmington, North Carolina	\$55.62	\$500,560
East Liverpool, Ohio	\$57.38	\$516,420
Trenton, New Jersey	\$58.60	\$527,400

LABOR

The success of a dinnerware industry depends to a considerable degree upon good management and the availability of semi-skilled and skilled potters. Wages account for approximately 45 per cent of the total cost of dinnerware production.

Any firm desiring to initiate dinnerware manufacture in North Carolina should plan on a training program for the employees prior to full plant operation.

ALTERNATE PLANT INVESTMENT

\$150,000 to \$200,000.

While this report is predicated upon a plant investment of \$1,200,000, for informative purposes an additional breakdown of a plant investment of approximately \$150,000 - \$200,000, depending on location, is shown as follows:

1. Plant capacity 260,000 dozen or 936 net tons
2. Value of products \$228,000
3. Plant employees:
 - Wage earners 52
 - Salaried, manufacturing 18
 - Salaried, distribution 4
4. Fuel requirements:
 - 607 gallons of heavy fuel oil, or
 - 90,000 cu. ft. of 1000 B.t.u. gas per day.
 - 18,210 gallons of heavy fuel oil, or
 - 2,700,000 cu. ft. of 1000 B.t.u. gas per month.
5. Power requirements:
 - Demand 50 KVA
 - Energy use per month 21,600 kilowatt hours
 - Energy use per year 259,200 kilowatt hours

It is recognized that the operation of a plant involving an investment of between 150 and 200 thousand dollars might be

successful, but experts who have studied the matter consider that the following principles and policies are practically mandatory:

1. Production must be limited to about two patterns at a time, and these must be carefully chosen and executed to meet with widespread favor in the market.
2. Salary overhead must be kept low, probably through operation by someone familiar with the operating details of finance, production and sales.

Unless these principles govern, it is doubtful whether the smaller plant projected herewith could marshal the advantages of southeastern markets and semi-skilled workers under conditions which will compete with fully mechanized larger plants. Thus, it would be difficult to realize the essential need of the southeastern market; the production of low-cost, well-designed ware having some art values.

Since operating flexibility implies larger financial reserves, simultaneously with a lower degree of mechanized or line production, it would be well to begin and continue operation of the smaller plant visualized here with at least \$100,000 of reserve capital.

While several plants of this approximate size have succeeded in developing an extensive demand for wares of restricted design and execution (pattern), their history indicates that they are managed and operated with superior competence, and are backed by a fairly large monetary reserve.

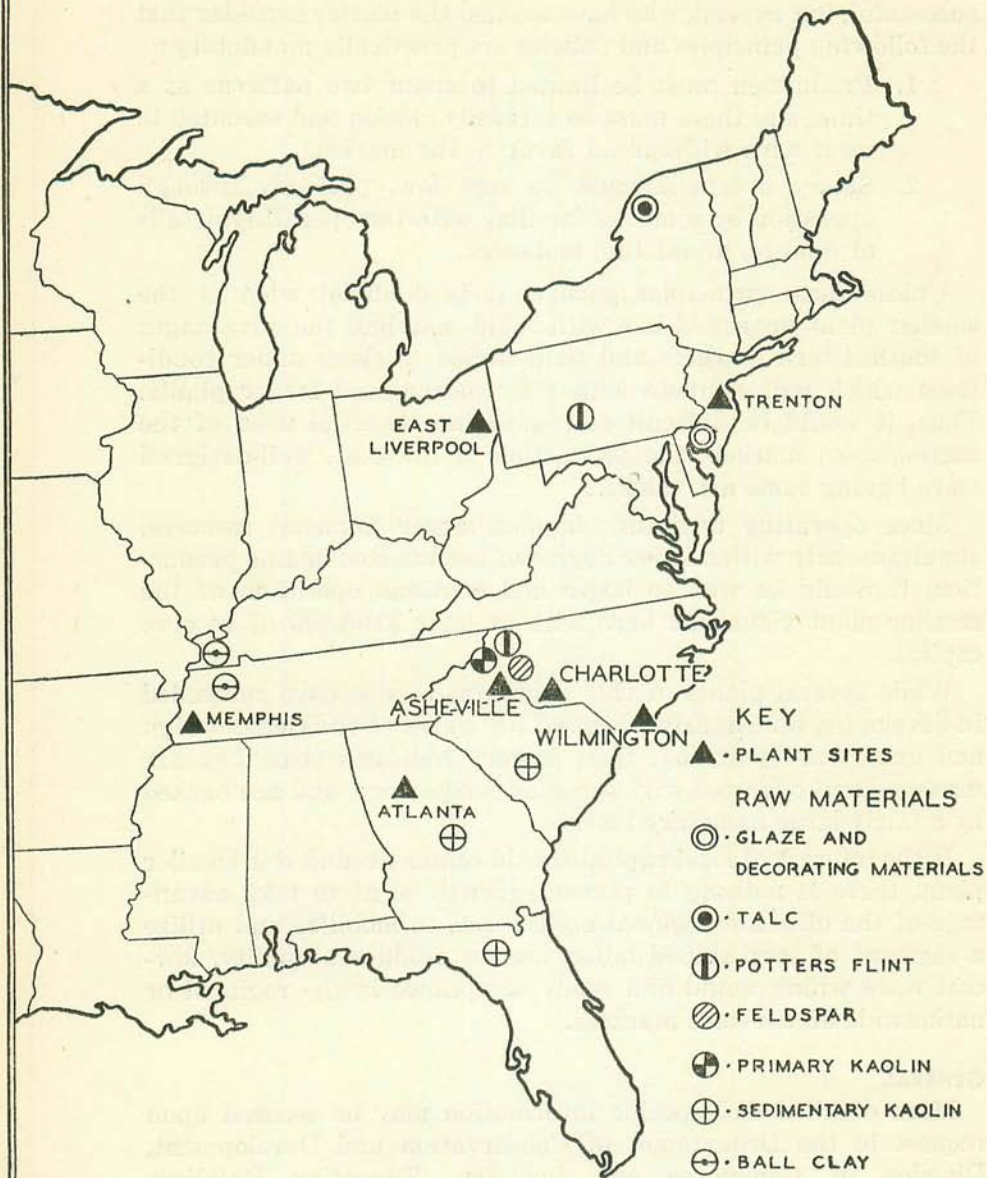
If the interest of local capital should center around this smaller plant, there is nothing to prevent growth so as to take advantage of the ultimate regional needs; i. e., to mobilize and utilize a segment of semi-skilled labor, and to produce a quality, low-cost ware which would find ready acceptance in the regional or nationwide dinnerware markets.

GENERAL

More detailed and specific information may be secured upon request to the Department of Conservation and Development, Division of Commerce and Industry, Education Building, Raleigh, N. C.

COMPARATIVE PLANT LOCATIONS

While many locations in North Carolina may be chosen for study, those presented in this report are considered as representative of conditions in the three principal geographical sec-



PROPOSED PLANT SITES AND RAW
 MATERIAL LOCATIONS FOR A
 SEMI-PORCELAIN DINNERWARE INDUSTRY.

tions of the state. Figures for the locations outside of the state are shown so that they may be compared with those in North Carolina to analyze locational differences.

Among these, East Liverpool, Ohio, and Trenton, N. J., are now important centers for dinnerware production in the United States, and serve as good points for making comparisons. Memphis, Tenn., and Atlanta, Ga., are potential low-cost production points for dinnerware in the southeast. Consequently, they too serve as satisfactory comparative locations.

The data included in this report are based on published rates for power, taxes, fuel, and freight. The purpose is to show differences in cost due to geographic location for a fully mechanized dinnerware plant. No attempt is made to compare actual existing production costs with those that would accrue for the proposed plant in North Carolina.

We believe the economic factors shown for these representative points justify detailed investigation by industry of the profitability of dinnerware production in North Carolina, either in establishing a branch unit or a new one.

ASSUMED AND DERIVED DATA

1. Plant Capacity—2,500,000 dozen units per year or 9,000 net tons.
Average weight 7.2 lbs. per dozen.
Value of products: \$2,000,000 per year.
2. Plant Investment—\$1,200,000. This investment will provide for all modern industrially proved equipment for fairly complete mechanization.
3. Plant Employees:

Wage earners	700
Salaried, manufacturing	50
Salaried, distribution	6
4. Fuel Requirements:

3,239 gallons of heavy fuel oil, or
480,000 cu. ft. of 1000 B.t.u. gas per day.
97,170 gallons of heavy fuel oil, or
14,400,000 cu. ft. of 1000 B.t.u. gas per month.
5. Power Requirements:

Demand 430 KVA	
Energy use per month	158,000 kilowatt hours
Energy use per year	1,900,000 kilowatt hours

6. Raw Materials:

Sample Body‡	BODY, GLAZE AND DECORATING MATERIAL		
	Percentage of Fin. Prod. in Consumed Wgts.†	Net Pounds of Raw Mtls. per Ton Fin. Prod.	F.o.b. Price per Ton
Potters flint	34.2	684	\$14.00
Ball clay	15.3	359	17.00
Primary kaolin	14.4	336	25.00
Sedimentary kaolin	9.0	209	14.00
Feldspar	12.6	252	16.00
Talc	4.5	94	13.00
Glaze and decorating materials*	10.0	400	55.00
		2,334	

‡This is a representative body for dinnerware production. The percentage composition will vary according to the type of product desired.

†Packaged, delivered weight basis.

*Delivered cost of sagger materials, kiln furniture, firebrick, and equipment replacements would vary slightly according to location but are not considered because quantities per ton of product are not definable until the type of equipment has been selected.

7. Distribution:

	Distribution of Finished Ware (Tons per year)
Birmingham, Alabama	810
Miami, Florida	720
Atlanta, Georgia	1260
Louisville, Kentucky	990
New Orleans, Louisiana	720
Jackson, Mississippi	360
Charlotte, North Carolina	1440
Columbia, South Carolina	450
Memphis, Tennessee	1170
Richmond, Virginia	1080
Total	9000

TABLE I
 PRINCIPAL VARIABLE COST PER TON OF FINISHED PRODUCT FOR A
 SEMI-PORCELAIN DINNERWARE PLANT
 (Based on Plant Producing 9,000 Tons of Dinnerware Per Year)

	Charlotte	Atlanta	Memphis	Asheville
Fuel (gas or oil).....	\$ 4.80	\$ 4.30	\$ 3.26	\$ 5.18
Power (published rates).....	1.87	2.49	1.40	2.18
Taxes (Corporation Income, Property, and Franchise).....	3.28	3.60	4.29	4.29
Raw Materials (Delivered cost).....	32.23	33.25	34.10	32.29
Distribution (Transportation costs on finished product).....	10.01	9.46	11.18	10.94
Total Cost Per Ton.....	\$52.19	\$53.10	\$54.24	\$54.88

	Wilmington	East Liverpool	Trenton
Fuel (gas or oil).....	\$ 3.07	\$ 6.14	\$ 3.65
Power (Published rates).....	2.80	2.85	2.93
Taxes (Corporation Income, Property, and Franchise).....	3.74	1.66	5.53
Raw Materials (Delivered cost).....	33.54	32.88	32.26
Distribution (Transportation costs on finished product).....	12.47	13.85	14.23
Total Cost Per Ton.....	\$55.62	\$57.38	\$58.60

PLANT SITE

VARIABLE COST PER YEAR

Charlotte, North Carolina	\$469,710
Atlanta, Georgia	477,900
Memphis, Tennessee	488,070
Ashville, North Carolina	493,920
Wilmington, North Carolina	500,580
East Liverpool, Ohio	516,420
Trenton, New Jersey	527,400

DETAILS OF PRINCIPAL VARIABLE COST FACTORS FOR A SEMI-PORCELAIN DINNERWARE PLANT LOCATION

FUEL REQUIREMENTS

For the purpose of this study it was assumed that natural gas would be used as fuel at Atlanta, Memphis, and East Liverpool, and that fuel oil would be used at Charlotte, Wilmington, Asheville, and Trenton. In determining the amount of each type of fuel required, the gross heating values were scaled in terms of the heating efficiency (or available B.t.u.), based upon a usual type of modern continuous kiln. More precise estimates of fuel cost will depend upon kind of kiln and other heating installations:

Plant Location	Cost per Million B.t.u. gross
Wilmington (Fuel Oil—6.224 million B.t.u. per Barrel)*.....	\$.16
Memphis (Natural Gas—950 B.t.u. per cu. ft.).....	.17
Trenton, N. J. (Fuel Oil).....	.19
Atlanta, Ga. (Natural Gas—990 B.t.u. per cu. ft.).....	.22
Charlotte (Fuel Oil—6.224 million B.t.u. per barrel)*.....	.25
Asheville (Fuel Oil—6.224 million B.t.u. per barrel)*.....	.27
East Liverpool (Natural Gas—1100 B.t.u. per cu. ft.).....	.32

*Based on: 1 barrel = 42 gallons; 1 gal. = 7.8 lbs.; 1 lb. = 19,000 B. t. u.

The cost of gas at East Liverpool, Atlanta, and Memphis was determined from the present published rate per thousand cubic feet. The current published rate for Bunker "C" fuel oil at Wilmington is \$1.60 per barrel. The pre-war price of fuel oil at the same location was \$0.95 per barrel. It is believed that for post-war estimates a figure of \$1.00 per barrel for fuel oil delivered at Wilmington is reasonable. Actually, fuel oil prices may be lower after the war than the pre-war prices since more shipping space will be available.

Post-war fuel oil prices from the pipeline at Charlotte are not known, but it is reasonable to assume that the price will be competitive with tanker-rail movement. (By tanker to Charleston, South Carolina, and by rail from Charleston to Charlotte.) The cost based on such a movement would be approximately \$1.54 per barrel. (95 cents per barrel at Charleston plus 18 cents per 100 pounds for rail movement to Charlotte and 23 cents per 100 pounds for rail movement to Asheville.)

Assuming that the plant will use 14.4 billion B.t.u. each month, the resulting fuel costs would be:

Plant Site	Cost per million B.t.u.	Fuel cost per ton of finished product	Annual Fuel Cost
Wilmington	\$.16	\$ 3.07	\$27,648
Memphis .....	.17	3.26	29,376
Trenton .....	.19	3.65	32,832
Atlanta .....	.22	4.30	38,706
Charlotte .....	.25	4.80	43,200
Asheville .....	.27*	5.18	46,656
East Liverpool .....	.32	6.14	55,296

NOTE: Costs per million B.t.u. are given in nearest cents. Where natural gas is used fuel cost per ton and annual fuel costs are based upon published schedule of rates which are on a sliding scale similar to elective rate charges.

*If it is desired to determine production costs at Asheville based on natural gas instead of fuel oil, then a cost of 24 cents per million B.t.u. can be used which will give \$4.61 as fuel cost per ton of finished product and \$41,472 for annual fuel cost. Although natural gas is not now available at Asheville there is a line proposed by the Tennessee Gas & Transmission Company (now owned by the Chicago Corporation), or by the Kentucky-Tennessee Natural Gas Company to supply that city. The Chicago Corporation's main line is now under construction, and they plan to serve post-war markets in Tennessee and western North Carolina.

POWER REQUIREMENTS

For producing 30 tons of dinnerware per day it is estimated that the plant would demand 430 KVA and have an energy requirement of 158,000 KWH per month. The power costs based on published rates (which include various "sliding rates," surcharges, etc.) are:

Plant Site	Approximate rates mills per KWH	Power cost per ton of finished product	Annual power cost
Memphis	7	\$1.40	\$12,600.00
Charlotte	9	1.87	16,788.60
Asheville	10	2.18	19,635.84
Atlanta	12	2.49	22,393.92
Wilmington	13	2.80	25,195.20
East Liverpool	14	2.85	25,638.00
Trenton	14	2.93	26,334.40

TAXES

Although there are several taxes which a manufacturing establishment must pay, only property, corporation income, and franchise taxes are included in this study, since they are the principal ones which influence plant location.

City, school and county, and state taxes are included to present the maximum weight that taxation might bear upon the plant

location. Substantial savings would apparently be available if the plant were located outside the city limits. The states of Ohio and North Carolina do not have a general state property tax.

RECENT CITY, COUNTY AND STATE PROPERTY TAX RATES*

(In dollars per \$100 of assessed valuation)

	Year	City	School & County	State
Trenton, Mercer Co., N. J.....	1942	\$1.95	\$2.52	.29
East Liverpool, Columbiana Co., Ohio	1939-1940	0.62	1.18	0
Charlotte, Mecklenburg Co., N. C.....	1942	1.10	1.12	0
Wilmington, New Hanover Co., N. C.	1942	1.40	0.75	0
Asheville, Buncombe Co., N. C.....	1942	1.53	1.43	0
Memphis, Shelby Co., Tennessee.....	1941-1942	2.10	.87	.08
Atlanta, Fulton Co., Georgia.....	1942	1.60**	1.50	.50

(**1.60 includes 1.12 city and .48 school.)

PROBABLE FRACTION OF ASSESSMENT*

(Percentage of Total Investment)

	City	County	State
Trenton	85%	85%	85%
East Liverpool	70%	60%	0
Charlotte	67%	67%	0
Wilmington	85%	85%	0
Asheville	75%	75%	0
Memphis	75%	100%	100%
Atlanta	59%	48%	48%

*Source: Moody's Governments and Municipals, 1943; Tennessee Taxpayers Association Reports; Corporation Tax Service, Commerce Clearing House, Inc., Loose Leaf Service Division of the Corporation Trust Co.

ANNUAL PROPERTY TAX

	Annual Property Tax for \$1,200,000 Investment
East Liverpool	\$13,704
Charlotte	17,849
Wilmington	21,930
Atlanta	22,848
Asheville	26,640
Memphis	30,300
Trenton	48,552

Since the plant would most likely be operated by a corporation, a net income tax of 3.75 per cent would have to be paid in Tennessee, 5½ per cent in Georgia, and 6 per cent in North Carolina. There is no net income corporation tax for the states of Ohio and New Jersey. Total annual tax and tax per ton of finished product will therefore be as follows, assuming a net income of \$160,000 or 8 per cent of total sales.

Plant Site	Annual Property Tax*	Annual Income Tax	Annual Franchise Tax	Total Annual Prop., Income & Franchise Tax	Tax Per Ton of Finished Product
East Liverpool, Ohio.....	\$13,704	0	\$1,200	\$14,904	\$1.66
Charlotte, N. C.....	17,849	\$9,600	2,100	29,549	3.28
Atlanta, Ga.	22,848	8,800	750	32,398	3.60
Wilmington, N. C.....	21,930	9,600	2,100	33,630	3.74
Memphis, Tenn.	30,300	6,000	1,950	38,250	4.29
Asheville, N. C.....	26,640	9,600	2,100	38,340	4.29
Trenton, N. J.....	48,552	0	1,200	49,752	5.53

(*For \$1,200,000 Investment.)

From the above figures it would appear that an Ohio location would be advantageous from the point of view of taxes alone. This is true only for direct corporate taxes. It should be noted that from the viewpoint of the stockholders of a corporation the same advantages would not accrue. In Ohio shares of stock owned are taxable at 5 per cent of the earnings thereon under the intangible property tax provisions, and such tax may be applied to the pro-rata share of the earnings as well as to dividends unless it can be shown that any accumulation of earned surplus by the corporation is necessary. In North Carolina on the other hand dividends from a corporation are deductible for personal income tax purposes, if the corporation has paid an income tax on the earnings from which the dividends are received.

In Georgia, the next nearest tax bracket, dividends received are taxable under the personal income tax law at rates graduated from 1 per cent to 7 per cent.

Two other factors should be noted in connection with the question of tax differentials. One is the fact that both local property taxes and state taxes in North Carolina are at their present level because of debts incurred in the period of rapid public improvements in the 1920's. The present policy is one of debt reduction, and as debts are reduced the revenue needs should decline proportionately. The importance of this factor may be indicated by the fact that in 1942 41 per cent of the property taxes levied in Wilmington, N. C. and 45 per cent levied in Asheville, N. C. for both city and county purposes were levied for debt service charges. There is now a constitutional limitation on the authority of the state to create debts, and through the local government commission of the state government rigid supervision is exercised over the creation of debt by local governments.

The other factor is that North Carolina has attained a high level of service in certain aspects of government which involve

the greater portion of state expenditures. The operation of the public school system is state supported except for capital improvements and certain curricula supplements, and provision is already made for a nine months, twelve grade, system in all schools in the state. There is a similar high standard for higher education. All roads, including local roads, are both constructed and maintained by the State Highway Department. There will thus not be the same need for further increases in revenues as may inevitably be expected in states that have not as yet attained a similar level of public service government.

RAW MATERIALS

Only present producing sources were used in determining delivered raw materials costs. F.o.b. prices for the raw materials were assumed to be the same at all producing points. These producing points or points of origin for the raw materials are given in Table III, page 28.

It was estimated that each ton of dinnerware produced would require 1.1666 tons of raw materials as shipped, the weights of these materials per ton of finished product to be distributed as follows:

Raw Materials	Weight in tons per ton of finished product
Potters Flint	0.3420
Ball Clay	0.1794
Primary Kaolin	0.1678
Sedimentary Kaolin	0.1043
Feldspar	0.1260
Talc	0.0471
Glaze and Decorating Materials	0.2000
Total	1.1666

North Carolina contains important reserves of raw material suitable for the manufacture of high grade chinaware and porcelain. Kaolin, feldspar, and quartz are produced in important amounts and shipped either crude or ground and concentrated to manufacturing plants in distant states. The only other products needed for chinaware industry in the State—ball clay and sedimentary kaolin—are found in nearby states. The talc, which constitutes a small portion of the body, will have to be imported from upper New York state. Ball clay is found in the same latitude a short distance west in Tennessee while sedimentary kaolin comes from South Carolina, Georgia, and Florida to the south and often crosses North Carolina on its way to market.

For many years North Carolina has been the leading state in the production of residual kaolin. Detailed field work by engineers and geologists indicates that in Avery, Mitchell, and Yancey Counties there are deposits containing 51,000,000 tons of crude kaolin from which can be produced 3,500,000 to 5,000,000 tons of refined kaolin. Research work carried out jointly by the Tennessee Valley Authority and the U. S. Bureau of Mines demonstrates that high grade refined kaolin, finer grained, more plastic and stronger than English clays could be prepared. Modern plants are now supplying a blended kaolin of uniform quality to the trade which is equal to the best imported kaolin. In addition to the reserves in Avery, Mitchell, and Yancey Counties numerous other deposits of kaolin occur in the upper Piedmont and Mountain counties.

The following analyses indicate the high quality of the refined kaolin now being produced:

SiO ₂	47.94	46.18
Al ₂ O ₃	37.02	38.38
Fe ₂ O ₃	0.61	0.57
TiO ₂	0.02	0.04
CaO	0.30	0.37
MgO	0.07	0.42
K ₂ O	1.25	0.58
Na ₂ O	0.06	0.10
ZrO ₂		0.08
Ignition Loss	13.03	13.28
Total	100.29	100.00

During the past decade the State's production of feldspar has averaged 82,500 tons annually. Large reserves of feldspar are known in the Mountain Section and for twenty-five years North Carolina has been the leading state in the production of feldspar. Modern grinding mills are in operation and high grade potash, soda and blended feldspar are available to the trade.

An abundance of high grade quartz is found associated with feldspar in the western part of the State. The quality of this quartz was recognized some years ago when it was selected for the manufacture of the world's largest telescope lens. Quartz in the crude form or ground or crushed is available in any amounts needed.

Of the raw materials for the body only ball clay and sedimentary kaolin will have to come from outside the State. The other

body materials, residual kaolin, feldspar, and quartz are produced and processed in the State as high grade raw materials in ample quantities to supply any market demands.

DISTRIBUTION

It was assumed that in addition to utilizing the local kaolins, feldspar and flint, one of the principal reasons for establishing a dinnerware plant in North Carolina would be to serve the southeastern market, a market which is now served almost entirely from plants outside of this region. Consequently the distribution of the finished product is based upon representative southeastern points according to the percentage population and retail trade of the corresponding states. The representative points selected were those cities having the highest retail trade within each state. It was assumed that shipping costs based on these destination points would suffice for estimating purposes.

	1940 State Population	State Retail Trade 1939	Percentage Market Ratio*	Distribution of Finished Ware (tons)
Birmingham, Ala.	2,833,000	\$435,973,000	9	810
Miami, Fla.	1,897,000	614,464,000	8	720
Atlanta, Ga.	3,124,000	624,765,000	14	1260
Louisville, Ky.	2,846,000	520,135,000	11	990
New Orleans, La.	2,364,000	486,250,000	8	720
Jackson, Miss.	2,184,000	282,440,000	4	360
Charlotte, N. C.	3,572,000	633,240,000	16	1440
Columbia, S. C.	1,900,000	332,224,000	5	450
Memphis, Tenn.	2,916,000	606,489,000	13	1170
Richmond, Va.	2,678,000	628,172,000	12	1080
Total.....	26,314,000	\$5,164,152,000	100	9000

*This percentage ratio was determined by multiplying the percentage population by the percentage retail trade distribution by states.

Transportation costs for distribution of the ware are given in Table IV, page 29, and freight rates upon which these costs are based are given in Table V, page 31.

LABOR SUPPLY

A large number of industries requiring a high grade of skilled and semi-skilled workers operate successfully in North Carolina. An evidence of this ability among workers in this state is indicated in the fact that North Carolina now leads the Southeast in value added by manufacture.

Further evidence of the acceptable characteristics of North Carolina workers, 99.6 per cent of which are native born, and their adaptability to a new industry is found in expressions from manufacturers in the state cited below.

A manufacturer, who had recently established a plant in North Carolina, wrote:

"We are now employing some 300 persons, running two shifts. We are particularly pleased as to the type of labor we have been able to obtain here. Although we had to train them and they have been at work less than two months, the products being turned out are of a high grade and uniform quality."

Another manufacturer employing a very large number of workers, as recently as December 20, 1943, wrote:

"We found at the time we organized our company and started our production here that this mountain population showed a remarkable keenness and adaptability for industrial work.

"We found them in general,—to be alert, reliable, steady and loyal."

A third manufacturer also employing a large group, under date of December 27, 1943, wrote:

"It was necessary for us to employ inexperienced people and train them. We found that these people were easily trained and showed a high degree of enthusiasm and interest in their work. They have proved to be efficient workmen, steady and reliable.

"We have had practically no absentee problem. All our workers are exceptionally loyal and are vitally interested in the welfare of our company and organization.

"We would like to say we have been well pleased with the high type labor and with the manner in which they have learned new skills and have been able to adapt themselves to a new industry."

If labor requirements are considered as immediate needs the records of the War Manpower Commission show a current limited availability in the several communities considered. However, normal and estimated post-war conditions indicate an ample supply of labor.

More detailed and specific labor information may be secured upon request to the Department of Conservation and Development, Division of Commerce and Industry, Education Building, Raleigh, North Carolina.

MARKETS FOR DINNERWARE IN THE SOUTHEAST

There are several indices by which markets may be measured for any given area. Among the more important of these are population, retail trade and income.

ECONOMIC OPPORTUNITIES FOR PRODUCING
SEMI-PORCELAIN DINNERWARE IN NORTH CAROLINA

Market Indices	Southeast	United States	Percent S. E. is of U. S.
Population (1940)	26,312,442	131,669,275	19.98
Retail trade (1939).....	\$5,164,152,000	\$42,023,818,000	12.29
Income (1939)	\$7,993,000,000	\$69,378,000,000	11.52

The Census of Manufacturers, 1939, reports the following value of whiteware and hotel china produced in the United States for the year 1939:

	Value
Whiteware	\$27,800,677
Hotel China	9,359,660
Total.....	\$37,160,337

Included in the census figures for whiteware are values for semi-vitreous china, types of earthenware and semi-porcelain ware. The major portion of this production is dinnerware.

**MARKET FOR WHITEWARE AND HOTEL CHINA IN THE
SOUTHEAST**

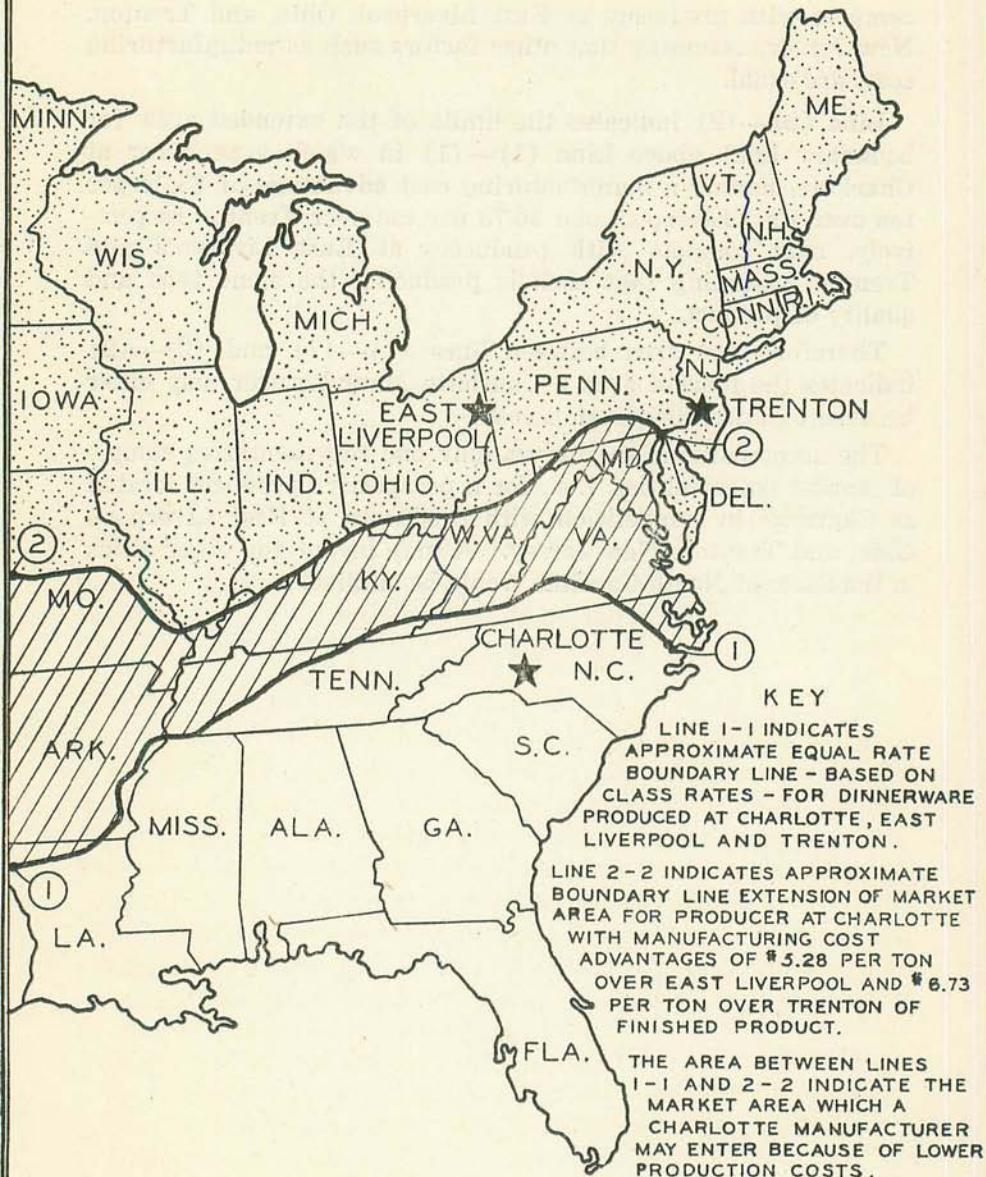
	Based on Population	Based on Retail trade	Based on Income
Whiteware	\$5,554,575	\$3,416,703	\$3,202,638
Hotel China	\$1,870,060	\$1,150,302	\$1,078,233
Total Market.....	\$7,424,635	\$4,567,005	\$4,280,871

While population does measure the markets for certain types of products it is felt that income and retail trade would be better indices of consumption for dinnerware. It is evident from the above figures that the southeastern market could support a dinnerware plant in North Carolina of the size proposed in this study, since practically no production is resident. In addition to the southeastern market, a plant in North Carolina might supply markets in the southwest, and even in the north and northeast depending, of course, upon the quality and type of product manufactured. There are at present two producers of dinnerware in the southeast, but their combined production is relatively small in proportion to the present and potential markets, and neither produce the low-cost type of dinnerware contemplated in this report.

The accompanying map, page 23, shows the potential market area of a dinnerware manufacturer at Charlotte, North Carolina, based on the transportation costs of the finished product and in competition with manufacturers at two of the present dinnerware production centers.

Line (1)—(1) designates the approximate northern boundary of the distribution area in which the producer at Charlotte may

NORTH CAROLINA DEPARTMENT OF CONSERVATION AND DEVELOPMENT,
DIVISION OF COMMERCE AND INDUSTRY.



POTENTIAL MARKET AREAS BASED ON
TRANSPORTATION COST OF FINISHED
PRODUCT..... SEMI-PORCELAIN DINNERWARE
[CHINAWARE, EARTHENWARE OR PORCELAINWARE]
IN CARLOADS.

compete with producers at East Liverpool, Ohio, and Trenton, New Jersey, assuming that other factors such as manufacturing costs are equal.

Line (2)—(2) indicates the limits of the extended area (or boundary line) above Line (1)—(1) in which a producer at Charlotte, having a manufacturing cost advantage of \$5.28 per ton over East Liverpool and \$6.73 per ton over Trenton respectively, may compete with producers at East Liverpool and Trenton, assuming that each is producing the same type and quality of product.

Therefore, the area between lines (1)—(1) and (2)—(2) indicates the market area a Charlotte Manufacturer may enter because of lower production costs.

The accompanying map gives only one representative sample of market potentialities, i. e., for a prospective producer located at Charlotte in competition with producers at East Liverpool, Ohio, and Trenton, New Jersey. A map layout for other cities in the State of North Carolina would be similar.

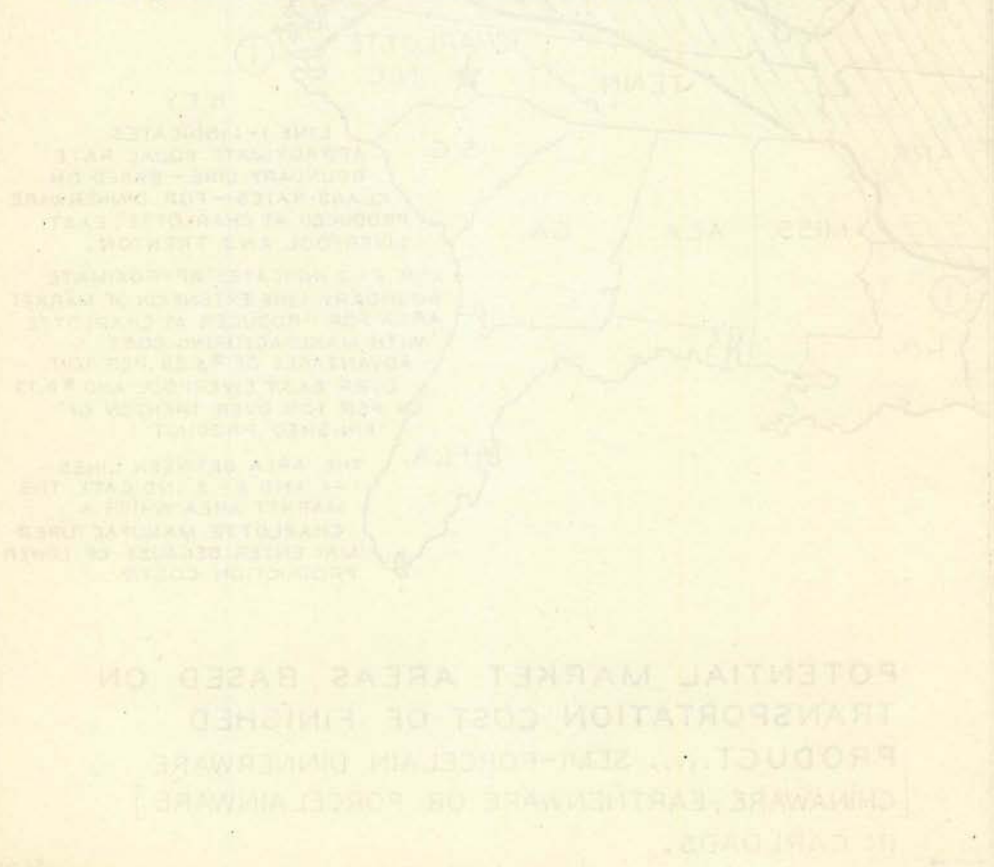


TABLE II
RAW MATERIAL COST PER TON OF FINISHED PRODUCT

	Proportional Body Com- position	F. O. B. Price Per Ton	CHARLOTTE		
			Freight Rate	Delivered Cost Per Ton	Cost Per Ton of Fin. Prod.
Potters Flint.....	0.3420	\$14.00	\$ 2.75	\$16.75	\$ 5.73
Ball Clay.....	0.1794	17.00	4.50	21.50	3.86
Primary Kaolin.....	0.1678	25.00	2.53	27.53	4.62
Sedimentary Kaolin.....	0.1043	14.00	3.66	17.66	1.84
Feldspar.....	0.1260	16.00	2.75	18.75	2.36
Talc.....	0.0471	13.00	7.00	20.00	0.94
Glaze and Decorating Materials.....	0.2000	55.00	9.40	64.40	12.88
					\$32.23
			EAST LIVERPOOL		
Potters Flint.....	0.3420	\$14.00	\$ 2.30	\$16.30	\$ 5.57
Ball Clay.....	0.1794	17.00	5.28	22.28	4.00
Primary Kaolin.....	0.1678	25.00	6.60	31.60	5.30
Sedimentary Kaolin.....	0.1043	14.00	7.26	21.26	2.22
Feldspar.....	0.1260	16.00	5.60	21.60	2.72
Talc.....	0.0471	13.00	5.40	18.40	0.87
Glaze and Decorating Materials.....	0.2000	55.00	6.00	61.00	12.20
					\$32.88
			MEMPHIS		
Potters Flint.....	0.3420	\$14.00	\$ 4.87	\$18.87	\$6.45
Ball Clay.....	0.1794	17.00	1.40	18.40	3.30
Primary Kaolin.....	0.1678	25.00	4.71	29.71	4.99
Sedimentary Kaolin.....	0.1043	14.00	3.47	17.47	1.82
Feldspar.....	0.1260	16.00	4.87	20.87	2.63
Talc.....	0.0471	13.00	8.00	21.00	0.99
Glaze and Decorating Materials.....	0.2000	55.00	14.60	69.60	13.92
					\$34.10

TABLE II (Con.)
RAW MATERIAL COST PER TON OF FINISHED PRODUCT

	Proportional Body Com- position	F. O. B. Price Per Ton	WILMINGTON		
			Freight Rate	Delivered Cost Per Ton	Cost Per Ton of Fin Prod.
Potters Flint.....	0.3420	\$14.00	\$ 4.21	\$18.21	\$ 6.23
Ball Clay.....	0.1794	17.00	6.40	23.40	4.20
Primary Kaolin.....	0.1678	25.00	4.00	29.00	4.87
Sedimentary Kaolin.....	0.1043	14.00	4.62	18.62	1.94
Fedspar.....	0.1260	16.00	4.21	20.21	2.55
Talc.....	0.0471	13.00	7.20	20.20	0.95
Glaze and Decorating Materials.....	0.2000	55.00	9.40	64.00	12.80
					\$33.54

Note: See Table III, page 28, for freight rates upon which the raw material assembly costs are based.

TABLE III
FREIGHT RATES ON RAW MATERIALS, IN CARLOADS
(Rates stated in cents per ton of 2,000 pounds)

		Charlotte	Asheville	Trenton	East Liverpool
Potters Flint.....	Erwin, Tenn., and Mapleton, Pa.....	275 0	235 0	0 286 ^b	0 230 ^b
Ball Clay.....	McKenzie, Tenn., & Clayburn, Ky.	450*	450	70 ^d	528*
Primary Kaolin.....	Spruce Pine, N. C.....	253*	200	540	660*
Sedimentary Kaolin	Gordon, Ga.....	366	418	660	726*
Feldspar.....	Erwin, Tenn., and Keene, N. H.....	275 0	235* 0	580 400 ^f	560 ^c 0
Talc.....	Emeryville, N. Y.....	700**	780**	500	540 ^d
Glaze & Decorating Materials.....	Wilmington, Del.	940 ^a	1,060 ^a	280	600 ^e
		Atlanta	Wilm- ington	Memphis	
Potters Flint.....	Erwin, Tenn. and Mapleton, Pa.....	380 0	421 0	487 0	
Ball Clay.....	McKenzie, Tenn., and Clayburn, Ky.....	310	640	140*	
Primary Kaolin.....	Spruce Pine, N. C.....	413	400	471*	
Sedimentary Kaolin.....	Gordon, Ga.....	190	462*	347*	
Feldspar.....	Erwin, Tenn., and Keene, N. H.....	380 0	421 0	487 0	
Talc.....	Emeryville, N. Y.....	880	720**	800**	
Glaze and Decorating Materials.....	Wilmington, Del.....	1,240	940 ^a	1,460 ^a	

*Present rate (published commodity rate).

**These rates reflect column 16-J (the basis applicable on talc from Trunk-Line to Southern Territory).

^aRates reflect 8th class (the basis applicable to paints and paint materials, dry from Truck-Line to Southern Territory).

^bEstimated rate, constructed in conformity with the basis prescribed by the I. C. C. for application on ground sand in Official Territory; from Mapleton, Pa., to East Liverpool.

^cColumn 16-J, the present basis for rates on feldspar from Erwin to points in Official Territory.

^dClass 22½ (22½ per cent of the applicable first-class rate), the general basis on talc within Official Territory.

^eClass 27½ (27½ per cent of the applicable first-class rates), the basis on paints and paint materials, dry, within Official Territory.

^fClass 21 (21 per cent of the applicable first-class rate), the basis on feldspar within Official Territory.

All other rates shown are estimated rates based on published commodity rates applying on the corresponding items from the origins shown to various points in Southern Territory. NOTE. Rates in this statement do not include the emergency increases (Ex Parte 148) which are due to expire 6 months after the end of the war.

TABLE IV
TRANSPORTATION COST PER TON OF FINISHED SEMI-PORCELAIN
DINNERWARE

(Based on Plant Producing 9,000 Tons Per Year)

DESTINATION POINTS	Tons Shipped	ATLANTA		CHARLOTTE	
		Fgt. Rate Per Ton	Annual Cost of Shipment	Fgt. Rate Per Ton	Annual Cost of Shipment
Birmingham, Ala.....	810	\$ 7.20	\$ 5,832	\$11.40	\$ 9,234
Miami, Fla.....	720	16.20	11,664	16.80	12,096
Atlanta, Ga.....	1,260	0	0	8.80	11,088
Louisville, Ky.....	990	11.60	11,484	12.60	12,474
New Orleans, La.....	720	12.20	8,784	15.20	10,944
Jackson, Miss.....	360	11.20	4,032	14.20	5,112
Charlotte, N. C.....	1,440	8.80	12,672	0	0
Columbia, S. C.....	450	8.40	3,780	5.80	2,610
Memphis, Tenn.....	1,170	11.20	13,104	14.20	16,614
Richmond, Va.....	1,080	12.80	13,824	9.20	9,936
	9,000		\$85,176		\$90,108
Weighted average cost per ton..			\$ 9.46		\$10.01

DESTINATION POINTS	Tons Shipped	ASHEVILLE		MEMPHIS	
		Fgt. Rate Per Ton	Annual Cost of Shipment	Fgt. Rate Per Ton	Annual Cost of Shipment
Birmingham, Ala.....	810	\$11.00	\$ 8,910	\$ 8.80	\$ 7,128
Miami, Fla.....	720	17.40	12,528	19.40	13,968
Atlanta, Ga.....	1,260	8.80	11,088	11.20	14,112
Louisville, Ky.....	990	11.00	10,890	10.40	10,296
New Orleans, La.....	720	14.80	10,656	11.00	7,920
Jackson, Miss.....	360	13.80	4,968	8.20	2,952
Charlotte, N. C.....	1,440	6.80	9,792	14.20	20,448
Columbia, S. C.....	450	7.20	3,240	14.00	6,300
Memphis, Tennessee.....	1,170	12.80	14,976	0	0
Richmond, Va.....	1,080	10.60	11,448	16.20	17,496
	9,000		\$98,496		\$100,620
Weighted average cost per ton..			\$10.94		\$ 11.18

TABLE IV (Con.)
 TRANSPORTATION COST PER TON OF FINISHED SEMI-PORCELAIN
 DINNERWARE
 (Based on Plant Producing 9,000 Tons Per Year)

DESTINATION POINTS	Tons Shipped	WILMINGTON		EAST LIVERPOOL	
		Fgt. rate Per Ton	Annual Cost of Shipment	Fgt. Rate Per Ton	Annual Cost of Shipment
Birmingham, Ala.....	810	\$13.20	\$10,692	\$15.40	\$ 12,474
Miami, Fla.....	720	17.20	12,384	21.60	15,552
Atlanta, Ga.....	1,260	11.40	14,364	16.00	20,160
Louisville, Ky.....	990	14.60	14,454	7.60	7,524
New Orleans, La.....	720	16.80	12,096	19.20	13,824
Jackson, Miss.....	360	16.00	5,760	17.00	6,120
Charlotte, N. C.....	1,440	7.60	10,944	12.00	17,280
Columbia, S. C.....	450	7.80	3,510	14.40	6,480
Memphis, Tennessee.....	1,170	16.00	18,720	14.00	16,380
Richmond, Va.....	1,080	8.60	9,288	8.20	8,856
	9,000		\$112,212		\$124,650
Weighted average cost per ton..			\$12.47		\$13.85

DESTINATION POINTS	Tons Shipped	TRENTON	
		Fgt. Rate Per Ton	Annual Cost of Shipment
Birmingham, Ala.....	810	\$16.60	\$13,446
Miami, Fla.....	720	20.20	14,544
Atlanta, Ga.....	1,206	14.80	18,648
Louisville, Ky.....	990	11.00	10,890
New Orleans, La.....	720	19.40	13,968
Jackson, Miss.....	360	18.60	6,696
Charlotte, N. C.....	1,440	11.20	16,128
Columbia, S. C.....	450	13.00	5,850
Memphis, Tennessee.....	1,170	17.60	20,592
Richmond, Va.....	1,080	6.80	7,344
	9,000		\$128,106
Weighted average cost per ton.....			\$14.23

NOTE: See Table V, page 31 for freight rates upon which these transportation costs are based.

TABLE V
RAILROAD FREIGHT RATES ON CHINAWARE, EARTHENWARE, OR
PORCELAINWARE, IN CARLOADS
(Rates stated in cents per ton of 2,000 pounds)

FROM	TO			
	Atlanta	Charlotte	Asheville*	Memphis*
Birmingham, Ala.....	720	1,140	1,100	880
Miami, Fla.....	1,620	1,680	1,740	1,940
Atlanta, Ga.....	0	880	880	1,120
Louisville, Ky.....	1,160	1,260	1,100	1,040
New Orleans, La.....	1,220	1,520	1,480	1,100
Jackson, Miss.....	1,120	1,420	1,380	820
Charlotte, N. C.....	880	0	680	1,420
Columbia, S. C.....	840	580	720	1,400
Memphis, Tenn.....	1,120	1,420	1,280	0
Richmond, Va.....	1,280	920	1,060	1,620

FROM	TO		
	Wilmington	East Liverpool*	Trenton
Birmingham, Ala.....	1,320	1,540	1,660
Miami, Fla.....	1,720	2,160	2,020
Atlanta, Ga.....	1,140	1,600	1,480
Louisville, Ky.....	1,460	**760	1,100
New Orleans, La.....	1,680	1,920	1,940
Jackson, Miss.....	1,600	1,700	1,860
Charlotte, N. C.....	760	1,200	1,120
Columbia, S. C.....	780	1,440	1,300
Memphis, Tenn.....	1,600	1,400	1,760
Richmond, Va.....	860	**820	680

*Except as otherwise indicated, the rates in this statement reflect seventh class (Southern classification), the basis applicable on chinaware within Southern Territory and from Official to Southern Territory.

**Fifth class (Official classification), the basis applicable on chinaware within Official Territory.

NOTE: The rates in this statement do not include the emergency increases (Ex Parte 148) which are scheduled to expire six months after the end of the war.