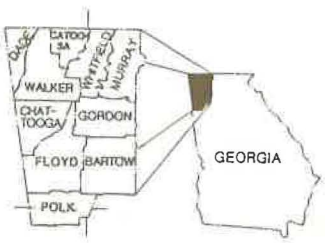
CERAMIC AND STRUCTURAL CLAYS, SHALES AND SLATES OF BARTOW COUNTY, GEORGIA

BRUCE J. O'CONNOR



DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

INFORMATION CIRCULAR 64

COVER PHOTO: Universal Ceramics' pit in Conasauga shale on the west side of county road S-829 south of Adairsville. (Map location no. Btw. 67-3 is from the same general area.)

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By

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Information Circular 64

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

INTRODUCTION

This report presents a compilation of all available published and unpublished ceramic firing tests and related analytical data on samples from Bartow County, Georgia. It provides information on mined and/or undeveloped clays, shales and related materials, and is intended for use by geologists, engineers and members of the general public. The report should aid in the exploration for deposits of ceramic raw material with economic potential for future development. This information may also be of use to those who wish to obtain information on the potential use of particular deposits at specific locations.

Tests by the U.S. Bureau of Mines, subsequently referred to as USBM, were performed by the Norris Metallurgy Research Laboratory, Norris, Tennessee and the Tuscaloosa Research Center, Tuscaloosa, Alabama under cooperative agreements with the Georgia Geologic Survey and its predecessors (i.e., the Earth and Water Division of the Ga. Department of Natural Resources; the Department of Mines, Mining and Geology and the Geological Survey of Georgia). Many of the firing tests were performed on samples collected by former staff members of the Georgia Geologic Survey (and its predecessors) during several uncompleted and unpublished studies. These include work by Bentley (1964), Smith (1968?) and Tadkod (1980). Additional unpublished data presented in this compilation include work by TVA (see Butts and Gildersleeve, 1948, p. 124 and 125). Published data include studies by the following authors: Spencer (1893, p. 217 to 287; chemical analyses only), Veatch (1909, p. 272 to 388), Smith (1931, p. 241 to 276), Butts and Gildersleeve (1948, p. 124 and 125) and Hollenbeck and Tyrrell (1969, p. 17 to 20).

Regardless of the source, all of the ceramic firing testing data presented in this report are based on laboratory tests that are preliminary in nature and will not suffice for plant or process design. They do not preclude the use of the materials in mixes (Liles and Heystek, 1977, p. 5).

ACKNOWLEDGEMENTS

The author gratefully acknowledges the help of many individuals during the preparation of this report and the work of many who contributed to the earlier, unpublished studies included here. The cooperative work of the U.S. Bureau of Mines forms the main data base of this study. During the last several years Robert D. Thomson, Chief of the Eastern Field Operations Center, Pittsburgh, Pennsylvannia, was responsible for administering the funding of costs incurred by the USBM. Others in that office who helped coordinate the program were Charles T. Chislaghi and Bradford B. Williams. Since 1966 M.E. Tyrrell, H. Heystek, and A.V. Petty, Ceramic Engineers, and Kenneth J. Liles, Research Chemist, planned and supervised the test work done at the USBM Tuscaloosa Research Center in Tuscaloosa, Alabama. Prior to 1966 this test work was supervised by ceramists H. Wilson, G.S. Skinner, T.A. Klinefelter, H.P. Hamlin and M.V. Denny at the former Norris Metallurgy Research Laboratory in Norris, Tennessee. Tests by the Tennessee Valley Authority were conducted under the supervision of H.S. Rankin and M.K. Banks at the Mineral Research Laboratory on the campus of North Carolina State College, Asheville, North Carolina, using samples collected by S.D. Broadhurst. Additional tests were conducted by professors W.C. Hansard, L. Mitchell, and J.F. Benzel at the Department of Ceramic Engineering, Georgia Institute of Technology, Atlanta, Georgia. The majority of the unpublished tests were performed on samples collected by former staff geologists of the Georgia Geologic Survey, predominantly by J.W. Smith, A.S. Furcron, R.D. Bentley, N.K. Olsen, D. Ray, M.A. Tadkod, and G. Peyton and assisted by C.W. Cressler of the U.S. Geological Survey. N.K. Olsen and C.W. Cressler also have

provided the author with valuable advice and suggestions regarding sample locations and past studies. The advice and encouragement of my colleagues on the staff of the Georgia Geologic Survey are greatly appreciated. However, the contents of this report and any errors of omission or commission therein are the sole responsibility of the author.

LOCATION OF STUDY AREA

Bartow County is located at the southeastern corner of the Valley and Ridge province of northwest Georgia (Fig. 1). Although only one company is currently mining clay and shale in the county, numerous operations have been active here in the past (Tables 1 and 2). The most abundant ceramic raw materials in the county are the shales and residual clays derived from the Conasauga Group; however, other units such as the Rome Formation shales and residual clays of the Knox Group are locally well developed. The general nature of these and other geologic units which occur in the county are summarized on Table 3.

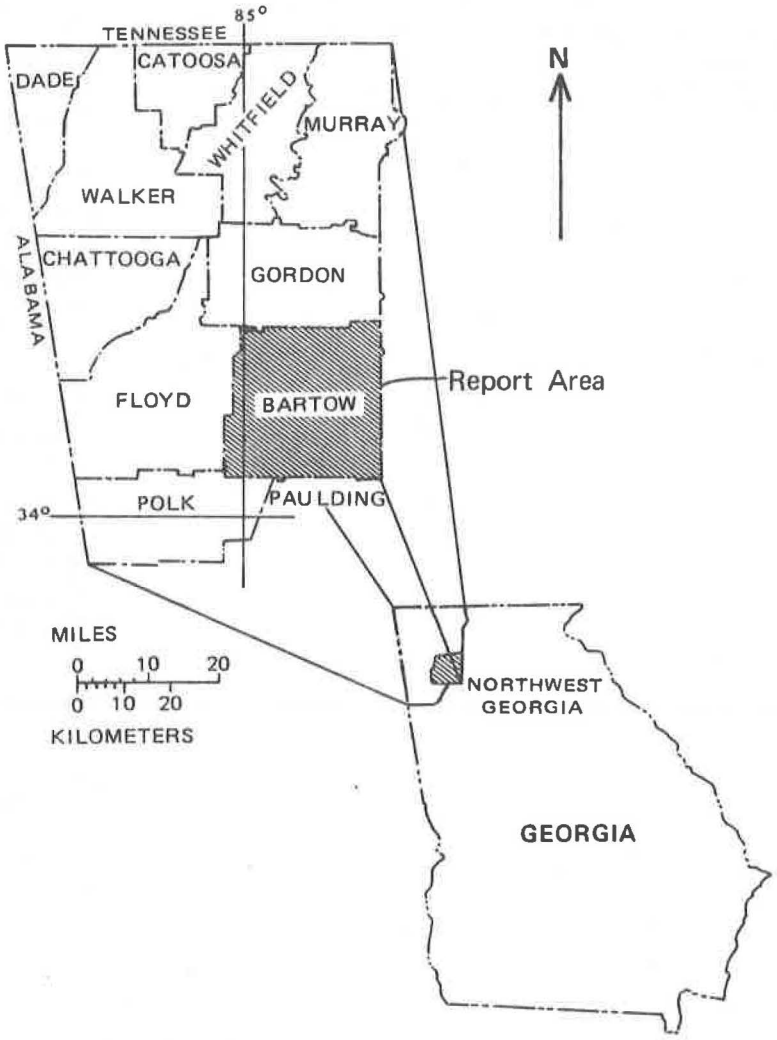


FIGURE 1

LOCATION OF BARTOW COUNTY REPORT AREA

(after Cressler, and others, 1976)

TABLE 1

Active Clay and Shale Mines and Pits in Bartow County, Georgia *

COMPANY	CONTACT	PIT LOCATION
Universal Ceramics, Inc. P.O. Box 483 Adairsville, GA 30103	Loring H. Kiker Ex. V. President (404) 773-3113	Pit no. 1 and tile plant: northwest side of Adairsville, north of Ga. Hwy. 140, west of Ga. Hwy. 3/U.S. Hwy. 41, just west of the L & N Railroad, and east of Oothkalooga Creek. (5 acres permitted.) Pit no. 2: south-southwest of Adairsville on the west side of county road S-829, west of Oothalooga Creek and north of Penn Hollow. (4 acres permitted.)

* After Kline and O'Connor, 1981, p. 11.

TABLE 2

Summary of 20th Century Clay, Shale and Slate Mines and Companies in Bartow County, Georgia

Adairsville Brick Co. (plant built in 1906 or 1907)*, Adairsville plant and pits: Common and face brick from Conasauga Group shale. Sold to Georgia Brick & Tile Co. in 1910 (Smith, 1931, No. 61, p. 243).

Atlanta Vitrified Brick Co. (1914), Emerson plant and pits: Unsuccessful vitrified brick (paving and building) from weathered graphite schist (Smith, 1931, No. 75, p. 274). Ceramic test: Btw.31S-75.

Cartersville Brick Co. (1908?)*, Cartersville pit: Common brick (Veatch, 1909, p. 289-290; Butts and Gildersleeve, 1948, p. 97). Ceramic test: Btw. 09V-4.

Fairmount Mining Co., Inc. (1979?)*, Flexatile quarry: Slate (crushed). Formerly Flexatile Slate Mine.

Flexatile Slate Mine (1909), Flexatile quarry: Slate. Ceramic test: Btw.46-4 (Bentley, and others, 1966, p. 15).

Funkhouser Mills (1927), Flexatile quarry: Slate (crushed) roofing granules (Hansard, and others, 1934, #14; Bentley, and others, 1966, p. 14-15). Ceramic test: Btw. 66-1 and 2.

GAF Corp. (1972)*, Fairmount-Flexatile quarry: Slate (crushed). (Formerly Flexatile Slate Mine).

Georgia Art Pottery (1937?)*, Cartersville: Pottery and stoneware (Butts and Gildersleeve, 1948, map location No. 42).

Georgia Brick & Tile Co. (1910?)*, Adairsville plant and pits; brick and tile. Formerly the Adairsville Brick Co., sold to the B.M. Hood Co., 1924 (Smith, 1931, No. 61, p. 243).

Georgia Green Slate Co. (1909), quarry for roofing slate operated until 1911 or 1912 and part of 1913 (Shearer, 1918, p. 104). (Reopened by the Richardson Slate Co. in 1920.)

Georgia Quarry Tile Co. (1941?)*, Adairsville plant and pits: Quarry tile from trucked-in shale. Acquired from B.M. Hood Co., c. 1941, and closed 1966 (Spalvins, 1969, p. 53).

B. Mifflin Hood Co., (Tn.) (1924), Adairsville plant and pits: Roofing tile from Conasauga shale and colluvial clay. (Formerly the Georgia Brick & Tile Co.). The plant was shut down in 1932 (Hansard, and others, 1934, #20) and was later sold to the Georgia Quarry Tile Co. (Smith, 1931, No. 61, p. 243; Butts and Gildersleeve, 1948, p. 97). Ceramic test: Btw. 31S-61a and b (and Btw. 64 - 7 below).

TABLE 2. Summary of 20th Century Clay, Shale and Slate Mines and Companies in Bartow County, Georgia (continued)

John Mion (1966?)*, Adairsville: formerly Georgia Quarry Tile Co. Ceramic test: approximately Btw. 64-7.

Richardson Slate Co. (1920): Slate quarry for split roofing shingles and ground for roofing granules. Sold to Funkhouser Mills in 1927 (Bentley, and others, 1966, p. 14-15).

W.F. Shephard (1908?)*, Cartersville: Pottery (Veatch, 1909, p. 290 and 428).

Universal Ceramics, Inc. ** (1967), Adairsville plant and pits: Tile quarry and ceramic) from Conasauga shale. Nine acres permitted. Ceramic test: Btw. 67-2 and 3.

NOTE:

The majority of the information for the companies listed above was taken from the Mining Directories (Circular 2, 1st to 18th editions) published by the Georgia Geologic Survey and its predecessors at irregular intervals since 1937. Some additional information came from the "Georgia Surface Mining and Land Reclamation Activities" published annually since 1969 by the Georgia Surface Mined Land Reclamation Program (Environmental Protection Division, Ga. Dept. of Natural Resources). Additional sources of information were found in the references cited at the end of each entry.

* Uncertainty in the dates is due to incomplete records in the Survey's files.

** Active pit.

TABLE 3

Generalized Summary of Stratigraphic Units in Bartow County, Northwest Georgia

CHRONOSTRATIGRAPHIC UNIT	STRATIGRAPHIC UNITS (THICKNESS AND ROCK TYPES)[1/]
Quarternary (and Tertiary?)	* Various unnamed bodies of alluvial, colluvial and residual material. (Largely clay and sand, but also, locally gravel and breccia.)
Ordovician	* Rockmart Slate - (Approx. 0-600 ft., dark greenish-gray slate, siltstone, sandstone and conglomerate.)
Cambrian-Ordovician	(*) Knox Group - (Approx. 2000-4500 ft., dominantly cherty dolostone with minor limestone.) Includes: Newala Limestone - (Approx. 100-400 ft., limestone and dolostone); Longview Limestone - (Approx. 350 ft.); Chepultepec Dolomite - (800+ ft.); and Copper Ridge Dolomite - (Approx. 2500 ft.).
Cambrian	** Conasauga Group (or Formation) - (Approx. 950-5000 ft., predominantly shale and limestone with minor sandstone.) Includes: Maynardville Limestone - (Approx. 50-300 ft.); "Upper Unit" = Nolichucky Shale - (Approx. 200-1000 ft.) and Maryville Limestone? - (Approx. 200-600 ft.); "Middle Unit" = Rutledge Limestone and Rogersville Shale? - (Approx. 200-400 ft.); and "Lower Unit" = Pumpkin Valley Shale and Honaker Dolomite? - (Approx. 30-500 ft.). ** Rome Formation - (Approx. 100-5000 ft., shale, and interbedded sandstone, siltstone and quartzite.) Includes the "Cartersville Formation" of Shearer (1918). * Shady Dolomite (or Dolostone) - (Approx. 30-500 ft., cherty gray dolomite limestone with minor shale.) = "Beaver Limestone" of former usage. * Chilhowee Group (or Weisner Formation) - (Approx. 300-500 ft., quartz sandstone, quartzite, conglomerate, shale and phyllite.)
Precambrian	* Ocoee Supergroup - (Slate, phyllite, quartzite, metagraywacke, mica schist, biotite gneiss, granite, minor talc & soapstone.)

NOTES:

* = Some ceramic firing tests have been made on shales or slates and clays of this unit.

(*) = Same as the above, but for residual clays only.

** = Numerous firing tests have been made on this unit.

1/ Descriptions based on data in Butts and Gildersleeve, 1948; Chowns, 1972, 1977; Cressler 1963, 1964a and b, 1970, 1974; Cressler and others, 1979; Croft, 1963; Georgia Geologic Survey, 1976.

EXPLANATION OF KEY TERMS ON THE CERAMIC TEST AND ANALYSES FORMS

The test data and analyses which are presented here were compiled on a set of standardized forms (Ceramic Tests and Analyses) in the most concise manner consistent with the various laboratories represented. These forms are modified in large part after those used by the Pennsylvania Geological Survey (e.g., O'Neill and Barnes, 1979, 1981).

It should be noted that, although the great majority of these tests were performed by the USBM, it was decided not to reproduce their data forms directly for several reasons. First, the USBM forms contain several entries which are not essential to this project (e.g., Date received) or do not make the most efficient use of space. Second, the USBM forms have been changed several times over the span of decades covered by the present compilation. Finally, investigators from other laboratories have reported parameters which were not measured by the USBM.

The paragraphs which follow briefly describe, in alphabetical order, the more critical entries on the forms, the nature of the information included and, where possible, the various factors and implications to be considered in their interpretation. Many of the particular comments here are based on descriptive information published in the following sources. Tests by Georgia Geologic Survey authors are described in Veatch (1909, p. 50 to 64) and in Smith (1931, p. 19 to 25), while the particulars of the USBM studies are given in Klinefelter and Hamlin (1957, especially p. 5 to 41) and in Liles and Heystek (1977, especially p. 2 to 16). The discussions which follow are not intended to be exhaustive but are merely meant to remind the reader,

and potential user, of the key aspects of the information presented. Various technical texts and reports should be consulted for more detailed information (e.g., Clews, 1969; Grimshaw, 1972; Jones and Beard, 1972; Norton, 1942; Patterson and Murray, 1983). The abbreviations used on these test forms are defined in Table 4.

1. Absorption (%)

The absorption is a measure of the amount of water absorbed by open pores in the fired specimen given as a percentage of the specimen's dry weight. For slow firing tests, it is measured on fired specimens which have been boiled in water for 2 to 5 hours and then kept immersed in the water for up to 24 hours while cooling (Smith, 1931, p. 22; Klinefelter and Hamlin, 1957, p. 27-28; Liles and Heystek, 1977, p. 3). For the quick firing tests, however, the specimens are not boiled but only cooled and then immersed in water for 24 hours (Liles and Heystek, 1977, p. 4).

The absorption gives an indication of the amount of moisture which may be absorbed and subject to destructive freezing in outdoor structures. Less than 22% absorption is considered promising for slow-fired materials.

2. App. Por. (%) - Apparent Porosity, Percent

The apparent porosity is a measure of the amount of open pore space in the fired sample, relative to its bulk volume, and is expressed as a percent. As in the case of absorption values, it is based on the weight and volume of the specimen which has been boiled in water for 2 to 5 hours and then kept immersed in water for several hours as it cools (Klinefelter and Hamlin, 1957, p. 27 to 28; Liles and Heystek,

TABLE 4

Abbreviations for Terms on the Ceramic Firing Test Forms

ABBREVIATIONS

Appr. Por. = Apparent Porosity
App. Sp. Gr. = Apparent Specific Gravity

Btw. = Bartow County

°C = Degrees Celsius
Ct. = Catoosa County
Cht. = Chattooga County

Dd. = Dade County
Dist. = District
DTA = Differential Thermal Analysis

E = East

°F = Degrees Fahrenheit
Fl. = Floyd County

g/cm^3 = Grams per cubic centimeter
Gdn. = Gordon County

Lab. & No. = Laboratory (name) and number (assigned in laboratory)
Lat. = Latitude
LOI = Loss on Ignition
Long. = Longitude
lb/in^2 = Pounds per square inch
lb/ft^3 = Pounds per cubic foot

Mry. = Murray County

N = North
NE = Northeast
NW = Northwest

org. = Organic

Plk. = Polk County

S = South
SE = Southeast
SW = Southwest
Sec. = Section

Table 4. Abbreviations for Terms on the Ceramic Firing Test Forms (continued)

7 1/2' topo. quad. = 7 and 1/2 minute topographic quadrangle

Temp. = Temperature
TVA = Tennessee Valley Authority

USBM = U.S. Bureau of Mines
USGS = U.S. Geological Survey

W = West
Wkr. = Walker County
Wf. = Whitfield County

XRD = X-ray diffraction

1977, p. 3). The apparent porosity is an indication of the relative resistance to damage during freezing and thawing. Less than 20% apparent porosity is considered promising for slow-fired materials (O'Neill and Barnes, 1979, p. 14, Fig. 4).

3. App. Sp. Gr. - Apparent Specific Gravity

As reported in earlier USBM studies, the apparent specific gravity is a measure of the specific gravity of that portion of the test specimen that is impervious to water. This is determined by boiling the sample in water for 2 hours and soaking it in water overnight or 24 hours (Klinefelter and Hamlin, 1957, p. 27 to 28). These data were replaced by bulk density and apparent porosity measurements after the USBM moved its laboratories from Norris, Tennessee to Tuscaloosa, Alabama in 1965.

4. Bloating

Bloating is the term given to the process in which clay or shale fragments expand (commonly two or more times their original volume) during rapid firing. It results from the entrapment of gases which are released from the minerals during firing but which do not escape from the body of the host fragment due to the viscosity of the host at that temperature. Bloating is a desirable and essential property for the production of expanded lightweight aggregate where an artificial pumice or scoria is produced. Expanded lightweight aggregate has the advantages of light weight and high strength compared to conventional crushed stone aggregate. Bloating is not desirable, however, in making other structural clay products such as brick, tile and sewer pipe where the dimensional characteristics must be carefully controlled. In these

cases bloating is extremely deleterious since it leads to variable and uncontrollable warping, expansion and general disruption of the fired clay body (Klinefelter and Hamlin, 1957, p. 39-41).

5. Bloating Test (or Quick Firing Test)

The Bloating Test refers to the process of rapidly firing (or "burning") the raw sample in a pre-heated furnace or kiln to determine its bloating characteristics for possible use as a lightweight aggregate. Although specific details of the different laboratory methods vary, all use several fragments of the dried clay or shale placed in a refractory plaque (or "boat") which in turn is placed in the pre-heated furnace for 15 minutes (Klinefelter and Hamlin, 1957, p. 41; Liles and Heystek, 1977, p. 4).

6. Bulk Density (or Bulk Dens.)

The bulk density is a measure of the overall density of the fired specimen based on its dry weight divided by its volume (including pores). Determinations are the same for slow firing and quick firing test samples, although for the latter the results are given in pounds per cubic inch as well as grams per cubic centimeter units (Klinefelter and Hamlin, 1957, p. 27 to 28 and 41; Liles and Heystek, 1977, p. 3 and 4). A bulk density of less than 62.4 lb/ft^3 is considered promising for quick-fired material (Liles, oral communication, 1984).

7. Color

The color of the unfired material, unless otherwise stated, represents the crushed and ground clay or shale. In most cases this is given for descriptive purposes only since it is generally of no

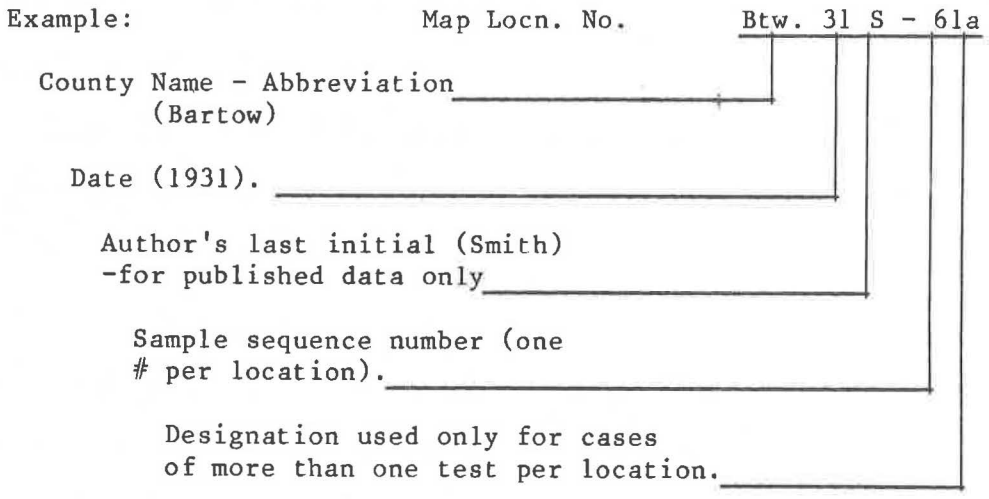
practical importance for ceramic applications (only the fired color is significant). Here only broad descriptive terms such as light-brown, cream, gray, tan, etc. are used. Fired colors are more critical and therefore more specific descriptive terms and phrases are used (Klinefelter and Hamlin, 1957, p. 18 and 19). In many cases the Munsell color is given for a precise description (see discussion below).

8. Color (Munsell)

This is a system of color classification based on hue, value (or brightness) and chroma (or purity) as applied to the fired samples in this compilation. It was used by Smith (1931, p. 23-25) and by the USBM since the early 1970's (Liles, oral communication, 1982; Liles and Heystek, 1977, p. 3). In all other cases the fired color was estimated visually.

9. Compilation Map Location No.

This number or code was assigned by the author to provide a systematic designation to be used in plotting sample locations on the base maps as shown by the typical example below.



The map location number Btw. 31S-61a is derived from the county name (e.g., Btw. for Bartow County), the year the tests were performed (e.g., 31 for 1931) plus the last initial of the author for major published sources (e.g., S for Smith), followed by a sequence number assigned in chronological order or sequential order for published data. (The only exceptions to this are the tests reported in Smith, 1931, wherein the sequence number of the present report is the same as the Map location No. of Smith.) Each map location number represents a specific location, or area, sampled at a particular time. In cases where several separate samples were collected from a relatively restricted area, such as an individual property, such samples are designated a, b, c, etc. Different map location numbers have been assigned to samples which were collected from the same general locality, such as a pit or quarry, but which were collected by different investigators at different times.

10. Cone

Standard pyrometric cones, or cones, are a pyrometric measure of firing temperature and time in the kiln. They are small, three-sided pyramids made of ceramic materials compounded in a series, so as to soften or deform in progression with increasing temperature, and/or time of heating. Thus, they do not measure a specific temperature, but rather the combined effect of temperature, time, and other conditions of the firing treatment. The entire series of cones ranges from about 1112°F (600°C) to about 3632°F (2000°C) with an average interval of about 20°C between cones for a constant, slow rate of heating (Klinefelter and Hamlin, 1957, p. 29). For the past several decades

the use of these cones has been limited to the Pyrometric Cone Equivalent (PCE) test (Liles and Heystek, 1977, p. 16). However, all of the ceramic firing tests reported by Veatch (1909) and Smith (1931) as well as some of the earliest USBM tests report firing conditions in terms of the standard cone numbers.

11. Drying Shrinkage

The drying shrinkage is a measure of the relative amount of shrinkage (in percent) which the tempered and molded material undergoes upon drying. Although there are a variety of ways by which this can be measured, in this report the shrinkage values represent the percent linear shrinkage based on the linear distance measured between two reference marks or lines imprinted on the plastic specimen before drying. Even though the methods have varied in detail, the drying is usually accomplished in two stages: first, by air drying at room temperature (usually for 24 hours) and second, by drying in an oven followed by cooling to room temperature in a desiccator (Klinefelter and Hamlin, 1957, p. 30-31; Liles and Heystek, 1977, p. 3). In most cases the heating was at 212°F (100°C) for 24 hours; however, studies by Smith (1931, p. 20 and 21) employed 167°F (75°C) for 5 hours followed by 230°F (110°C) for 3 hours.

12. Dry Strength

The dry strength (or green strength) is a measure of the apparent strength of the clay or shale after it has been molded and dried. Unless otherwise indicated, it represents the tranverse, or crossbreaking, strength as opposed to either tensile strength or compressive

strength. For the great majority of cases only the approximate dry strength is indicated as determined by visual inspection, using such terms as low, fair, good, or high (Klinefelter and Hamlin, 1957, p. 32-33; Liles and Heystek, 1977, p. 2). Smith (1931, p. 12-13) reports a quantitative measurement of this strength using the modulus of rupture (MOR) expressed in units of pounds per square inch (psi).

13. Extrusion Test

More extensive tests are sometimes made on clays and shales which show good plasticity and long firing range in the preliminary test. In the Extrusion Test several bars are formed using a de-airing extrusion machine (i.e., one which operates with a vacuum to remove all possible air pockets). These bars are fired and tested for shrinkage, strength (modulus of rupture) and water saturation coefficient (Liles and Heystek, 1977, p. 8).

14. Firing Range

The term Firing Range indicates the temperature interval over which the material shows favorable firing characteristics. For slow-fired materials such desirable qualities include: a) good strength or hardness; b) good color; c) low shrinkage; d) low absorption; and e) low porosity. For quick-fired materials these include: a) good pore structure; b) low absorption; and c) low bulk density. For slow-firing and quick-firing tests the firing range should be at least 100°F (55°C) to be considered promising (O'Neill and Barnes, 1979, p. 15-18).

15. Hardness

The hardness, as measured on fired materials, indicates the resistance to abrasion or scratching. It is designated either in verbal, descriptive terms or in numerical terms using Mohs' hardness (Liles and Heystek, 1977, p. 3). It is used as an indication of the strength of the fired materials. Smith (1931), however, measured the fired strength with the modulus of rupture.

16. Hardness (Mohs')

The hardness of fired specimens using the Mohs' scale of hardness is currently used by the USBM as a numerical measure of the fired bodies' strength (Liles and Heystek, 1977, p. 3). The values correspond to the hardness of the following reference minerals:

Mohs' Hardness No.	Reference Minerals
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase
7	Quartz
8	Topaz
9	Corundum
10	Diamond

A Mohs' hardness greater than 3 is considered promising for slow-fired materials.

17. HCl Effervescence

The effervescence in HCl is visually determined as none, slight or high based on the reaction of 10 ml of concentrated hydrochloric acid added to a slurry of 10 grams powdered clay or shale (minus 20 mesh) in

100 ml of water (Klinefelter and Hamlin, 1957, p. 17; Liles and Heystek, 1977, p. 4). This test gives a general indication of the amount of calcium carbonate present in the sample. An appreciable effervescence could be an indication of potential problems with "lime pops" and/or frothing of slow-fired ceramic products.

18. Linear Shrinkage, (%)

The term Linear Shrinkage represents the relative shrinkage of the clay body after firing. In most cases it represents the percent total linear shrinkage from the plastic state and is based on measurements between a pair of standard reference marks imprinted just after molding (Klinefelter and Hamlin, 1957, p. 30-32; Liles and Heystek, 1977, p. 3). (Also see the discussion under Drying Shrinkage.) Smith (1931, p. 22) gives the shrinkage relative to both the dry, or green, state (under the column headed Dry) as well as the plastic state (under the column headed Plastic). A total shrinkage of 10% or less is considered promising for slow-fired materials.

19. Modulus of Rupture (MOR)

The modulus of rupture is a measure of the strength of materials (for crossbreaking or transverse strength in this compilation) based on the breakage force, the distance over which the force was applied and the width and thickness of the sample. The MOR is expressed in psi units (pounds per square inch) for the limited MOR data reported here (determined by Smith, 1931, p. 21 and 23).

20. Mohs'

See Hardness (Mohs').

21. Molding behavior

See Working Properties.

22. Munsell

See Color (Munsell).

23. "MW" face brick

"MW" stands for moderate weather conditions. This is a grade of brick suitable for use under conditions where a moderate, non-uniform degree of frost action is probable (Klinefelter and Hamlin, 1957, p. 36 and 37; ASTM Annual Book of Standards, 1974). (Also see "SW" face brick.)

24. PCE - Pyrometric Cone Equivalent

The PCE test measures the relative refractoriness, or temperature resistance, of the clay or shale; it is indicated in terms of standard pyrometric cones. The value given is the number of the standard pyrometric cone which softens and sags (or falls) at the same temperature as a cone made from the clay or shale being studied. These tests are usually only made on refractory materials which show favorable potential in the preliminary slow firing tests (i.e., high absorption, low shrinkage, and light fired color). The results are usually given for the upper temperature range Cone 12 (1337°C; 2439°F) to Cone 42 (2015°C; 3659°F) where the temperature equivalents are based on a heat-

ing rate of 150°C (270°F) per hour. With increasing temperature resistance the sample is designated as either a low-duty, medium-duty, high-duty, or super-duty fire clay (Liles and Heystek, 1977, p. 16; Klinefelter and Hamlin, 1957, p. 29-30 and 57-58).

25. pH

The pH is a measure of the relative alkalinity or acidity with values ranging from 0 to 14. (A pH of 7 is neutral. Values greater than this are alkaline whereas those which are less than 7 are acid.) Most, but not all, of the ceramic tests by the USBM presented here show pH values as determined on the crushed and powdered raw material (in a water slurry) prior to firing (Klinefelter and Hamlin, 1957, p. 28; Liles and Heystek, 1977, p. 4).

Strongly acid or alkaline pH values may give some indication of potential problems with efflorescence and scum due to water-soluble salts in the clay. Unfortunately, no simple and direct interpretation is possible from the pH data alone. The best method for determining these salts is through direct chemical analysis as described under Soluble Salts. (Also see Solu-Br.)

26. Plasticity

See Working Properties.

27. Porosity, Apparent

See App. Por.

28. Quick Firing

See Bloating Test.

29. Saturation Coefficient

The saturation coefficient is determined only for specimens which have undergone the more extensive Extrusion Test. It is determined by submerging the fired specimen in cool water for 24 hours, followed by submerging the specimen in boiling water for 5 hours. The saturation coefficient is found by dividing the percent of water absorbed after boiling into the percent of water absorbed after the 24-hour submergence (Liles and Heystek, 1977, p. 8).

30. Shrinkage

See Drying Shrinkage and Linear Shrinkage.

31. Slaking

See Working Properties.

32. Slow Firing Test

Slow Firing Test refers to the process of firing ("burning") the dried specimen in a laboratory furnace or kiln. Although specific details of the different laboratory methods vary, all specimens are started at room temperature and are slowly heated to the desired temperature over a specific interval of time.

The majority of the slow firing tests by the USBM reported here were made using 15-minute draw trials. In this method a set of molded and dried test specimens are slowly fired in the kiln or furnace. The temperature is gradually raised to 1800°F (982°C) over a period of 3 to 4 hours (to avoid disintegration of the specimen as the chemically combined water is released) and the temperature is held constant for

about 15 minutes. One specimen is removed from the kiln (a draw trial) and the temperature is raised to the next level (usually in intervals of 100°F). At each interval the temperature is again held constant for a 15-minute soak and then one specimen is withdrawn. This process is repeated until the final temperature is achieved (usually 2300 or 2400°F; 1260 or 1316°C) - see Klinefelter and Hamlin (1957, p. 19 and 30). The disadvantage of this draw trial method is that it tends to underfire the specimens, compared to the industrial process, since they are soaked for a relatively short time and quickly cooled by removal from the kiln.

Since the early 1970's the USBM has abandoned the draw trials and has adopted a method which more closely resembles the conditions of commercial manufacture. As described by Liles and Heystek (1977, p. 2 and 3), one of the test specimens is slowly fired, over 24 hours, to 1832°F (1000°C), where it is held for a one-hour soak. The kiln is then turned off, but the specimen remains in the kiln as it slowly cools. (This gives a much closer approximation of most commercial firing processes.) This is subsequently repeated, one specimen at a time, for successive 50°C intervals usually up to 2282°F (1250°C). Unfortunately, only a relatively small part of the current data set is represented by USBM tests using this newer method.

The firing test methods used by Smith (1931, p. 21 and 22) are somewhat intermediate to the two methods described above. First, the specimens were slowly fired from 200 to 1200°F (93 to 649°C) over a period of 11 hours. The temperature was subsequently increased at a rate of 200°F per hour for approximately 4 hours followed by 100°F per hour until final temperature conditions were reached. At these later

stages firing conditions were monitored using standard pyrometric cones in the kiln. The maximum firing temperature was determined from observed pyrometric cone behavior. This temperature was based on the temperature equivalent to 2 cones below the desired final cone. The kiln temperature was then held constant until the desired cone soaked down. Test specimens were then removed from the kiln and allowed to cool. Smith's firings averaged about 17 hours in the kiln and all specimens were fired to cones 06, 04, 02, 1, 3 and 5 wherever possible. No specific information is available on the methods employed by Veatch (1909) or the unpublished data from TVA or Georgia Tech.

33. Solu-Br. (Solu-Bridge)

Solu-Bridge measurements were used in the 1950's and 60's by the USBM as a measure of the soluble salts (e.g., calcium sulfate) in the unfired raw material which might cause scum and efflorescence on fired products. In this method the pulverized clay or shale is boiled in water, left to stand overnight, and filtered. The content of soluble salts in the solution is then measured using the Solu-Bridge instrument readings applied to suitable calibration tables (Klinefelter and Hamlin, 1957, p. 28-29). These data are no longer collected because consistent and meaningful results are difficult to achieve.

34. Soluble Salts

Excessive water-soluble salts can cause problems with efflorescence or scum on fired clay products. (More than 3 to 4% calcium sulfate, and 1/2% magnesium or alkali sulfates are considered excessive.)

The most accurate determinative method is to boil the finely powdered sample in distilled water for 1/2 to 1 hour and let it soak overnight. The decanted solution is then analyzed for the soluble salts using standard chemical methods. The Solu-Bridge readings may also be used as a general measure of the soluble salts (Klinefelter and Hamlin, 1957, p. 28).

35. Strength

See Dry Strength and Modulus of Rupture.

36. "SW" face brick

"SW" stands for severe weather conditions. This is a grade of brick suitable for use under conditions where a high degree of frost action is probable (Klinefelter and Hamlin, 1957, p. 36 and 37, and the ASTM Annual Book of Standards, 1974). (Also see "MW" face brick.)

37. Temp. °F (°C)

The temperature at which the material was fired (both slow and quick firing tests) is given in Fahrenheit (°F) followed by the Celsius (°C) conversion in parenthesis. In cases where only pyrometric cone values are available (e.g., Smith, 1931), the approximate temperature is given on the form and is based on the table of temperature equivalents in Norton (1942, p. 756, Table 128).

38. Water of Plasticity (%)

This is a measure of the amount of water (as weight percent relative to the dry material) required to temper the pulverized raw

clay or shale into a plastic, workable consistency. This is not a precise measurement, being dependent upon the experience of the technician, the type of equipment used and the plasticity criteria. In most cases it represents the amount of water necessary for the material to be extruded into briquettes from a laboratory hydraulic ram press. In general, high water of plasticity values tends to correlate with a greater degree of workability, higher plasticity and finer grain size. Unfortunately, high values also correlate with a greater degree of shrinkage, warping and cracking of the material upon drying. (See Klinefelter and Hamlin, 1957, p. 20-22; Liles and Heystek, 1977, p. 2.)

39. Working Properties (or Workability)

This area of working properties includes comments on the slaking, plasticity, and molding, or extruding behavior of the tempered material (Klinefelter and Hamlin, 1957, p. 5, 19-22 and 33-34). The term slaking refers to the disintegration of the dry material when immersed in water. It may range in time from less than a minute to weeks, but generally in the present report it is given only a relative designation such as rapid, slow, or with difficulty. Plasticity likewise is designated in a comparative manner in order of decreasing plasticity: plastic, fat (or sticky), semiplastic, short (or lean), semiflint and flint. Molding behavior is referred to as good, fair, or poor and is a general designation for the ease with which the material can be molded into test bars or briquettes.

These working properties are very imprecise and strongly dependent upon the judgement and experience of the operator. They do, however, give a general indication of how the material might respond to handling in the industrial process.

Ceramic Tests and Analyses of Clays, Shales and Slates

in Bartow County, Georgia *

* The data presented in this report are based on laboratory tests that are preliminary in nature and will not suffice for plant or process design.

CERAMIC TESTS AND ANALYSES

Material Bauxitic clay. Compilation Map Location No. Btw. 09V-1

County Bartow. Sample Number -

Raw Properties: Lab & No. Ga. Survey, #8.

Date Reported 1909 Ceramist O. Veatch, Ga. Survey.

Water of Plasticity - % Working Properties Very little plasticity.

Color Pink. Drying Shrinkage 4.7 % Dry Strength (tensile) Low.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
2210 (1210)	Cream (with iron specks)	-	14.3	-	-	-
2354 (1290)	Cream (with metallic specks)	-	14.6	-	-	-
3362 (1850)	-	-	-	-	(near fusing point)	

Remarks / Other Tests "Unless carefully burned, it cracks badly." Its fusing point is near Cone 36, 3362°F(1850°C) (Veatch, 1909, p. 273).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size - Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis Oxide	Weight %
SiO_2	43.772
TiO_2	2.206
Al_2O_3	38.726
Fe_2O_3	
FeO (total)	1.119
MnO	-
MgO	0.038
CaO	0.020
Na_2O	0.168
K_2O	0.077
P_2O_5	0.000
S (total)	0.010
C (org.)	-
CO_2	-
H_2O^-	0.407
H_2O^+	-
Loss on Ignition	13.819
Total	100.362

Mineralogy Mineral	volume %
Quartz	X
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
"iron oxide"	x
"clay"	X
Total	-

X = present in major amounts.
x = present in lesser amounts.

Analyst E. Everhart, Ga. Survey. (in Veatch, 1909, p. 273 and App. B, No. 8, p. 410-411). O. Veatch, Ga. Survey.

Date c. 1909. 1909

Method Standard "wet". Microscope.

Sample Location Data:

County Bartow. Land Lot 117, Sec. 3, Dist. 16. (given in White and Denson, 1966, p. M25-26, Pl.1).

71/2' topo quad. Shannon (E edge). Lat. _____, Long. _____.

Field No. 8 (p. 410), Collected by O. Veatch. Date c. 1909.

Sample Method Grab (?). Weathering/alteration Residual (?) clay.

Structural Attitude -

Stratigraphic Assignment Eocene (?) residual from Knox Group carbonate rocks.

Sample Description & Comments Hermitage district: "40 ft. of clay with pockets of bauxite" in a pit of the Julia mines, Republic Mining & Mfg. Co., NW. Bartow Co., 1 1/2 mi. SW of Barnsley (Veatch, 1909, p. 272-273), and about 1/4 mi.SSE of Barnsley Church. Numerous analyses also given by Watson (1904, p. 83-86) for "Julia Bank" of the Georgia Bauxite & Mining Co.

Compiled by B.J. O'Connor Date Sept. 1980

CERAMIC TESTS AND ANALYSES

Material Residual clay, siliceous. Compilation Map Location No. Btw. 09V-2

County Bartow. Sample Number -

Raw Properties: Lab & No. Ga. Survey.

Date Reported 1909 Ceramist O. Veatch, Ga. Survey.

Water of Plasticity - % Working Properties Very lean, poorly plastic.

Color Variable. Drying Shrinkage 4 % Dry Strength Low.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
2246 (1230)	Dark red	(vitrified)	-	-	-	-
2498 (1370)	-	(glassy, viscous)	-	-	-	-

Remarks / Other Tests "This would be a rather inferior clay if used alone." (Veatch, 1909, p. 290).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size - Retention Time -

Chemical & Mineralogical Data: None.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (center). Lat. _____, Long. _____.

Field No. -, Collected by O. Veatch. Date c.1909

Sample Method Grab (?). Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Recent (to Eocene?) residual clay.

Sample Description & Comments A siliceous residual clay (variable color, texture and composition) from a 30 ft. high cut on the L & N Railroad about 1/2 mile north of Cartersville (Veatch, 1909, p. 290).

Compiled by B.J. O'Connor Date Sept. 1980

CERAMIC TESTS AND ANALYSES

Material Clay, residual &/or colluvial. Compilation Map Location No. Btw. 09V-3

County Bartow. Sample Number -

Raw Properties: Lab & No. Ga. Survey.

Date Reported 1909 Ceramist O. Veatch, Ga. Survey.

Water of Plasticity - % Working Properties Very plastic.

Color Bluish gray. Drying Shrinkage 4.8 % Dry Strength (tensile) 40 psi.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
2210 (1210)	-	(vitrified)	9	-	-	-

Remarks / Other Tests "This might be of value in stone-ware and terra cotta mixtures." (Veatch, 1909, p. 388).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size - Retention Time -

Chemical & Mineralogical Data: None.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot c. 80, Sec. 3, Dist. 16.

71/2' topo quad. Adairsville (center). Lat. _____, Long. _____.

Field No. -, Collected by O. Veatch. Date c. 1909

Sample Method Grab (?). Weathering/alteration Residual clay from shale.

Structural Attitude -

Stratigraphic Assignment Recent (to Eocene?) residual clay, derived from shales of the Conasauga Formation (Cambrian).

Sample Description & Comments Partly residual and partly colluvial bluish gray, plastic clay with a high percentage of fine sand. From the W.J. Newell property, 1/2 mile north of Halls Station on the Western & Atlantic (now L & N) Railroad (Veatch, 1909, p. 388).

Compiled by B.J. O'Connor Date Sept. 1980

CERAMIC TESTS AND ANALYSES

Material Alluvial clay, some sand and pebbles. Compilation Map Location No. Btw. 09V-4

County Bartow. Sample Number -

Raw Properties: Lab & No. Ga. Survey, #6.

Date Reported 1909. Ceramist O. Veatch, Ga. Survey.

Water of Plasticity - % Working Properties -

Color Red and yellow. Drying Shrinkage - % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests "The brick made from this clay are quite porous, unless burned very hard, and are often cracked by the pebbles." (Veatch, 1909, p. 289).

Preliminary Bloating (Quick Firing) Tests: None.

Crushing Characteristics (unfired material) -

Particle Size - Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis Oxide	Weight %
SiO_2	69.18
TiO_2	-
Al_2O_3	15.43
Fe_2O_3	
FeO (total)	5.83
MnO	-
MgO	0.71
CaO	0.00
Na_2	0.155
K_2	1.83
P_2O_5	-
S (total)	-
C (org.)	-
CO_2	-
H_2O^-	-
H_2O^+	6.61
Loss on Ignition	-
Total	99.96

Mineralogy Mineral	volume %
Quartz	
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
Total	

Analyst J.W. Spencer (1893, p. 287) and cited in Veatch (1909, p. 290 and App. B, No. 6, p. 410 and 411).

Date c. 1893

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot , Sec. 3 , Dist. 4 .

71/2' topo quad. Cartersville (S. 1/2) . Lat. , Long. .

Field No. 6 (p. 410). , Collected by O. Veatch. Date c. 1909

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Recent (?) alluvium of Etowah River.

Sample Description & Comments Clay pit of the Cartersville Brick Company. Red and yellow clay, worked to 5 feet (upper part is quite sandy and has quartz pebbles). The clay is not suitable for any other use than common building brick (Veatch, 1909, p. 289-290).

Compiled by B.J. O'Connor Date 8-29-81

CERAMIC TESTS AND ANALYSES

Material Conasauga shale. Compilation Map Location No. Btw. 31S-61a

County Bartow. Sample Number C-3-A

Raw Properties: Lab & No. Ga. Tech., #61.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 23.4 % Working Properties Somewhat slow slaking; grainy at first, good plasticity after aging 3 days; good molding behavior.

Color Brownish-gray. Drying Shrinkage 2.6 % Dry Strength (MOR) 109.3 psi.

Remarks Good drying, slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Medium red (1YR-5/5)	1470	5.0 (7.5)	10.6	-	slight
1920 (1050)	Fair red (R-YR-5/5)	1416	4.6 (7.3)	10.4	-	slight
2000 (1095)	Good red (1YR-5/4)	1825	5.3 (7.5)	8.6	-	slight
2060 (1125)	Good choc. red (1YR-4/4)	2321	7.3 (9.7)	5.9	-	considerable
2090 (1145)	Deep choc. red (R-YR-3/4)	1917	5.3 (7.8)	4.5	-	bad*
2160 (1180)	Very deep choc. (R-YR-3/4)	2257	4.0 (6.8)	2.6	-	very bad*

* = increasing degree of pimply surfaces and glassy structure on broken ends.

Remarks / Other Tests Firing range = Cone 04 to 2 (in commercial kiln = Cone 06 to 1). Used by the old Adairsville Brick Co. to manufacture common and face brick (Smith, 1931, p. 243).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) A little difficult to grind; tough rather than brittle.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis

Oxide	Weight %
SiO_2	59.18
TiO_2	0.91
Al_2O_3	23.83
Fe_2O_3	5.95
FeO	0.86
MnO	-
MgO	0.13
CaO	0.00
Na_2O	0.42
K_2O	3.42
P_2O_5	0.11
SO_3	0.34
C (org.)	-
CO_2	-
H_2O^-	*
H_2O^+	-
Loss on Ignition	4.90
Total	100.05*

(* = recalculated on a H_2O^- -free basis by Smith, 1931, p. 244).

Mineralogy Not determined.

Mineral	volume %
Quartz	
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
Total	

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow Land Lot _____, Sec. 3, Dist. 15.

71/2' topo quad. Calhoun South (S. edge). Lat. _____, Long. _____.

Field No. C-3-A, Collected by R.W. Smith. Date 4-10-30

Sample Method Grab samples across north end of pit.

Weathering/alteration Weathered at top, and fairly hard shale at base of 5 ft. deep pit.

Structural Attitude Beds generally strike N. 10°E. and dip 45° to 50°E.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Greenish-drab shale from the "old shale pit" of the B.M. Hood Co., north of their brick plant on west and south side of a ridge west of the railroad, north side of Adairsville (Smith, 1931, p. 243-245).

Compiled by B.J. O'Connor Date 8-29-81

CERAMIC TESTS AND ANALYSES

Material Colluvial clay (from the Conasauga Group). Compilation Map Location No. Btw.31S-61b

County Bartow. Sample Number C-3-B

Raw Properties: Lab & No. Ga. Tech., #61

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey

Water of Plasticity 30.2 % Working Properties Sticky, good plasticity; excellent molding behavior; rapid slaking.

Color Lt. grayish brown. Drying Shinkage 6.5 % Dry Strength (MOR) 288.0 psi.

Remarks Drying behavior: slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Good red* (2YR-4/3)	1938	8.7 (14.8)	8.8	-	some
1920 (1050)	Choc. red* (2YR-3/3)	1966	7.6 (14.1)	8.9	-	considerable
2000 (1095)	Choc. red* (3YR-4/2)	1624	5.4 (11.8)	9.0	-	considerable
2060 (1125)	Deep choc. red* (1YR-4/3)	2352	6.7 (12.7)	8.1	-	bad**

* = with white specks.
** = vitreous surface, broken ends show glassy structure.

Remarks / Other Tests Firing range from below Cone 06 to 02 (in commercial kiln = below Cone 04). Used by the B.M. Hood Co. to manufacture roofing tile (Smith, 1931, p. 243, 246-248).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	52.71		
TiO_2	0.78	Quartz	
Al_2O_3	19.59	Feldspar	
Fe_2O_3	11.01	Carbonate	
FeO	-	Mica	
MnO	1.46	Chlorite-vermiculite	
MgO	0.11	Montmorillonite	
CaO	0.98	Others	
Na_2O	0.89		
K_2O	2.70		
P_2O_5	0.46		
S (total)	-	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	9.40	(* = recalculated on an H_2O^- -free basis by Smith, 1931, p. 246).	
Total	100.09*		

Analyst E. Everhart, Ga. Survey

Date c. 1931

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot _____, Sec. 3, Dist. 15.

71/2' topo quad. Calhoun South (S. edge). Lat. _____, Long. _____.

Field No. C-3-B, Collected by R.W. Smith Date 4-10-30

Sample Method Grab - from steam shovel-full scooped from top to bottom of 10 ft. pit. Weathering/alteration Colluvial - from shale.

Structural Attitude Weathered clay washed from adjacent ridge of shale.

Stratigraphic Assignment Probably Recent (?) - derived from Conasauga shale.

Sample Description & Comments Mottled brown to light gray (some white) clay from large pit of the B.M. Hood Co., north of brick plant and west side of railroad propoerty on the north side of Adairsville (Smith, 1931, p. 245-248). (East of 31S-61a.)

Compiled by B.J. O'Connor Date 8-29-80

CERAMIC TESTS AND ANALYSES

Material Residual clay (from Conasauga). Compilation Map Location No. Btw. 31S-62

County Bartow. Sample Number C-37

Raw Properties: Lab & No. Ga. Tech., #62.

Date Reported 1931 Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 30.7 % Working Properties Rapid slaking; good plasticity; excellent molding behavior.

Color Drab. Drying Shrinkage 5.4 % Dry Strength (MOR) 148.5 psi.

Remarks Drying behavior: slight warpage.

Slow Firing Tests:

Aprox. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Salmon (4YR-6/6)	1649	6.1 (11.0)	13.9	-	slight
1920 (1050)	Light red (R-YR-5/4)	2827	8.2 (12.7)	8.0	-	some
2000 (1095)	Medium red (R-YR-5/4)	2836	8.8 (13.4)	4.9	-	some
2060 (1125)	Good red (R-YR-4/4)	2800	9.9 (14.6)	4.7	-	some
2090 (1145)	Deep red (R-YR-3/5)	1946	10.2 (15.5)	2.9	-	some *
2160 (1180)	Deep choc. red (1YR-3/4)	3190	10.2 (15.5)	1.5	-	considerable *

*: increasing tendency to show vitreous surfaces & glassy structure on broken ends.

Remarks / Other Tests Firing range = Cone 04 to 1 (commercial kiln = Cone 05 to 01). Satisfactory for building brick and possibly structural or roofing tile. Range could be lengthened by adding shale.

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	Not determined.
Oxide	Weight %	Mineral	volume %
SiO_2	58.31		
TiO_2	0.92	Quartz	
Al_2O_3	25.79	Feldspar	
Fe_2O_3	5.80	Carbonate	
FeO	1.27	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.20	Montmorillonite	
CaO	0.00	Others	
Na_2O	trace		
K_2O	2.68		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	5.12		
Total	100.09 *		

(* = calculated on a H_2O^- -free basis by Smith, 1931, p. 249).

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot _____, Sec. 3, Dist. 15.

71/2' topo quad. Adairsville (N. edge). Lat. _____, Long. _____.

Field No. C-37, Collected by R.W. Smith. Date 4-25-30

Sample Method Grab samples. Weathering/alteration Soft to hard clay.

Structural Attitude Shale = strike N.10°E. and dip 75°E.

Stratigraphic Assignment Recent (?) residual clay derived from Conasauga (Cambrian) shale.

Sample Description & Comments Gully exposure of residual red, brown, and mottled yellow and red clay at N end of Boyd Orchard Co. property, 1/2 mile SW of Adairsville, on Snow Springs School road and on the west side of Oothkaloga Creek (Smith, 1931, p. 248-250).

Compiled by B.J. O'Connor Date 8-29-81

CERAMIC TESTS AND ANALYSES

Material Conasauga shale. Compilation Map Location No. Btw. 31S-63

County Bartow. Sample Number C-13

Raw Properties: Lab & No. Ga. Tech., #63.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 23.4 % Working Properties Slow slaking; plasticity poor and grainy (better after aging overnite); fair molding behavior.

Color Light brown. Drying Shrinkage 1.4 % Dry Strength (MOR) 32.4 psi.

Remarks Rapid drying, only slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Light salmon (3YR-6/6)	759	3.4 (4.8)	19.4	-	slight
1920 (1050)	Dark salmon (2YR-5/5)	1148	4.8 (6.5)	17.7	-	slight
2000 (1095)	Light red (2YR-6/5)	1352	5.5 (7.2)	14.5	-	slight
2060 (1125)	Fair red (1YR-5/5)	1924	7.8 (9.3)	10.5	-	some
2090 (1145)	Good red (R-YR-4/3)	1985	8.7 (10.4)	8.5	-	considerable
2160 (1180)	Good red (R-YR-4/4)	2236	7.8 (9.0)	7.2	-	considerable

Remarks / Other Tests Firing range = Cone 01 to 6 (commercial kiln = Cone 02 to 5). Has possibilities for building brick manufacture (Smith, 1931, p. 252). The slow slaking and poor plasticity could be partly overcome by fine grinding, long pugging, hot water and/or the use of certain electrolytes in the tempering water.

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined	
Oxide	Weight %	Mineral	volume %
SiO_2	56.83		
TiO_2	0.91	Quartz	
Al_2O_3	26.11	Feldspar	
Fe_2O_3	6.08	Carbonate	
FeO	2.57	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.35	Montmorillonite	
CaO	0.00	Others	
Na_2O	0.58		
K_2O	1.41		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	5.31		
Total	100.15 *		

(* = recalculated on a H_2O^- -free basis by Smith, 1931, p. 251).

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot ____, Sec. 3, Dist. 15.

71/2' topo quad. Adairsville (N. center). Lat. ____, Long. ____.

Field No. C-13, Collected by R. W. Smith. Date 4-14-30

Sample Method Grab samples. Weathering/alteration Variably weathered.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Soft to semi-hard, brownish-drab Conasauga shale from the W.E. Pearson property, 1 mile S. of Adairsville, on W. side of railroad and south of Swains Branch (Smith, 1931, p. 250-252).

Compiled by B.J. O'Connor Date 8-31-80

CERAMIC TESTS AND ANALYSES

Material Shale, soft to hard, (Conasauga Group). Compilation Map Location No. Btw. 31S-64

County Bartow. Sample Number C-31

Raw Properties: Lab & No. Ga. Tech., #64

Date Reported _____ Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 25.4 % Working Properties Grainy, poor plasticity (even on aging several days); slow slaking; poor molding behavior.

Color Reddish-brown. Drying Shrinkage 1.0 % Dry Strength (MOR) 31.5 psi.

Remarks Rapid drying, very slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Light salmon (3YR-6/6)	261	2.6 (3.6)	22.9	-	slight
1920 (1050)	Salmon (1YR-5/5)	423	3.3 (4.3)	20.7	-	slight
2000 (1095)	Salmon (2YR-6/5)	640	3.9 (4.9)	20.3	-	slight
2060 (1125)	Light red (1YR-5/5)	945	6.6 (7.5)	16.2	-	some
2090 (1145)	Medium red (R-YR-4/4)	1038	6.9 (7.8)	12.2	-	some
2160 (1180)	Good red (R-YR-4/3)	1057	8.0 (8.5)	11.3	-	considerable

Remarks / Other Tests Firing range = Cone 3 to 5 and higher (commercial kiln = Cone 2 to 5 and higher?). By itself not suitable for heavy clay products manufacture, possibly suitable for lightweight aggregate manufacture (Smith, 1931, p. 254).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size - 16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	Not determined.
Oxide	Weight %	Mineral	volume %
SiO_2	44.28		
TiO_2	0.91	Quartz	
Al_2O_3	36.75	Feldspar	
Fe_2O_3	7.57	Carbonate	
FeO	0.96	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.39	Montmorillonite	
CaO	0.00	Others	
Na_2O	0.51		
K_2O	2.58		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	6.14		
Total	100.09 *		

(* = recalculated on a H_2O^- -free basis by Smith, 1931, p. 253).

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 101, Sec. 3, Dist. 16.

71/2' topo quad. Adairsville (center). Lat. _____, Long. _____.

Field No. C-31, Collected by R.W. Smith Date 4-25-30

Sample Method Grab samples. Weathering/alteration Variably weathered.

Structural Attitude -

Stratigraphic Assignment Conasauga Group shale (Cambrian).

Sample Description & Comments Several samples from road cut and gully outcrops on the C.W. Clemmons and J.C. Greenfield properties, both on east side Nashville RR at Halls Station (and Linwood P.O.), 5 miles south of Adairsville. Soft to to semi-hard, reddish-brown to drab shale (Smith, 1931, p. 252 - 254).

Compiled by B.J. O'Connor Date 9-4-81

CERAMIC TESTS AND ANALYSES

Material Drab to brownish-red shale (Conasauga Group). Compilation Map Location No. Btw. 31S-65

County Bartow. Sample Number C-26

Raw Properties: Lab & No. Ga. Tech., #65.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity - % Working Properties Poor plasticity, "short" and mealy (even on aging 3 days); slow slaking; very poor molding.

Color Reddish brown. Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests Molding behavior too "short" to form test bars as clay cracked badly on coming through roll-press die. Shale "unsuited, by itself, for the manufacture of heavy clay products." (Smith, 1931, p. 255). However, if blended with a plastic clay it might be suitable for making heavy clay products.

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Fairly easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	59.90		
TiO_2	0.90	Qaurtz	
Al_2O_3	24.36	Feldspar	
Fe_2O_3	6.38	Carbonate	
FeO	0.38	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.23	Montmorillonite	
CaO	0.00	Others	
Na_2O	0.74		
K_2O	2.10		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	5.08		
Total	100.07 *		

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p. 255.).

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot ____, Sec. 3, Dist. 5.

71/2' topo quad. Kingston (NE. corner). Lat. ____, Long. ____.

Field No. C-26, Collected by R.W. Smith. Date 4-22-30

Sample Method Several grab samples. Weathering/alteration Weathered.

Structural Attitude -

Stratigraphic Assignment Conasauga Group shale (Cambrian).

Sample Description & Comments Fissile to non-fissile (locally micaceous and schistose), soft to hard, drab to brownish-red metamorphosed shale from road cut along the west (Rome) branch of the Dixie Hwy.*, 3/4 mile north of the Nashville RR, east of Two Run Creek, about 3 1/2 miles east of Kingston on the F. Milner and R.S. Mumford properties (Smith, 1931, p. 254-255).

* = Ga. Hwy. 3 and U.S. Hwy. 41.

Compiled by B.J. O'Connor Date 9-7-81

CERAMIC TESTS AND ANALYSES

Material Mottled residual clay. Compilation Map Location No. Btw. 31S-66a

County Bartow. Sample Number C-1

Raw Properties: Lab & No. Ga. Tech., #66.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 29.0 % Working Properties Good plasticity; rapid slaking; good molding behavior.

Color Red with yellow specks. Drying Shrinkage 6.7 % Dry Strength (MOR) 126.0 psi.

Remarks Good drying behavior, slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Salmon (3YR-6/7)	1135	5.4 (11.8)	14.9	-	some
1920 (1050)	Light red (2YR-6/6)	1094	5.6 (12.1)	12.9	-	some
2000 (1095)	Light red (R-YR-5/5)	1293	6.5 (12.6)	10.8	-	some
2060 (1125)	Medium red (1YR-5/5)	1467	8.2 (14.6)	9.4	-	some
2090 (1145)	Good red (R-YR-4/5)	1507	7.2 (12.9)	10.2	-	some
2160 (1180)	Good red (R-YR-4/4)	1613	9.0 (14.8)	8.3	-	some

Remarks / Other Tests Firing range = Cone 1 to 5 and higher (commercial kiln = Cone 02 to 5). "This clay is suited to the manufacture of building brick." (Smith, 1931, p. 257) which "are said to have been made from this clay some time before the Civil War when Cassville was the county seat of Cass County." (p. 256).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis

Oxide	Weight %
SiO_2	58.04
TiO_2	1.15
Al_2O_3	18.85
Fe_2O_3	9.79
FeO	-
MnO	trace
MgO	0.06
CaO	0.00
Na_2O	0.61
K_2O	3.37
P_2O_5	trace
SO_3	0.00
C (org.)	-
CO_2	-
H_2O^-	*
H_2O^+	-
Loss on Ignition	8.03
Total	99.90 *

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p. 256).

Mineralogy Not determined.

Mineral	volume %
Qaurtz	
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
Total	

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot _____, Sec. 3, Dist. 5.

71/2' topo quad. White West (SW. cor.) + Cartersville (NW. cor.). Lat. _____, Long. _____.

Field No. C-1, Collected by R.W. Smith. Date 4-9-30

Sample Method Several grab samples. Weathering/alteration Weathered.

Structural Attitude -

Stratigraphic Assignment Recent (?) residual clay derived from calcareous shale (or possibly from a very impure limestone?).

Sample Description & Comments Gully outcrops of mottled deep-red to grayish-white stiffly plastic clay with spots and irregular streaks of white and brown, at places showing traces of shaly structure. From the W.D. Pittard property (Old Hawks Place) just west of Cassville village, 2 miles north of the Nashville RR on the east (Dalton) branch of the "Dixie Hwy"* (Smith, 1931, p. 255-257).

* = Ga. Hwy. 3 and U.S. Hwy. 41.

Compiled by B.J. O'Connor Date 9-7-81

CERAMIC TESTS AND ANALYSES

Material Shale, soft to hard (Conasauga Group). Compilation Map Location No. Btw.31S-66b

County Bartow. Sample Number C-2

Raw Properties: Lab & No. Ga. Tech., #66.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 27.3 % Working Properties Poor plasticity, "short" (even on aging 2 days); slow slaking; poor molding behavior.

Color Brown + green specks. Drying Shrinkage 1.3 % Dry Strength (MOR) 35.4 psi.

Remarks Fairly rapid drying, slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Pale salmon (4YR-6/6)	512	1.8 (2.5)	26.0	-	slight
1920 (1050)	Salmon (1YR-6/5)	708	3.5 (4.8)	22.2	-	slight
2000 (1095)	Salmon (1YR-5/5)	718	5.0 (6.0)	20.2	-	slight
2060 (1125)	Medium red (R-YR-4/5)	1488	7.6 (9.0)	17.5	-	slight
2090 (1145)	Good dull red (R-YR-5/4)	1056	7.4 (7.8)	16.0	-	considerable
2160) (1180)	Deep dull red (R-YR-4/3)	1639	8.7 (10.5)	12.0	-	some

Remarks / Other Tests Firing range = Cone 1 to 5 and higher. Due to poor working properties, low strength, and high absorption this shale "is not suited, by itself, for the manufacture of heavy clay products." If mixed with a clay, such as 66a, it may be suitable for building brick and other products (Smith, 1931, p. 260).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size - 16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	55.85		
TiO_2	0.90	Quartz	
Al_2O_3	26.41	Feldspar	
Fe_2O_3	8.10	Carbonate	
FeO	0.28	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.12	Montmorillonite	
CaO	0.00	Others	
Na_2O	1.06		
K_2O	1.82		
P_2O_5	trace		
SO_3	0.21	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	5.35		
Total	100.10*		

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p. 258.)

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot ____, Sec. 3, Dist. 5.

71/2' topo quad. White West (SW. cor.) + Cartersville (NW. cor.). Lat. ____, Long. ____.

Field No. C-2, Collected by R.W. Smith. Date 4-9-30

Sample Method Several grab samples. Weathering/alteration Some weathering.

Structural Attitude -

Stratigraphic Assignment Conasauga Group shale (Cambrian).

Sample Description & Comments From several scattered outcrops of soft reddish brown to hard greenish-drab, fissile to massive shale on the W.D. Pittard property from low ridge just east of Cassville and the Dixie Hwy.* up to a "mile or so" north of Cassville (Smith, 1931, p. 257-260). (Note : sample Btw. 31S-67 is from the southern end of this same ridge).

* here "Dixie Hwy." is the East Branch, now Ga. Hwy. 3 and U.S. 41.

Compiled by B.J. O'Connor Date 9-7-81

CERAMIC TESTS AND ANALYSES

Material Soft to semi-hard shale (somewhat metamorphosed Conasauga). Compilation Map Location No. Btw. 31S-67

County Bartow. Sample Number C-14

Raw Properties: Lab & No. Ga. Tech., #67.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity - % Working Properties Very poor plasticity (even on aging 3 days); slow slaking; molding too poor to form test bars.

Color Red. Drying Shrinkage - % Dry Strength -

Remarks

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests No further tests run since working properties are too poor for the shale to be used, by itself, for heavy clay products manufacture (unless possibly blended with more plastic clays, like 66a). But perhaps suitable for lightweight aggregate manufacture (Smith, 1931, p. 261).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	Not determined.
Oxide	Weight %	Mineral	volume %
SiO_2	55.67		
TiO_2	1.08	Quartz	
Al_2O_3	28.68	Feldspar	
Fe_2O_3	8.35	Carbonate	
FeO	-	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.29		
CaO	0.00	Montmorillonite	
Na_2O	0.23	Others	
K_2O	0.10		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	5.50		
Total	99.90*		

(* = analysis recalculated on a H_2O^--free basis by Smith, 1931, p. 260.)

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot _____, Sec. 3, Dist. 5.

71/2' topo quad. Cartersville (NW cor.). Lat. _____, Long. _____.

Field No. C-14, Collected by R.W. Smith. Date 4-14-30

Sample Method Several grab samples. Weathering/alteration Weathered and somewhat metamorphosed.

Structural Attitude -

Stratigraphic Assignment Conasauga Group shale (Cambrian).

Sample Description & Comments Samples from several outcrops of somewhat metamorphosed Conasauga shale (soft to semi-hard, drab to reddish-brown and red, flaky and fissile to massive) from active and abandoned road cuts on the "Dixie Hwy." (Ga. Hwy. 3 & 20), 3/4 mile NW. of Cass Stn., 1/8 mile N. of the Nashville RR. at the southern end of a low ridge (same as Btw. 31S-66b to the north) on the S.H. Beardon and T.McKelvy properties (Smith, 1931, p. 260-261).

Compiled by B.J. O'Connor Date 9-7-81

CERAMIC TESTS AND ANALYSES

Material Hard shale and soft clay (Conasauga residuum). Compilation Map Location No. Btw. 31S-68

County Bartow. Sample Number C-30

Raw Properties: Lab & No. Ga. Tech., #68.

Date Reported 1931 Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 23.8 % Working Properties Clay = sticky plasticity; shale = grainy - fairly good on aging. Slaking is rapid to slow; molding is good.

Color Light brown. Drying Shrinkage 4.2 % Dry Strength (MOR) 93.5 psi.

Remarks Drying behavior: only slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Light salmon (3YR-6/7)	713	2.3 (6.6)	16.8	-	slight
1920 (1050)	Salmon (2YR-6/6)	922	2.6 (7.0)	15.9	-	slight
2000 (1095)	Light red (2YR-6/6)	1050	4.1 (7.9)	12.1	-	slight
2060 (1125)	Fair red (R-YR-5/5)	1359	5.0 (9.0)	11.9	-	slight
2090 (1145)	Medium red (R-YR-4/5)	1414	4.6 (8.8)	11.0	-	some
2160 (1180)	Good red (R-YR-4/3)	1682	5.9 (10.0)	8.8	-	some

Remarks / Other Tests Firing range = Cone 01-05 (commercial kiln = Cone 02-04). This mixture is satisfactory for building brick manufacture, but the shale by itself is probably too slow in slaking to be suitable for this (Smith, 1931, p. 261-263).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	44.72		
TiO_2	0.92	Quartz	
Al_2O_3	43.01	Feldspar	
Fe_2O_3	7.92	Carbonate	
FeO	trace	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.28	Montmorillonite	
CaO	0.00	Others	
Na_2O	0.37		
K_2O	1.94		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	9.89		
Total	100.05*		

(* = analysis recalculated on a H_2O^--free basis by Smith, 1931, p. 262).

Analyst E. Everhart, Ga. Survey.

Date c.1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot _____, Sec. 3, Dist. 4.

71/2' topo quad. Cartersville (NW. cor.). Lat. _____, Long. _____.

Field No. C-30, Collected by R.W. Smith. Date 4-24-30

Sample Method Grab (several). Weathering/alteration Variable.

Structural Attitude -

Stratigraphic Assignment Conasauga Group shale (Cambrian) and Recent (?) clay-probably from the residual weathering of impure Conasauga limestone.

Sample Description & Comments Mixture of about equal parts of shale and clay from the Richardson property (Hargis Homestead) on W. side of Nashville RR, 1/4 to 1/2 mile southeast of Cass Station. Shale (from RR. cut) is fissile to massive, hard and drab-colored in 500 ft. long exposure. Yellow (some brown and red) plastic clay is from the west slope of the ridge, near a family graveyard. (Shale is from east side of same ridge, Smith, 1931, p. 261-263.)

Compiled by B.J. O'Connor Date 9-10-81

CERAMIC TESTS AND ANALYSES

Material Gray clay & weathered shale (Rome Formation). Compilation Map Location No. Btw. 31S-69

County Bartow. Sample Number C-19

Raw Properties: Lab & No. Ga. Tech.; #69.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 27.8 % Working Properties Rapid slaking; fair plasticity, a little "short"; molding behavior fair.

Color Very light gray. Drying Shrinkage 2.4 % Dry Strength (MOR) 96.4 psi.

Remarks Drying behavior: Good, little or no warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005))	Salmon (3YR-6/5)	1282	5.5 (7.8)	16.5	-	very slight
1920 (1050)	Dark salmon (2YR-5/5)	1382	7.3 (9.5)	13.7	-	very slight
2000 (1095)	Light red (1YR-5/4)	2548	12.5 (14.8)	5.8	-	slight
2060 (1145)	Fair red (R-YR-4/3)	3514	12.7 (14.7)	2.1	-	some
2090 (1145)	Deep red (1YR-3/3)	3994	14.1 (16.3)	1.0	-	considerable (with vitrified appearance)
2160 (1180)	Gun-metal "black" (YR-3/2)	4088	12.4 (14.6)	0.1	-	bad (with vitrified surface glaze)

Remarks / Other Tests Firing range = Cone 02 to 1 (commercial kiln = Cone 04 to 01). Probably suited only for brick, flower pots, crude pottery and possibly for porous roofing tile or lightweight aggregate manufacture (Smith, 1931, p. 265).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	56.09		
TiO_2	0.91	Quarts	
Al_2O_3	29.11	Feldspar	
Fe_2O_3	6.44	Carbonate	
FeO	0.58	Mica	
MnO	-	Chlorite-. vermiculite	
MgO	0.13	Montmorillonite	
CaO	0.00	Others	
Na_2O	0.79		
K_2O	2.34		
P_2O_5	0.59		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	3.07		
Total	100.05*		

(* = analysis recalculated on an H_2O^--free basis by Smith, 1931, p. 264).

Analyst E. Everhart, Ga. Survey.

Date c.1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 267, Sec. 3, Dist. 4.

71/2' topo quad. Cartersville (E. center). Lat. _____, Long. _____.

Field No. C-19, Collected by R.W. Smith Date 4-17-30

Sample Method 6 ft. groove (prospect pit). Weathering/alteration Much weathered.

Structural Attitude A "shaly structure" striking to the NW., dipping 60°SE.

Stratigraphic Assignment Recent (?) residual clay and weathered shale of the Rome Formation (formerly "Cartersville Formation") of Cambrian age.

Sample Description & Comments 7 ft. pit: soft, massive, light gray at top to soft and dark gray clay at bottom with distinct shaly structure ("much weathered" shale) from the Dr. R.E. Adair property near north edge of Cartersville, east of and adjacent to the Nashville RR. freight yards (Smith, 1931, p. 263-265).

Compiled by B.J. O'Connor Date 9-10-81

CERAMIC TESTS AND ANALYSES

Material Soft shale and clay (Conasauga). Compilation Map Location No. Btw.31S-70

County Bartow. Sample Number C-9

Raw Properties: Lab & No. Ga. Tech., #70.

Date Reported 1931 Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 29.6 % Working Properties Fair plasticity (slightly "short" and grainy); rapid slaking; poor molding behavior.

Color Reddish-brown. Drying Shrinkage 2.0 % Dry Strength (MOR) 57.0 psi.

Remarks Drying behavior: good, little or no warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Salmon (2YR-6/6)	917	5.3 (7.2)	19.2	-	slight
1920 (1050)	Light red (1YR-5/5)	1240	6.5 (8.5)	16.8	-	some
2000 (1095)	Fair red (2YR-5/4)	1607	8.3 (10.1)	9.8	-	slight
2060 (1125)	Good red (1YR-5/4)	2185	10.7 (12.7)	8.8	-	considerable
2090 1145)	Good red (R-YR-4/4)	2401	12.8 (14.6)	6.0	-	considerable
2160 (1180)	Choc. red (1YR-3/4)	2616	13.7 (15.3)	3.8	-	some (with vitrified surface)

Remarks / Other Tests Firing range = Cone 02 to 4 (commercial kiln = Cone 03 to 2). This mixture is suitable for building brick manufacture only as the green strength is too poor for other clay products (Smith, 1931, p. 267).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Very easy grinding.

Particle Size -16 mesh. Retention Time c.17 hours.

Chemical & Mineralogical Data:

Chemical Analysis			Mineralogy	Not determined.
Oxide		Weight %	Mineral	volume %
SiO_2		54.95		
TiO_2		0.92	Quartz	
Al_2O_3		23.06	Feldspar	
Fe_2O_3		10.87	Carbonate	
FeO		-	Mica	
MnO		-	Chlorite-vermiculite	
MgO		0.03	Montmorillonite	
CaO		0.00	Others	
Na_2O		trace		
K_2O		3.44		
P_2O_5		0.03		
SO_3		0.00	Total	
C	(org.)	-		
CO_2		-		
H_2O^-		*		
H_2O^+		-		
Loss on Ignition		6.71		
Total		100.01*		

(*=analysis recalculated on a H_2O^--free basis by Smith, 1931, p. 266.)

Analyst E. Everhart, Ga. Survey.

Date c.1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 243 and 262, Sec. _____, Dist. _____.

71/2' topo quad. White West (SE corner). Lat. _____, Long. _____.

Field No. C-9, Collected by R.W. Smith. Date 4-12-30.

Sample Method Grab samples along 200 ft. of road ditch. Weathering/alteration Weathered shale and clay.

Structural Attitude Beds strike N.5°E., dipping 30° to 45°E.

Stratigraphic Assignment Conasauga Group shale and clay (Cambrian).

Sample Description & Comments Soft, flaky, brown to red shale and yellowish-brown to reddish-brown, slightly sandy clay from beside the White to Grassdale road, 1 mile west of the L & N RR. from the properties of J. Black, J. Randolph, R.L. Guyton and J. Ward (Smith, 1931, p. 265-267).

Compiled by B.J. O'Connor Date 9-11-82

CERAMIC TESTS AND ANALYSES

Material Semi-hard shale (Rome Formation). Compilation Map Location No. Btw. 31S-71

County Bartow. Sample Number C-18

Raw Properties: Lab & No. Ga. Tech.; # 71.

Date Reported 1931 Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 24.5 % Working Properties Poor plasticity ("short"); slow slaking; poor molding behavior.

Color Bluish-gray. Drying Shrinkage 1.1 % Dry Strength (MOR) 50.6 psi.

Remarks Drying behavior: rapid with only slight warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Light salmon (4YR-6/6)	1237	4.3 (5.4)	14.8	-	slight
1920 (1050)	Salmon (3YR-6/5)	1307	4.7 (6.0)	15.9	-	slight
2000 (1095)	Dark salmon (3YR-5/5)	1455	6.8 (8.0)	12.4	-	some
2060 (1125)	Fair red (R-YR-4/4)	2476	10.2 (11.2)	7.5	-	some
2090 (1145)	Deep choc. red (R-YR-3/2)	3433	11.6 (12.2)	1.8	-	considerable (with vitrified surface)
2160 (1180)	Deep choc. (R-YR-2/2)	3562	12.1 (13.1)	0.3	-	considerable to bad (surface is vitrified, almost glazed)

Remarks / Other Tests Short firing range (Cone 01 to 2) and poor green strength indicates it is not suitable, by itself, for heavy clay products manufacture, but it may be suited to lightweight aggregate manufacture (Smith, 1931, p. 269).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Fairly easy grinding-brittle rather than tough.

Particle Size -16 mesh. Retention Time c. 17 hours.

Chemical & Mineralogical Data:

Chemical Analysis

Oxide	Weight %	
SiO_2	48.48	56.38
TiO_2	0.91	0.86
Al_2O_3	33.90	17.14
Fe_2O_3	6.28	6.56
FeO	0.35	1.44
MnO	-	trace
MgO	2.02	3.20
CaO	0.00	0.00
Na_2O	0.57	0.53
K_2O	2.42	9.57
P_2O_5	trace	-
SO_3	0.15	-
C (org.)	-	-
CO_2	-	-
H_2O^-	*	0.70
H_2O^+	-	3.40
Loss on Ignition	4.96	-
Total*	100.04*	99.78

(* = analysis recalculated on an H_2O^--free basis by Smith, 1931, p. 268.)

Mineralogy Not determined.

Mineral	volume %
Quartz	
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
Total	

Analyst E. Everhart, Ga. Survey.

Date c. 1931. (second analysis in Shearer, 1918, p. 151, S-512).

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 298, Sec. 3, Dist. 5.

71/2' topo quad. White West (SE. side). Lat. _____, Long. _____.

Field No. C-18, Collected by R.W. Smith, Date 4-16-30

Sample Method Several grab samples across quarry, perpendicular to bedding. Weathering/alteration Weathered 12 years.

Structural Attitude Strike N.45° to 72°E., dip 40° to 70°SE. (Shearer, 1918).

Stratigraphic Assignment Rome Formation ("Cartersville Formation") - Cambrian.

Sample Description & Comments Slaty, semi-hard, somewhat crumbly, vari-colored shale (light yellow through gray to purplish gray) from abandoned quarry (American Potash Co.) on the T.A. Bennett property 1/4 mile south of White between old Ga. Hwy. 61 (on the west) and the L & N RR. (on the east) as described by Smith (1931, p. 267-269) and based in part on earlier descriptions in Shearer (1918, p. 150-152). (Smith's map shows this location on the E. side of the RR).

Compiled by B.J. O'Connor Date 9-11-81

CERAMIC TESTS AND ANALYSES

Material Semi-hard to hard shale (Conasauga Group). Compilation Map Location No. Btw. 31S-72

County Bartow. Sample Number C-12

Raw Properties: Lab & No. Ga. Tech.; #72.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity - % Working Properties Very poor plasticity, "short"; slow slaking; molding behavior too poor to form test bars on a roll press, even after several days aging.

Color Red. Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined (working properties too poor).

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests This sample unsuited, by itself, for manufacture of heavy clay products (Smith, 1931, p. 270).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis

Oxide	Weight %
SiO_2	60.31
TiO_2	1.09
Al_2O_3	22.51
Fe_2O_3	7.08
FeO	1.16
MnO	-
MgO	0.25
CaO	0.00
Na_2O	2.54
K_2O	0.44
P_2O_5	0.08
SO_3	0.00
C (org.)	-
CO_2	-
H_2O^-	*
H_2O^+	-
Loss on Ignition	4.66
Total	100.12*

(* = analysis recalculated on a H_2O^--free basis by Smith, 1931, p.270).

Mineralogy Not determined.

Mineral	volume %
Quartz	
Feldspar	
Carbonate	
Mica	
Chlorite-vermiculite	
Montmorillonite	
Others	
Total	

Analyst E. Everhart, Ga. Survey.

Date c. 1931.

Method Standard "wet".

Sample Location Data:

County Bartow Land Lot 259 & 245, Sec. 3, Dist. 5. (Sullins & Hamrick Props.)

71/2' topo quad. White West (E. center). Lat. _____, Long. _____.

Field No. C-12, Collected by R.W. Smith. Date 4-14-30.

Sample Method Grab samples. Weathering/alteration Some weathering.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) - partly metamorphosed.

Sample Description & Comments Semi-hard to hard, red (Hamrick prop.) and gray to brownish-red "shale" or phyllite with a crenulated fracture and a silky luster, locally with vein quartz. Tests were run on the red and gray types from road outcrops on the Sullins property about 1 mile NW. of the L & N Railroad northeast of and adjacent to the Hamrick property (Smith, 1931, p. 269-270).

Compiled by B.J. O'Connor Date 9-11-81

CERAMIC TESTS AND ANALYSES

Material Semi-hard red shale. Compilation Map Location No. Btw. 31S-73

County Bartow. Sample Number C-17

Raw Properties: Lab & No. Ga. Tech. #73.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity - % Working Properties Very poor plasticity, "short" (even after aging several days); very slow slaking.

Color Reddish-purple. Drying Shrinkage - % Dry Strength -

Remarks Molding properties too poor to roll into bars.

Slow Firing Tests: Not determined (working properties too poor).

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests Sample not suited, by itself, for manufacture of heavy clay products although it could possibly be used in blends with more plastic clays or shales (Smith, 1931, p. 271).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Easy grinding.

Particle Size -16 mesh. Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy Not determined.	
Oxide	Weight %	Mineral	volume %
SiO_2	54.64		
TiO_2	0.90	Quartz	
Al_2O_3	30.33	Feldspar	
Fe_2O_3	6.31	Carbonate	
FeO	-	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.64		
CaO	0.00	Montmorillonite	
Na_2O	0.50	Others	
K_2O	0.44		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	4.15		
Total	99.91*		

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p.271).

Analyst E. Everhart, Ga. Survey.

Date c.1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 318, Sec. 3, Dist. 5.

71/2' topo quad. White East (W. center). Lat. _____, Long. _____.

Field No. C-17, Collected by R.W. Smith. Date 4-16-30

Sample Method Several grab. Weathering/alteration Weathered.

Structural Attitude Red shale strikes "a little east of north" and dips "nearly vertical".

Stratigraphic Assignment From near contact between Conasauga Group and Rome Formation ("Cartersville Formation") - Cambrian.

Sample Description & Comments Semi-hard red shale near and south of the house on the J.L. Parker property on the west side of old Ga. Hwy. 61, about 1 mile north of White (Smith, 1931, p. 270-271) and west of the L & N Railroad tracks.

Compiled by B.J. O'Connor Date 9-11-81

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga). Compilation Map Location No. Btw. 31S-74

County Bartow. Sample Number C-5

Raw Properties: Lab & No. Ga. Tech., #74.

Date Reported 1931. Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity 26.2 % Working Properties Poor plasticity, grainy (after aging several days); very slow slaking; molding very poor, bars formed by "slop molding".

Color Brownish-red. Drying Shrinkage 1.7 % Dry Strength (MOR) 27.2 psi.

Remarks Drying behavior: rapid with little or no warpage.

Slow Firing Tests:

Approx. Temp. °F (°C)	Color (Munsell)	Hardness (MOR, psi.)	Linear Shrinkage, % dry (plastic)	Absorption %	Appr. Por. %	Other data: Warpage
1840 (1005)	Pale salmon (4YR-6/6)	337	1.0 (2.5)	23.7	-	none
1920 (1050)	Lt. salmon (3YR-6/5)	581	2.1 (3.6)	20.1	-	none
2000 (1095)	Salmon (2YR-6/5)	820	3.1 (4.6)	17.4	-	none
2060 (1125)	Light red (R-YR-5/5)	1569	3.8 (5.2)	14.7	-	very slight
2090 (1145)	Fair red (R-YR-5/4)	1357	7.4 (9.5)	11.6	-	slight
2160 (1180)	Good red (9R-4/4)	2010	7.4 (9.0)	8.4	-	slight

Remarks / Other Tests Firing range = Cone 3 to 5 (commercial kiln = Cone 1 to 5). This sample is not suited, by itself, for the manufacture of heavy clay products due to its poor working properties, low strength and high absorption. It may be used in blends with other plastic clays or shales or possibly in lightweight aggregate manufacture (Smith, 1931, p. 273-274).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Fairly easy grinding; brittle rather than tough.

Particle Size -16 mesh. Retention Time c.17 hrs.

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	Not determined.
Oxide	Weight %	Mineral	volume %
SiO_2	57.32		
TiO_2	0.90	Quartz	
Al_2O_3	19.80	Feldspar	
Fe_2O_3	12.31	Carbonate	
FeO	-	Mica	
MnO	-	Chlorite-vermiculite	
MgO	trace		
CaO	0.00	Montmorillonite	
Na_2O	0.70	Others	
K_2O	2.44		
P_2O_5	trace		
SO_3	0.00	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	6.80		
Total	100.27*		

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p.273).

Analyst E. Everhart, Ga. Survey.

Date c.1931.

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot ____, Sec. 2, Dist. 23.

71/2' topo quad. White East (NW. cor.). Lat. ____, Long. ____.

Field No. C-5, Collected by R.W. Smith. Date 4-11-30

Sample Method Grab samples from highway cut. Weathering/alteration Weathered, somewhat metamorphosed.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian).

Sample Description & Comments Artificial cuts on Ga. Hwy. 61 and the L&N RR., 1 mile north of Rydal (on the S.W. Bowen and S.R. Bradford properties) exposing hard Conasauga "shale" or phyllite with a silky luster - some is crenulated and almost schistose. It is mostly drab to purplish-brown in color and is very fissile - fragile and crumbly where weathered (Smith, 1931, p. 272 - 274).

Compiled by B.J. O'Connor Date 9-12-81

CERAMIC TESTS AND ANALYSES

Material Hard graphitic schist. Compilation Map Location No. Btw.31S-75

County Bartow. Sample Number C-27

Raw Properties: Lab & No. Ga. Tech., #76.

Date Reported 1931 Ceramist R.W. Smith, Ga. Survey.

Water of Plasticity - % Working Properties Slow slaking (if any at all); practically no plasticity; impossible to mold test bars, even by hand.

Color Black. Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined (due to extremely poor working properties).

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Remarks / Other Tests Material not suited, by itself, for manufacture of heavy clay products unless blended with a more plastic material (Smith, 1931, p. 276).

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) Fairly easy grinding.

Particle Size -16 mesh. Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2	56.40		
TiO_2	0.91	Quartz	
Al_2O_3	29.94	Feldspar	
Fe_2O_3	0.36	Carbonate	
FeO	0.64	Mica	
MnO	-	Chlorite-vermiculite	
MgO	0.65	Montmorillonite	
CaO	0.71	Others	
Na_2O	0.83		
K_2O	0.69		
P_2O_5	trace		
SO_3	0.66	Total	
C (org.)	-		
CO_2	-		
H_2O^-	*		
H_2O^+	-		
Loss on Ignition	8.15		
Total	99.94*		

(* = analysis recalculated on a H_2O^- -free basis by Smith, 1931, p. 276).

Analyst E. Everhart, Ga. Survey.

Date c. 1931

Method Standard "wet".

Sample Location Data:

County Bartow. Land Lot 1113 & 1120 Sec. 3, Dist. 4.

71/2' topo quad. Burnt Hickory Ridge (NE. side). Lat. ____, Long. ____.

Field No. C-27, Collected by R.W. Smith. Date 4-23-30.

Sample Method Grab samples. Weathering/alteration Metamorphosed.

Structural Attitude -

Stratigraphic Assignment Unit "gms" (Precambrian ?) graphite-feldspar-quartz-muscovite schist (Cressler, and others, 1979, p. 14 and pl. 4).

Sample Description & Comments Dark gray to black graphitic, micaceous schist with much quartz and pyrite from the H.A. Beard property on the side of the valley of a small branch on the south side of Pumkinvine Creek, 2 miles due south of Emerson. Samples from the abandoned quarry of the old Atlanta Vitrified Brick Co. (1914) which unsucessfully attempted to make vitrified paving and building brick from the schist blended with local alluvial clay - the schist was also formerly ground and used as a fertilizer filler (Smith, 1931, p. 274-276) by Cherokee Chemical Co. (Kesler, 1950, p. 91; locn. GR 2, pl. 1).

Compiled by B.J. O'Connor Date 9-12-81

CERAMIC TESTS AND ANALYSES

Material Clay, soft. Compilation Map Location No. Btw. 46-1

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; Ga. 16.

Date Reported 5-16-46 Ceramist H. Wilson, USBM.

Water of Plasticity - % Working Properties Fair plasticity; slakes readily.

Color Very dark slate gray. Drying Shrinkage - % Dry Strength -

Slow Firing Tests:

Approx. Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
2075 (1135) (Cone 2)	Pale brick red	Fairly hard	-	-	-	-
2174 (1190) (Cone 6)	Dark, non-descript	Very hard	-	-	-	-

Remarks / Other Tests This material seems to merit further investigation as a brick clay.

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lots 421-423, and 442-445 (Robertson, 1948, p. 2) Sec. 3, Dist. 17.

71/2' topo quad. Wax (SE. side) & Kingston (SW. side). Lat. _____, Long. _____.

Field No. -, Collected by J.W. Hodge (owner). Date c. 4-26-46

Sample Method Grab (?). Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Recent (?) residual clay from Knox Group carbonates.

Sample Description & Comments Dark gray clay from J.W. Hodge of Hodge Mining Co. N. of Taylorsville (apparently the same as locn. #44, Butts and Gildersleeve, 1948, mine location map). (Also see Btw. 65-1a to -g and 66-9.)

Compiled by B.J. O'Connor Date 12-29-80

CERAMIC TESTS AND ANALYSES

Material Shale (Rome Formation). Compilation Map Location No. Btw. 46-2

County Bartow. Sample Number 16.

Raw Properties: Lab & No. N.C. State College Research Lab
Asheville, North Carolina; TVA #113.

Date Reported 10-8-46. Ceramist M. K. Banks, TVA.

Water of Plasticity - % Working Properties -

Color Red-green. Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Preliminary Bloating (Quick Firing) Tests: Negative.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	Remarks
2350 (1288)	-	-	-	-
2400 (1316)	-	-	-	-
2450 (1343)	-	-	-	Vitrified only (too refractory).

Remarks Not usable, by itself, for expanded lightweight aggregate manufacture.

Crushing Characteristics (unfired material) -

Particle Size -8 mesh. Retention Time 30 min. (in muffle furnace).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (NW 1/4). Lat. _____, Long. _____.

Field No. 16, Collected by S.D. Broadhurst (TVA). Date c. 1946.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Rome Formation (Cambrian).

Sample Description & Comments Interim report on tests from N.C. Research Lab via H.S. Rankin (TVA, 10-22-46). Sample from roadcut on U.S. 411 and 41, 1/2 mi. E. of their junction, W. of Cartersville. Material is a relatively hard, red-green shale which is slightly sandy in spots, but no sand-sandstone beds were noted in the immiediate vicinity. Workable areas of similar materials are found in the surrounding vicinity.

Compiled by B.J. O'Connor Date 2-26-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga). Compilation Map Location No. Btw. 46-3.

County Bartow. Sample Number 17.

Raw Properties: Lab & No. N.C. State College Research Lab
Asheville, N.C.; TVA #114.

Date Reported 10-8-46 Ceramist M. K. Banks, TVA.

Water of Plasticity - % Working Properties -

Color Brown-green. Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Preliminary Bloating (Quick Firing) Tests: Negative.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	Remarks
2350 (1288)	-	-	-	-
2400 (1316)	-	-	-	-
2450 (1343)	-	-	-	Vitrified only (too refractory).

Remarks Not usable, by itself, for expanded lightweight aggregate manufacture.

Crushing Characteristics (unfired material) -

Particle Size -8 mesh. Retention Time 30 min. (in muffle furnace).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (N. cntr.). Lat. _____, Long. _____.

Field No. 17, Collected by S.D. Broadhurst (TVA). Date c. 1946.

Sample Method Grab (?). Weathering/alteration _____

Structural Attitude _____

Stratigraphic Assignment Conasauga Group (Cambrian).

Sample Description & Comments Interim report on tests from N.C. Research Lab. via H.S. Rankin (TVA, 10-22-46). Sample is from cut on the L & N Railroad, 1/2 mi. south of Adairsville, and is composed of fairly soft, brown to green shale. Limestone is present in the immediate vicinity but not enough to prevent the shale being worked. Sandy layers are present but not numerous.

Compiled by B.J. O'Connor Date 2-26-82

CERAMIC TESTS AND ANALYSES

Material Slate (Conasauga Group). Compilation Map Location No. Btw. 46-4.

County Bartow. Sample Number 18.

Raw Properties: Lab & No. N.C. State College Research Lab
Asheville, N.C.; TVA #115.

Date Reported 10-8-46 Ceramist M. K. Banks, TVA.

Water of Plasticity - % Working Properties -

Color (Dark green?) Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Preliminary Bloating (Quick Firing) Tests: Positive.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	Remarks
2350 (1288)	-	-	-	-
2400 (1316)	-	-	-	(Bloated a small amount).
2450 (1343)	-	-	66	Poor pore structure; irregular and brittle.

Remarks Bloating range = 2350-2450°F (1288-1343°C); peak inferred to be about 2425°F (1329°C).

Crushing Characteristics (unfired material) -

Particle Size -8 mesh. Retention Time 30 minutes (in muffle furnace).

Chemical & Mineralogical Data: None.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Fairmount (SW. 1/4). Lat. _____, Long. _____.

Field No. 18, Collected by S.D. Broadhurst (TVA). Date c. 1946.

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group slate (Cambrian).

Sample Description & Comments Interim report on tests from N.C. Research Lab via H.S. Rankin (TVA, 10-22-46). From "quarry adjacent to U.S. Highway 411, 4 miles south of Fairmount (Gordon Co.) in Bartow Co." (Butts and Gildersleeve, 1948, p. 124-125, Table 8, sample 4 and map location No. 35, p. 154). Flexatile slate quarry, at Funkhouser grinding plant (roofing granules).

Compiled by B.J. O'Connor Date 3-8-82

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 57-1

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; no. 728.

Date Reported 2-11-57. Ceramist H.P. Hamlin, USBM.

Water of Plasticity 50 % Working Properties Smooth, very plastic, and slightly fatty.

Color - Drying Shrinkage - % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
1800 (982)	Cream	-	-	-	-	-
2100 (1149)	Light buff	-	-	-	-	-
2200 (1204)	Dark buff	-	-	-	-	-
2300 (1260)	Tan-gray	(vitrified)	19	0.4	-	-
2400 (1316)	Stoneware gray	-	(considerable expansion = over firing)		-	-

Remarks / Other Tests Color is poor but might be suitable for pottery or artware or in blends with other clays.

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C)

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Rockmart North (NE 1/2). Lat. _____, Long. _____.
or Taylorsville (N 1/3)?

Field No. - _____, Collected by A.B. Scheuer Date Jan. 1957

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Recent (?)

Sample Description & Comments From an abandoned "mortar mix" pit in SW. Bartow County near the Polk County line. (The exact location is unknown.)

Compiled by B.J. O'Connor Date 12-29-80

CERAMIC TESTS AND ANALYSES

Material Clay, tripolitic. Compilation Map Location No. Btw. 57-2

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; no. 825.

Date Reported 9-5-57 Ceramist H.P. Hamlin, USBM.

Water of Plasticity - % Working Properties -

Color - Drying Shrinkage - % Dry Strength -

Slow Firing Tests: Not determined.

Temp. °F (°C)	Color (Munsell)	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size 20 mesh to 200 mesh. Retention Time -

Chemical & Mineralogical Data:

Chemical Analysis: Not determined

Oxide	Weight %
SiO_2	
TiO_2	
Al_2O_3	
Fe_2O_3	
FeO	
MnO	
MgO	
CaO	
Na_2O	
K_2O	
P_2O_5	
S (total)	
C (org.)	
CO_2	
H_2O^-	
H_2O^+	
Other volatiles	
Total	

Mineralogy

Mineral	volume %
Quartz	90 (± 5%)
Feldspar	
Carbonate	
Mica	5 (± 2%)
Chlorite-vermiculite	
Montmorillonite	
Others	
Clay	5 (± 2%)
Total	100

Analyst _____ H.P. Hamlin (?), USBM.

Date _____ 1-16-57

Method _____ X-ray and petrography.

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (?). Lat. _____, Long. _____.

Field No. - , Collected by A.B. Schure (Scheure ?) Date 1-11-57

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Recent (?) residual clay (from weathered Knox Group chert?).

Sample Description & Comments Composed largely of fine sand that "would probably qualify as tripoli." (A screen analysis is available on file at the Ga. Survey.) The exact location is unknown, but is probably in the Cartersville area.

Compiled by B.J. O'Connor Date 12-29-80

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 57-3

County Bartow. Sample Number

Raw Properties: Lab & No. USBM, Norris, Tenn.; no. 857.

Date Reported 10-15-57 Ceramist H.P. Hamlin, USBM.

Water of Plasticity - % Working Properties Very plastic, smooth, slightly sandy. pH = 4.03.

Remarks Drying behavior: No defects.

Color Light gray. Drying Shrinkage 5 % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Appr. Sp. Gr.
1800 (982)	Light pink	Soft, crumbly	5.5	19.0	32.9	2.58
2000 (1093)	Light pink	Soft, crumbly	7.5	18.1	32.0	2.60
2100 (1149)	Light ivory	Fairly hard	10.0	11.8	23.1	2.55
2200 (1204)	Light tan	Fairly hard	11.0	7.6	15.9	2.48
2300 (1260)	Tan-gray	Hard	12.5	5.5	11.7	2.42
2400 (1316)	Gray	Very hard	12.5	2.9	6.4	2.37

Remarks / Other Tests PCE = Cone 23-26. Possible uses are for low heat-duty refractory products (e.g., fire brick, flue tile, etc.) or for mixing with non-plastic material to improve their plasticity. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: None.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (SW 1/4). Lat. _____, Long. _____.

Field No. -, Collected by Don Ray (Ga. Survey) Date c. 9-16-57

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Recent (?)

Sample Description & Comments From the F.H. Shaw property (near Ladds) about 2 miles southwest of Cartersville - the precise location is unknown.

Compiled by B.J. O'Connor Date 12-29-80

CERAMIC TESTS AND ANALYSES

Material Clay, halloysite. Compilation Map Location No. Btw. 59-1

County Bartow. Sample Number 2.

Raw Properties: Lab & No. USBM, Norris, Tenn.; no. 1091.

Date Reported 5-21-59 Ceramist H.P. Hamlin, USBM.

Water of Plasticity 46 % Working Properties Fairly plastic, slightly "short"; and tears easily. pH = 4.5.

Color White. Drying Shrinkage 2.5 % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	White	Soft, crumbly	9.5	37.7	50.8	2.74
2000 (1093)	White	Soft, crumbly	9.5	36.9	50.5	2.76
2100 (1149)	White	Soft, crumbly	9.5	36.0	49.7	2.75
2200 (1204)	White	Soft, crumbly	10.5	31.7	46.5	2.74
2300 (1260)	White	Hard	17.0	17.6	32.6	2.75
2400 (1316)	White	Hard	20.0	13.2	26.7	2.76

Remarks / Other Tests PCE = Cone 35-36; X-ray and electron microscope analysis indicates a high grade halloysite with very little extraneous material. Color analysis also performed: "Colors are satisfactory for any ceramic use." (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data:

Chemical Analysis: Not determined.

Oxide	Weight %
SiO_2	
TiO_2	
Al_2O_3	
FE_2O_3	
FeO	
MnO	
MgO	
CaO	
Na_2O	
K_2O	
S	(total)
C	(org.)
CO_2	
H_2O^-	
H_2O+	
Other volatiles	
Total	

Mineralogy Mineral	volume %
Quartz	
Feldspar	
Mica	
Chlorite	
vermiculite	
Montmorillonite	
Others	
Halloysite	100
Total	100

Analyst _____ H.P. Hamlin, USBM.

Date _____ 5-21-59

Method _____ X-ray & electron microscope.

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Acworth (NW. cor.). Lat. _____, Long. _____.

Field No. 2, Collected by E.C. Perry, Jr. (Ga. Survey) Date 1958

Sample Method Grab (?) Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Recent (?) associated with iron ores in Shady Cambrian).

Sample Description & Comments High grade halloysite clay associated with iron ore at the open pit mine on the Frank Smith property at Bartow, E. of U.S. Hwy. 41 and N. of Pumpkinvine Creek, below Allatoona store (A.S. Furcron, Ga. Min. Newsletter, 1959, p. 42 and 43 and unpubl. notes). Also see Color Analysis.

Compiled by B.J. O'Connor Date 3-29-82

CERAMIC TESTS AND ANALYSES

Material Clay, kaolin. Compilation Map Location No. Btw. 61-1(a)

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn. #1359 (857).

Date Reported 9-20-61. Ceramist H.P. Hamlin, USBM.

Water of Plasticity 26.0 % Working Properties Fair plasticity; gritty and "short" working. pH = 5.2.

Color Light cream. Drying Shrinkage 5.0 % Dry Strength Low.

Remarks Drying properties: Good.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Appr. Sp. Gr.
1800 (982)	Faint ivory	-	5.0	20.5	34.9	2.62
2000 (1093)	Off-white	-	7.5	19.5	34.1	2.65
2100 (1149)	Off-white	-	9.0	17.6	31.7	2.64
2200 (1204)	Light gray	-	10.5	13.1	25.1	2.56
2300 (1260)	Light gray	-	11.0	12.1	23.2	2.49
2400 (1316)	Light gray	-	12.5	3.7	8.2	2.43

Remarks / Other Tests Potential use for off-color ceramic ware and low heat-duty refractory products. Beneficiation to remove the quartz and mica would improve the quality of this clay (see Btw. 61-1b). (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Boating (Quick Firing) Tests: Not determined.

CERAMIC TESTS AND ANALYSES

Material Clay (bastard stoneware). Compilation Map Location No. Btw. 61-1(b)

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; #1359 A (washed from 1359).

Date Reported 4-16-62. Ceramist H.P. Hamlin, USBM.

Water of Plasticity 33.0 % Working Properties Fairly plastic and smooth; slightly fatty; fine grit.

Color Gray. Drying Shrinkage 5.0 % Dry Strength Above average.

Remarks Drying properties: Good; no defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Appr. Sp. Gr.
1800 (982)	Very lt. cream-gray	Fair hard (3)	5.5	20.7	34.5	2.54
2000 (1093)	Off white	Very hard (5)	9.0	14.4	26.7	2.53
2100 (1149)	Very lt. gray	Steel hard (6)	11.0	8.5	17.5	2.49
2200 (1204)	Very lt. tan-gray	Steel hard (6)	15.5	4.1	9.0	2.42
2300 (1260)	Very lt. tan-gray	Steel hard (6)	16.0	0.1	2.3	2.34
2400 (1316)	Light gray	Steel hard (6)	0.2	0.2	4.5	2.34

Remarks / Other Tests PCE = slightly below Cone 27 (on the unbeneficiated material it was Cone 20). Properties improved by washing (from Btw. 61-1a). Potential use for stoneware, pottery and intermediate heat-duty refractories. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Not determined.

locn. no. Btw. 61-1 (a & b), cont.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (SW. 1/4). Lat. _____, Long. _____.

Field No. -, Collected by C.A. Shields, Jr. Date August 1961

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Recent (?) clay.

Sample Description & Comments Clay sample (associated with gravel deposit) from the Shaw property 1/2 mile from Etowah mound - also see Btw. 57-3. Sample submitted by C.A. Shields, Jr. of Armstrong & Brothers Co., Atlanta (unpubl. data, Ga. Survey files).

Compiled by B.J. O'Connor Date 2-5-82

CERAMIC TESTS AND ANALYSES

Material Clay (tripolitic). Compilation Map Location No. Btw. 61-2

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; #1302.

Date Reported 3-8-61. Ceramist H.P. Hamlin, USBM.

Water of Plasticity 38.0 % Working Properties Short, not plastic; fine grit. pH = 5.0.

Color Cream. Drying Shrinkage 5.5 % Dry Strength Low.

Remarks Drying properties: No defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Appr. Sp. Gr.
1800 (982)	Buff-cream	Soft, crumbly	6.0	33.5	46.8	2.63
2000 (1093)	Off white	Soft, crumbly	6.0	33.1	46.4	2.62
2100 (1149)	Off white	Soft, crumbly	10.0	31.6	45.3	2.62
2200 (1204)	Off white	Soft, crumbly	10.0	28.1	42.0	2.58
2300 (1260)	Off white	Soft, crumbly	11.0	19.2	32.1	2.46
2400 (1316)	Off white	Fair hard	Expanded	16.4	28.0	2.37

Remarks / Other Tests Potential use for abrasive buffing compounds, foundry mold facings, inert filler, etc. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Not determined.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data:

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	90±
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O		Clay (kaolin)	10±
K_2O			
P_2O_5			
S (total)		Total	100
C (org.)			
CO_2			
H_2O^-			
H_2O^+			

Loss on Ignition

Total

Analyst _____ H.P. Hamlin, USBM.

Date _____ 3-8-61

Method _____ Not given.

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (SE. side). Lat. _____, Long. _____.

Field No. -, Collected by R. Turkington. Date c. Feb. 1961.

Sample Method Grab (?). Weathering/alteration Residual (?) shale.

Structural Attitude -

Stratigraphic Assignment Weathered shale probably from the Knox Group.

Sample Description & Comments Light grey shale with brown "iron" stains collected on U.S. Hwy 41, 4 miles south of Cassville.

Compiled by B. J. O'Connor Date 2-5-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-1

County Bartow. Sample Number 20

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1553-R.

Date Reported 4-8-64 (revised 1967) Ceramist M.V. Denny, USBM (revised by M. E. Tyrrell, Tuscaloosa, Ala.)

Water of Plasticity 29.2 % Working Properties Long working, plastic, smooth, fatty. (Low plasticity.) pH ≈ 6.80. (Not effervescent with HCl.)

Color Red. Drying Shrinkage 1.0 (0.0) % Dry Strength Good. (Low.)

Remarks Drying props.: Fair - uneven surface. (No defects.)

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cm^3
1800 (982)	Tan	Soft (2)	2.5	26.8	41.3	1.54
1900 (1038)	Tan	Soft (2)	2.5	21.5	35.9	1.67
2000 (1093)	Light brown	Hard (4)	6.5 (6.0)	15.7	28.9	1.84
2100 (1149)	Brown	Hard (4)	9.5 (9.0)	8.6	17.9	2.08
2200 (1204)	Dark choc. (brown)	Steel hard (6)	9.5 (9.0)	1.8	4.3	2.38
2300 (1260)	Dark choc. (brown)	Steel hard (6)	11.0	1.1	2.7	2.41

Remarks / Other Tests Good color. (Abrupt vitrification). Potential use: brick and tile, general pottery at about 2050 - 2100°F (1121- 1149°C) if surface not too uneven. (Face brick, sewer pipe, quarry tile. Should fire to "SW" face brick specifications at about 2100°F, 1149°C.)

Preliminary Bloating (Quick Firing) Tests: Negative.

NOTE: App. Por. and Bulk Dens. plus data and remarks in parentheses are from 1967 revised data sheets by Tyrrell.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (NW. 1/4). Lat. _____, Long. _____.

Field No. ("new 12"), 20, Collected by J.W. Smith. Date 1963.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments On east side of U.S. Highway 41, 0.16 mile north of intersection with U.S. Highway 411, 8.60 miles S. of Btw. 64-2 and near Btw. 31S-67 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-2

County Bartow. Sample Number 26

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1553-X.

Date Reported 4-8-64 (revised 1967) Ceramist M.V. Denny, USBM (revised by M. E. Tyrrell, Tuscaloosa, Ala.)

Water of Plasticity 25.8 % Working Properties Long working, smooth, plastic, fatty. (Low plasticity.) pH = 6.5. (Not effervescent with HCl.)

Color Red-tan. Drying Shrinkage 2.5 % Dry Strength Good. (Low.)

Remarks Drying props.: Good, slightly rough surface. (No defects.)

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Red-tan	Soft (2)	2.5	29.1	46.3	1.59
1900 (1038)	Red-tan	Fair hard (3)	5.0	22.3	37.9	1.70
2000 (1093)	Red-brown	Hard (4)	5.0	18.3	33.1	1.81
2100 (1149)	Red-brown	Hard (4)	5.5 (5.0)	16.2	30.6	1.89
2200 (1204)	Dark brown	Very hard (5)	8.5 (8.0)	12.8	25.6	2.00
2300 (1260)	Dark brown	Steel hard (6)	10.0	9.6	20.3	2.11

Remarks / Other Tests Fair color, high absorption. (Should fire to "MW" face brick specifications at about 2200°F, 1204°C.) Potential use: Inside brick. (Face brick.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Note: App. Por. and Bulk Dens. plus data and remarks in parentheses are from 1967 revised data sheets by Tyrrell.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartzrtz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (E. cntr.) . Lat. _____, Long. _____.

Field No. 26, ("new 10") , Collected by J.W. Smith. Date 1963.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments On the east side of U.S. Highway 41, 8.76 miles northwest of intersection with U.S. Highway 411, and 8.60 miles N. of Btw. 64-1 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-3

County Bartow. Sample Number 36

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1554-H.

Date Reported 5-8-64 (revised 1967) Ceramist M.V. Denny, USBM (revised by M. E. Tyrrell, Tuscaloosa, Ala.)

Water of Plasticity 24.2 % Working Properties Short working, mealy, gritty, smooth. (Low plasticity.) pH = 6.6. (Not effervescent with HCl.)
Color Light-brown. Drying Shrinkage 1.0 (0.0) % Dry Strength Fair. (Low.)

Remarks Drying props.: fair, rough. (No defects.)

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Flesh	Fair hard (3)	0.5 (0.0)	22.2	37.7	1.70
1900 (1038)	Red-tan	Hard (4)	2.5	17.7	32.2	1.82
2000 (1093)	Light brown	Hard (4)	5.0	15.4	29.1	1.89
2100 (1204)	Brown	Very hard (5)	5.0	13.4	26.3	1.96
2200 (1204)	Chocolate	Very hard (5)	5.0	9.7	20.0	2.06
2300 (1260)	Dark brown	Shattered	Expanded	-	-	-

Remarks / Other Tests Good color, low shrinkage, absorption a little high, mottled surface. (Should fire to "MW" face brick specifications at 2100°F, 1204°C.) Potential use: decorative brick. (Face brick.) Might make good art pottery if plasticizer added.

Preliminary Bloating (Quick Firing) Tests: Positive.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	Remarks
1900 (1038)	14.3	2.45	153	-
2000 (1093)	16.0	2.43	151	-
2100 (1149)	19.0	1.98	123	Slight bloating, no skin.
2200 (1204)	15.0	1.83	114	Slight bloating, no skin.
2300 (1260)	8.5	1.42	87.5	Rotary kiln bloating about 2100°F (1149°C).

Remarks Possible lightweight aggregate; a little heavy and high temperature.

Crushing Characteristics (unfired material) Good.

Particle Size -20 mesh and -3/4", + 1/2" Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F., 982°C) and 15 min. (quick-firing tests).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (N. cntr.) . Lat. _____, Long. _____.

Field No. ("new 9"), 36 , Collected by J.W. Smith. Date 1963.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments 12 feet below the top of the cut on the west side of County Road S-829 (Kingston-Adairsville Road), 3.27 miles south of intersection with Ga. Highway 140 in Adairsville and 0.62 mile S. of Btw. 64-4 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-4

County Bartow. Sample Number 37

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1554-I.

Date Reported 5-8-64 (revised 1967) Ceramist M.V. Denny, USBM (revised by M. E. Tyrrell, Tuscaloosa, Ala.)

Water of Plasticity 19.0 % Working Properties Short working, mealy, gritty, smooth. (Low plasticity.) pH = 6.9. (Not effervescent with HCl.)
Color Gray. Drying Shrinkage 1.0 (0.0) % Dry Strength Good. (Low.)

Remarks Drying props.: Good. (No defects.)

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Flesh	Fair hard (3)	0.0	18.6	33.5	1.80
1900 (1038)	Tan	Hard (4)	4.0	14.5	27.8	1.92
2000 (1093)	Light brown	Hard (4)	4.5 (4.0)	12.4	24.4	1.97
2100 (1149)	Chocolate	Very hard (5)	5.5 (5.0)	10.1	20.7	2.05
2200 (1204)	Dark brown	Steel hard (6)	7.5	6.8	14.8	2.18
2300 (1260)	-	-	(Expanded)	-	-	-

Remarks / Other Tests Good color - needs plasticizer. Too much iron for flue tile. (Should fire to "MW" face brick specifications at about 2000°F, 1093°C.)
Potential use: decorative brick and inside tile. (Face brick.)

Preliminary Bloating (Quick Firing) Tests: Positive.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	
1900 (1038)	21.0	2.22	139	Shaley.
2000 (1093)	21.0	2.28	142	-
2100 (1149)	12.0	2.05	128	Irregular bloating.
2200 (1204)	2.8	1.59	99	Layered bloating.
2300 (1260)	2.3	1.33	83	Layered bloating, good skin.

Remarks Use: Probable lightweight aggregate, a little heavy and high temperature.

Crushing Characteristics (unfired material) Shaley.

Particle Size -20 mesh and -3/4", + 1/2". Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C) and 15 min. (quick-firing tests .

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (N. cntr.) . Lat. _____, Long. _____.

Field No. 37, ("new 8") , Collected by J.W. Smith. Date 1963.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments 20-25 feet from the top of the cut on W. side County Road S-829 (Kingston-Adairsville Road), 2.65 miles south of intersection with Ga. Highway 140 in Adairsville, and 0.62 mile N. of Btw. 64-3, about 1.1 mile S. of Btw. 67-3 and just S. of Btw. 31S-63 (after Smith, 1968? unpubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-5

County Bartow. Sample Number 40

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1554-L.

Date Reported 5-8-64 (revised 1967) Ceramist M.V. Denny, USBM (revised by M. E. Tyrrell, Tuscaloosa, Ala.)

Water of Plasticity 26.2 % Working Properties Long working, plastic, smooth, fatty. (Moderate plasticity.) pH = 7.1. (Not effervescent with HCl.

Color Gray. Drying Shrinkage 2.5 % Dry Strength Good. (Fair.)

Remarks Drying props.: Good. (No defects.)

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	Fair hard (3)	4.0	19.6	34.1	1.74
1900 (1038)	Light brown	Hard (4)	10.0	11.8	23.4	1.98
2000 (1093)	Medium brown	Hard (4)	12.5	9.0	18.8	2.09
2100 (1149)	Brown	Very hard (5)	12.5	7.1	15.2	2.14
2200 (1204)	Dark brown	Glassy	5.0 Expanded	4.2	-	-
2300 (1260)	Dark brown	Glassy	Expanded	1.1	-	-

Remarks / Other Tests Fair color, shrinkage too high, firing range too low. (Should fire to "MW" face brick specifications at about 1900°F, 1038°C.)
Potential use: (Face brick.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Note: App. Por. and Bulk Dens. plus data and remarks in parentheses are from 1967 revised data sheets by Tyrrell.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
AL_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (N. edge). Lat. _____, Long. _____.

Field No. 40, ("new 6"), Collected by J.W. Smith. Date 1963.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments On the west side of County Road S-829 (Kingston-Adairsville Road), 1.11 miles south of intersection with Ga. Highway 140 in Adairsville, about 1/2 mile N. of Btw. 64-4 at about the same location as Btw. 31S-62 (after Smith, 1968?, upubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 64-6

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1618.

Date Reported 7-9-64 Ceramist M.V. Denny, USBM.

Water of Plasticity 49.4 % Working Properties Short-working, smooth, plastic, fatty. pH = 4.90.

Color Light yellow. Drying Shrinkage 1.0 % Dry Strength Good.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Flesh	Soft (2)	5.0	45.5	50.1	2.21
1900 (1038)	Flesh	Soft (2)	5.0	41.7	48.6	2.27
2000 (1093)	Pink	Fair hard (3)	5.0	38.5	46.9	2.29
2100 (1149)	Pale pink	Fair hard (3)	5.0	37.0	46.3	2.33
2200 (1204)	Light gray	Fair hard	5.0	35.7	45.9	2.38
2300 (1260)	Yellow-gray	Hard (4)	5.0	37.0	46.2	2.32

Remarks / Other Tests PCE = Cone 30-31. Good color, but too soft for brick or tile. (Also too soft for a low-duty refractory.) Addition of an alkali (sodium silicate, etc.) would make a good pottery clay. (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. - . Lat. _____, Long. _____.

Field No. -, Collected by Bob M. Green. Date April, 1964.

Sample Method Grab (?). Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Cambrian (Conasauga Group or Rome Formation ?)

Sample Description & Comments Exact location unknown (probably from road-cut). From Bob M. Green, Route 1, White, Georgia.

Compiled by B.J. O'Connor Date 3-25-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 64-7

County Bartow. Sample Number -

Raw Properties: Lab & No. USBM, Norris, Tenn.; #1629.

Date Reported 8-28-64 Ceramist M.V. Denny, USBM.

Water of Plasticity 31.6 % Working Properties Long working, smooth, plastic, fatty. pH = 7.35. Soluable salts = 1.2%.

Color Light brown. Drying Shrinkage 6.5 % Dry Strength Fair.

Remarks Drying props: Fair, slight warping, some crazing, scum.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Reddish brown	Fair hard (3)	9.0	14.9	27.6	2.56
1900 (1038)	Reddish brown	Hard (4)	11.0	11.9	23.4	2.56
2000 (1093)	Brown	Very hard (5)	15.5	4.6	10.1	2.43
2100 (1149)	Chocolate	Steel hard (6)	16.0	1.8	3.9	2.24
2200 (1204)	Chocolate	Steel hard (6)	12.0	0.8	1.6	2.04
2300 (1260)	Chocolate	Very hard (5)	10.0	0.6	1.1	1.84

Remarks / Other Tests Poor color, high shrinkage, expands. Potential Use: Ceramic - none; lightweight aggregate possibility. (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Positive.

Temp. °F (°C)	Absorption %	Bulk Density g/cm^3	Bulk Density lb/ft^3	Remarks
2000 (1093)	6.1	2.17	146	Shaley expansion.
2100 (1149)	3.9	1.28	80	Shaley expansion.
2200 (1204)	5.4	1.22	76	Fair skin - cracks.
2300 (1260)	9.7	0.71	49	Good skin.

Remarks Drying characteristics - Good. Use: Possible lightweight aggregate.

Crushing Characteristics (unfired material) Good.

Particle Size -20 mesh and -1", + 3/4"

Retention Time 15 min. draw trials (following 3-4 hr. to 1,800°F, 982°C) and 15 min. (quick-firing tests).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Calhoun South (S. edge). Lat. _____, Long. _____.

Field No. - , Collected by J.J. Mion (with R.D. Bentley, Ga. Survey). Date 1964.

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian).

Sample Description & Comments From shale pit about 1/4 mile N-NW. of the old shale pit of the B. Miffin Hood Company at Adairsville (see locn. no. 31S-61 = sample No. 61 of Smith, 1931, p. 243-248).

Compiled by B.J. O'Connor Date 3-25-82

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1 (a)

County Bartow. Sample Number #1

Raw Properties: Lab & No. USBM, Norris, Tenn.; #1680-A.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 31.4 % Working Properties Long-working, smooth, plastic, fatty. pH = 2.20. Solu-Br.K. = 40.0.

Color Red. Drying Shrinkage 0.0 % Dry Strength Fine.

Remarks Drying props.: Good with slight scum.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Pink-tan	Fair hard (3)	4.0	25.6	40.2	2.63
1900 (1038)	Tan	Hard (4)	7.0	17.5	31.3	2.60
2000 (1093)	Light brown	Very hard (5)	10.0	11.6	22.9	2.56
2100 (1149)	Chocolate	Steel hard (6)	14.0	7.2	15.4	2.52
2200 (1204)	Dark brown	Steel hard (6)	14.0	4.4	9.9	2.51
2300 (1260)	Black-brown	Very hard (5)	18.0	1.4	3.4	2.45

Remarks / Other Tests Fair color, slight scum, shrinkage a little high. Addition of alkali would improve working properties. Very high soluble salt content. Mostly sulfates; may need addition of barium salts to control efflorescence. Potential Use: Brick - inside or glazed; art pottery. Ceramic use limited to low-strength structures of non-weathering conditions. (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(b)

County Bartow. Sample Number #2

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-B.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 29.0 % Working Properties Long-working, smooth, plastic, fatty. pH = 6.20. Solu-Br.K. = 3.5.

Color Yellow. Drying Shrinkage 0.0 % Dry Strength Good.

Remarks Drying props: Fair with cracks and warping.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp.Gr.
1800 (982)	Light tan	Fair hard (3)	4.0	22.2	34.2	2.34
1900 (1038)	Light tan	Fair hard (3)	8.0	17.9	30.9	2.50
2000 (1093)	Tan	Hard (4)	10.0	11.8	22.8	2.50
2100 (1149)	Light brown	Very hard (5)	15.0	6.8	14.4	2.48
2200 (1204)	Brown	Steel hard (6)	15.0	4.6	10.1	2.43
2300 (1260)	Dark gray	Steel hard (6)	15.0	2.5	5.7	2.42

Remarks / Other Tests Good color; checks; warping; shrinkage a little high; and higher temperature color is spotted (pepper-like). Addition of fine quart would reduce shrinkage and absorption. Potential Use: Brick-inside or glazed; art pottery. (Ceramic use limited to low-strength structures or non-weathering conditions. (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(c)

County Bartow. Sample Number #3.

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-C

Date Reported 2-16-65 Ceramist M.V. Denny, USBM

Water of Plasticity 30.4% Working Properties Long-working, smooth, plastic, fatty. pH = 6.55. Solu-Br.K. = 30.

Color Yellow. Drying Shrinkage 4.0% Dry Strength Fair.

Remarks Drying props.: Fair with crazing and warping.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Tan	Soft (2)	4.0	32.3	47.1	2.76
1900 (1038)	Tan	Fair hard (3)	6.0	20.8	35.4	2.63
2000 (1093)	Light brown	Hard (4)	10.0	14.9	28.2	2.63
2100 (1149)	Brown	Very hard (5)	14.0	10.1	20.9	2.61
2200 (1204)	Chocolate	Very hard (5)	15.5	6.9	15.2	2.59
2300 (1260)	Blue-black	Steel hard (6)	18.0	2.6	6.3	2.58

Remarks / Other Tests Good color; shrinkage a little high; warping. Potential use: Doubtful Brick. Too soft in lower temperatures; too high shinkage in higher temperature. (Ceramic use limited to low-strength structures or non-weathering conditions.) (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(d)

County Bartow. Sample Number #4

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-D.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 29.6 % Working Properties Long-working, smooth, plastic, fatty. pH = 7.10. Solu-Br. K. = 14.0.

Color Pink. Drying Shrinkage 4.0 % Dry Strength Fair.

Remarks Drying props.: Poor with scum, warping, and iron stain.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Off white	Soft (2)	4.0	25.6	39.1	2.51
1900 (1038)	Off white	Fair hard (3)	5.5	15.9	28.6	2.52
2000 (1093)	Pale tan	Hard (4)	8.0	10.8	21.3	2.51
2100 (1149)	Tan-gray	Very hard (5)	13.0	6.3	13.7	2.52
2200 (1204)	Brown-gray	Very hard (5)	15.0	3.4	7.9	2.53
2300 (1260)	Grey	Steel hard (6)	15.0	1.8	4.2	2.46

Remarks / Other Tests Fair color; addition of barium salts would eliminate staining. Shrinkage a little high; warping. Potential Use: None (ceramic). (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(e)

County Bartow. Sample Number #5.

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-E.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 27.4 % Working Properties Long-working, smooth, plastic. pH = 7.00. Solu-Br. K. = 3.5.

Color Light pink. Drying Shrinkage 4.0 % Dry Strength Good.

Remarks Drying props.: Good with slight scum.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Pink-white	Fair hard (3)	4.0	24.4	38.3	2.54
1900 (1038)	Pink-white	Fair hard (3)	5.0	17.5	30.8	2.54
2000 (1093)	Pale flesh	Hard (4)	8.0	12.0	23.3	2.53
2100 (1149)	Tan-flesh	Very hard (5)	11.0	3.3	7.6	2.49
2200 (1204)	Pink-gray	Very hard	11.0	2.9	6.7	2.48
2300	Gray	Steel hard (6)	11.0	2.0	4.5	2.38

Remarks / Other Tests PCE: Cone 23-24. Light color; slight scum. Potential Use: Inside brick; wall tile, pottery. (Ceramic use limited to low-strength structures or non-weathering conditions). (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(f)

County Bartow. Sample Number #6

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-F.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 35.2 % Working Properties Long-working, smooth, plastic, fatty. pH = 6.75. Solu-Br. K. = 3.3.

Color Yellow. Drying Shrinkage 4.5 % Dry Strength Fair.

Remarks Drying props: Good with slight warping.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Red-tan	Fair hard (3)	5.0	27.8	42.9	2.70
1900 (1038)	Red-tan	Fair hard (3)	5.0	26.3	41.2	2.66
2000 (1093)	Light brown	Hard (4)	9.0	20.0	34.5	2.63
2100 (1149)	Chocolate	Very hard (5)	13.0	13.0	24.8	2.54
2200 (1204)	Dark brown	Very hard (5)	15.0	8.9	18.4	2.54
2300 (1260)	Very dark brown	Steel hard (6)	18.0	2.2	5.2	2.49

Remarks / Other Tests Fair color; shrinkage a little high; slight cracking; dull surface. Potential Use: Brick, out-door; pottery; tile. (Ceramic use limited to low-strength structures or non-weathering conditions.) (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 65-1(g)

County Bartow. Sample Number #7.

Raw Properties: Lab & No. USBM, Norris, Tenn.; No. 1680-G.

Date Reported 2-16-65 Ceramist M.V. Denny, USBM.

Water of Plasticity 31.4 % Working Properties Long-working, smooth, plastic. pH = 6.20. Solu-Br. K. = 2.4.

Color Red. Drying Shrinkage 5.0 % Dry Strength Fair.

Remarks Drying props.: Fair with cracks and slight warping.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')*	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: App. Sp. Gr.
1800 (982)	Red-brown	Fair hard (3)	8.0	24.4	42.3	3.00
1900 (1038)	Red-brown	Fair hard (3)	8.0	22.2	40.4	3.05
2000 (1093)	Brown	Hard (4)	12.0	14.9	30.9	3.00
2100 (1149)	Dark brown	Very hard (5)	14.0	13.0	27.9	2.98
2200 (1204)	Dark brown	Very hard (5)	14.0	12.2	26.6	2.97
2300 (1260)	Very dark brown	Steel hard (6)	15.0	11.0	24.5	2.95

Remarks / Other Tests Good color; shrinkage a little high; high iron content; dull surface. Potential Use: Too heavy for normal brick use. Could be mixed with a low-iron clay for color improvement. (Absorption data corrected and App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

*Based on comparison of Tyrrell's 1967 revisions of Denny's 1964 data sheets.

locn. no. Btw. 65-1, cont. (a to g)

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot 421-423, 442,445 (Robertson, 1948, p. 2). Sec. _____, Dist. 17.

71/2' topo quad. Wax (SE. side) and Kingston (SW. side). Lat. _____, Long. _____.

Field No. 1-7., Collected by J.W. Harris. Date 12-4-64

Sample Method Grab. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Recent (?) clays from Knox Group carbonates.

Sample Description & Comments "Old Virginia Iron and Coal Co. property from various pits after it was mined by Hodge" Mining Co. (Furcron, 1964, Ga. Survey files) about 5 3/4 mi. north of Taylorsville. (Also see Btw. 46-1 and 66-9.)

Compiled by Bruce J. O'Connor Date 4-6-82

CERAMIC TESTS AND ANALYSES

Material Weathered slate (Conasauga Group). Compilation Map Location No. Btw. 66-1

County Bartow. Sample Number No. 121

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; # G-8-1.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 22.8 % Working Properties Low plasticity.
pH = 7.8. Not effervescent in HCl.

Color Brown. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks Drying Defects: None.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	2	0.0	24.0	39.6	1.65
1900 (1038)	Tan	3	0.0	22.1	38.4	1.73
2000 (1093)	Light brown	4	2.5	17.3	32.2	1.86
2100 (1149)	Red brown	5	5.0	12.1	24.7	2.04
2200 (1204)	Dark brown	6	7.5	8.9	19.0	2.14
2300 (1260)	Black	7	7.5	5.3	11.5	2.17

Remarks / Other Tests Not suitable for use in vitreous clay products. Low green strength; poor color. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Fairmount (S. cntr.). Lat. _____, Long. _____.

Field No. ("new 2"), 121, Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Weathered slate.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) slate.

Sample Description & Comments Flexatile Mine at Funkhouser, 3.5 miles south of Fairmount and 0.3 mi. east of U.S. Highway 411. Weatherd slate from dump of active Flexatile Mine (easternmost pit); also see Btw. 46-4, 66-2 and 66-3 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-22-82

CERAMIC TESTS AND ANALYSES

Material Slate (Conasauga Group). Compilation Map Location No. Btw. 66-2

County Bartow. Sample Number No. 122

Raw Properties: Lab & No. USBM, Tsucaloosa, Ala.; #G-8-2.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 25.7 % Working Properties Low plasticity
pH = 9.2. Slightly effervescent with HCl.

Color Gray. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	2	0.0	20.3	35.1	1.73
1900 (1038)	Tan	3	0.0	16.6	30.9	1.86
2000 (1093)	Light brown	4	2.5	11.4	23.3	2.04
2100 (1149)	Red-brown	5	10.0	3.0	7.1	2.38
2200 (1204)	-	-	Expanded	-	-	-

Remarks / Other Tests Not suitable for use in vitreous clay products. Low green strength; abrupt vitrification; poor color. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Other volatiles			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Fairmount (S. cntr.). Lat. _____, Long. _____.

Field No. ("new 3"), 122, Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Fresh slate.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) slate.

Sample Description & Comments Flexatile Mine, 3.5 miles south of Fairmount, 0.3 mile east of U.S. Highway 411. Fresh slate from active Flexatile Mine (easternmost pit); also see 66-1 and 66-3 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-2-82

CERAMIC TESTS AND ANALYSES

Material Phyllite (Ocoee). Compilation Map Location No. Btw. 66-3

County Bartow. Sample Number No. 123

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-3.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 25.0 % Working Properties Low plasticity.
pH = 7.2. Not effervescent with HCl.

Color Tan. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	2	0.0	29.1	44.2	1.52
1900 (1038)	Tan	2	0.0	27.0	42.1	1.56
2000 (1093)	Light brown	2	0.0	23.7	38.9	1.64
2100 (1149)	Red-brown	4	2.5	16.6	30.7	1.85
2200 (1204)	Dark brown	6	2.5	9.3	19.7	2.12
2300 (1260)	-	-	Expanded	-	-	-

Remarks / Other Tests Not suitable for use in vitreous clay products. Low green strength; abrupt vitrification; poor color. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Fairmount (S. cntr.). Lat. _____, Long. _____.

Field No. ("new 4"), 123, Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Weathered phyllite.

Structural Attitude -

Stratigraphic Assignment Ocoee Supergroup (Precambrian) phyllite.

Sample Description & Comments Flexatile Mine, 3.5 miles south of Fairmount, 0.3 mi. east of U.S. Highway 411. Weathered phyllite from exposure about fifty feet high and fifty feet wide on east side of active Flexatile Mine (easternmost pit). Also see 66-1 and 66-2 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay, residual (Shady Dolomite). Compilation Map Location No. Btw. 66-4

County Bartow. Sample Number No. 124

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-4.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 25.3 % Working Properties Low plasticity.
pH = 5.5. Not effervescent with HCl.

Color Red. Drying Shrinkage 2.5 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk dens. gm/cc
1800 (982)	Dark tan	2	5.0	22.1	38.7	1.75
1900 (1038)	Dark tan	3	5.0	19.3	35.3	1.83
2000 (1093)	Light brown	4	10.0	12.5	25.9	2.07
2100 (1149)	Dark brown	4	10.0	12.3	25.7	2.09
2200 (1204)	Dark brown	4	10.0	10.8	23.0	2.13
2300 (1260)	Dark brown	5	12.5	9.4	20.5	2.18

Remarks / Other Tests Not suitable for use in vitreous clay products. Poor color. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (SE. cntr). Lat. _____, Long. _____.

Field No. ("new 14"), 124, Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Shady (Lower Cambrian) dolostone residuum (Tertiary?)

Sample Description & Comments In Cartersville, about 0.2 mile east of U.S. Highway 41 and about 0.05 mile south of Church Street. Reddish-brown residuum from "B" soil horizon from the upper working bank of the New Riverside Ocher Co. barite mine. The upper working bank is about 10 feet high and 450 ft. long, 0.2 mile W. and 0.05 mile S. of Btw. 66-5 (after Smith, 1968? unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay, residual (Shady Dolomite). Compilation Map Location No. Btw. 66-5

County Bartow. Sample Number No. 125

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-5.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 22.1 % Working Properties Low plasticity.
pH = 5.6. Not effervescent with HCl.

Color Red. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk dens. gm/cc
1800 (982)	Light brown	2	0.0	21.6	39.1	1.81
1900 (1038)	Light brown	3	5.0	13.7	28.4	2.07
2000 (1093)	Red-brown	4	10.0	8.6	19.8	2.30
2100 (1149)	Red-brown	5	10.0	6.6	15.7	2.38
2200 (1204)	Red-brown	6	12.5	4.5	11.1	2.47
2300 (1260)	Dark brown	7	12.5	3.4	8.5	2.51

Remarks / Other Tests Low green strength. (Color not especially good.) Should fire to "SW" face brick specifications at about 2000°F (1093°C). Potential Use: Face brick mixtures. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (SE. ctr.). Lat. _____, Long. _____.

Field No. ("new 15"), 125 , Collected by J.W. Smith Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Shady (Lower Cambrian) dolostone residuum (Tertiary?).

Sample Description & Comments In Cartersville, 0.4 mile east of U.S. Highway 41, adjacent to the north side of Church Street which passes through the pit. Brown residuum from the "C" soil horizon, 15 to 50 feet below ground surface on the E. side of active barite pit of the New Riverside Ochre Company, 0.2 mile E. and 0.05 N. of Btw. 66-4 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay, residual (Shady Dolomite). Compilation Map Location No. Btw. 66-6

County Bartow. Sample Number No. 126

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-6.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 18.6 % Working Properties Low plasticity.
pH = 5.5. Not effervecent with HCl.

Color Red. Drying Shrinkage 2.5 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk dens. gm/cc
1800 (982)	Orange-tan	2	2.5	20.0	35.8	1.79
1900 (1038)	Orange-tan	2	5.0	17.5	32.9	1.88
2000 (1093)	Light brown	2	10.0	14.8	29.2	1.97
2100 (1149)	Brown	3	10.0	14.1	28.1	1.99
2200 (1204)	Dark brown	4	10.0	13.2	26.5	2.01
2300 (1260)	Dark brown	5	10.0	12.4	25.2	2.03

Remarks / Other Tests Low green strength. High absorption at all temperatures. Color is marginal. Potential Use. Face brick mixtures. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) ___-_____

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	_____
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition	_____		
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Cartersville (SE. 1/4) . Lat. _____, Long. _____.

Field No. 126, ("new 16") , Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. (Quartzite was avoided.) Weathering/alteration Residual clay.

Structural Attitude _____-_____

Stratigraphic Assignment Shady (Lower Cambrian) dolostone residuum (Tertiary?).

Sample Description & Comments Sample from Paga Mining Co. barite mine pit 1 mile SW. of Georgia Hwy. 293 bridge over the Etowah River about 1 and 1/2 mi. NW of Emerson. Residuum contains a small percentage of quartzite fragments which were not sampled (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay, residual (Conasauga). Compilation Map Location No. Btw. 66-7

County Bartow. Sample Number No. 129

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-9.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 23.1 % Working Properties Low plasticity. PH = 5.7. Not effervescent with HCl.

Color Brown. Drying Shrinkage 2.5 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk dens. gm/cc
1800 (982)	Tan	2	2.5	32.2	46.4	1.44
1900 (1038)	Tan	3	5.0	22.2	37.3	1.68
2000 (1093)	Brown	4	15.0	7.0	15.3	2.19
2100 (1149)	Red-brown	5	17.5	1.5	3.7	2.44
2200 (1204)	-	-	Expanded	-	-	-

Remarks / Other Tests Abrupt vitrification. High firing shrinkage. Potential Use: Not suitable for use in vitreous clay products. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Fairmount (S. edge). Lat. _____, Long. _____.

Field No. ("new 5"), 129, Collected by J.W. Smith. Date c. 1966.

Sample Method Composite of many grab samples. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Conasauga Group (Cambrian) dolostone residuum (Tertiary?).

Sample Description & Comments Roadcut is on east side of U.S. Highway 411, 0.3 mi. S of railroad spur crossing with U.S. Highway 411 at Flexatile. Mottled and layered yellowish-brown and reddish-brown dolostone residuum with occasional black streaks. Roadcut is about 400 feet long and up to 15 ft. high, about 0.3 mi. S. of Btw. 66-1, 2 and 3 (after Smith, 1968?, unpbl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 66-8

County Bartow. Sample Number No. 130

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-10.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 30.4 % Working Properties Moderate plasticity. pH = 5.6. Not effervescent with HCl.

Color Brown. Drying Shrinkage 2.5 % Dry Strength Fair.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data Bulk dens: gm/cc
1800 (982)	Light brown	2	2.5	32.4	49.6	1.53
1900 (1038)	Light brown	3	7.5	21.4	39.4	1.84
2000 (1093)	Dark brown	4	15.0	8.9	20.8	2.34
2100 (1149)	Dark brown	5	17.5	5.7	14.2	2.49
2200 (1204)	Dark brown	6	17.5	2.5	6.6	2.64
2300 (1260)	-	-	Expanded	-	-	

Remarks / Other Tests Abrupt vitrification; high firing shrinkage. Potential Use: Not suitable for use in vitreous clay products. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Acworth (NW. cor.). Lat. _____, Long. _____.

Field No. 130 ("new 17"), Collected by _____ Date _____

Sample Method 10' channel. Weathering/alteration Residual clays.

Structural Attitude Approximately horizontal.

Stratigraphic Assignment Recent--from old settling pond for iron ore washings.

Sample Description & Comments Vertical channel sample where stream has cut settling pond dam about 100 yds. NE. of Ga. Hwy. 293 and 0.7 mi. S. of junction with U.S. Hwy. 41, S. of Emerson. Clay is in about 1 in. layers (average) of light, dark and reddish brown (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 4-8-82

CERAMIC TESTS AND ANALYSES

Material Clay. Compilation Map Location No. Btw. 66-9

County Bartow. Sample Number No. 133

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-8-13.

Date Reported 10-6-66 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 26.7 % Working Properties High plasticity.
pH = 5.5. Not effervescent in HCl.

Color Red. Drying Shrinkage 7.5 % Dry Strength High.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk dens. gm/cc
1800 (982)	Salmon	2	7.5	21.7	37.8	1.74
1900 (1038)	Salmon	3	10.0	15.8	30.7	1.94
2000 (1093)	Light brown	4	15.0	7.7	17.5	2.27
2100 (1149)	Red-brown	5	17.5	2.0	5.1	2.53
2200 (1204)	Red-brown	6	17.5	0.3	0.8	2.58
2300 (1260)	-	-	Expanded	-	-	-

Remarks / Other Tests High drying shrinkage. High firing shrinkage. (Color not especially good). Potential Use: Face brick mixtures. (App. Por. data added by K. J. Liles, USBM, written communication, 2-16-84.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot c.492 to 494, Sec. _____, Dist. 17.

71/2' topo quad. Wax (SE. side) and Kingston (SW. side). Lat. _____, Long. _____.

Field No. 133, ("new 13"), Collected by J.W. Smith. Date c.May 1966.

Sample Method Hand auger to depth of 4 feet. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Recent clay (settling pond - iron ore washings).

Sample Description & Comments Clay from Hodge Mining Company settling pond for iron ore washings. Top few inches is reddish-brown, remainder is yellowish brown. Sample from mine area about 5 miles W. of Euharlee, 3/4 mile south of Chulio Road, 1/3 mile W. of Macedonia Slough (after Smith, 1968?, unpubl. ms.) about 5 1/4 mi. north of Taylorsville. Also see Btw. 65-1 (a to g) and 46-1.

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Weathered phyllite (Chilhowee Gp.) Compilation Map Location No. Btw. 67-1

County Bartow. Sample Number No. 152

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #G-9-16.

Date Reported 1-11-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 20.2 % Working Properties Low plasticity.
pH = 5.0. Not effervescent with HCl.

Color White. Drying Shrinkage 2.5 % Dry Strength Low.

Remarks Drying Defects: None.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data:
1800 (982)	Light tan	No bond	-	-	-	-
1900 (1038)	Light tan	No bond	-	-	-	-
2000 (1093)	Light tan	No bond	-	-	-	-
2100 (1149)	Beige	Poor bond	-	-	-	-
2200 (1204)	Gray	Poor bond	-	-	-	-
2300 (1260)	Gray	Poor bond	-	-	-	-

Remarks / Other Tests Not suitable for use as the principal component in vitreous clay products. Poor ceramic bond.

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Acworth (NW. cor.). Lat. _____, Long. _____.

Field No. 152, ("new 18"), Collected by J.W. Smith. Date 1966.

Sample Method Composite of many grab samples from base of roadcut. Weathering/alteration Deeply weathered.

Structural Attitude -

Stratigraphic Assignment Chilhowee Group (Cambrian) phyllite.

Sample Description & Comments South of Emerson at the intersection of U.S. Hwy. 41 and Ga. Hwy. 293, along the west side of U.S. Hwy. 41. Highly weathered, white phyllite from roadcut 200 feet long, 20 feet high (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 67-2

County Bartow. Sample Number No. 154

Raw Properties: Lab & No. USBM, Tuscaloosa, # G-9-17.

Date Reported 1-11-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 25.1 % Working Properties Moderate plasticity. pH =4.6. Not effervescent with HCl.

Color Brown. Drying Shrinkage 5.0 % Dry Strength Fair.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	3	5.0	26.1	41.0	1.57
1900 (1038)	Tan	3	5.0	25.7	40.9	1.59
2000 (1093)	Tan	4	7.5	18.3	32.2	1.76
2100 (1149)	Light brown	4	10.0	14.8	27.5	1.86
2200 (1204)	Red-brown	5	10.0	12.2	23.4	1.92
2300 (1260)	Dark brown	6	12.5	7.6	15.7	2.06

Remarks / Other Tests Fair color. Potential Use: Building brick. Should fire to "MW" face brick specifications at about 2200°F (1204°C).

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Calhoun S. (S. edge). Lat. _____, Long. _____.

Field No. ("new 1"), 154, Collected by J.W. Smith. Date 1966.

Sample Method Composite of many channel samples. Weathering/alteration Slightly weathered.

Structural Attitude Beds strike N. 18°E., dip 53°SE.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Sample is slightly weathered, reddish-yellow to brownish-yellow shale from an old, overgrown shale pit of the B.M. Hood Co. on Ga. Hwy. 140, 0.3 miles west of the intersection with U.S. Hwy. 41 on the N. side of Adairsville (after Smith, 1968?, unpubl. ms.). Also see Btw. 31S-61.

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 67-3

County Bartow. Sample Number No. 155

Raw Properties: Lab & No. USBM, Tuscaloosa, # G-9-18.

Date Reported 1-11-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 21.0 % Working Properties Low plasticity. pH = 4.9. Not effervescent with HCl.

Color Tan. Drying Shrinkage 2.5 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Tan	3	5.0	19.2	33.0	1.72
1900 (1038)	Tan	3	5.0	15.1	27.3	1.81
2000 (1093)	Light brown	4	7.5	10.1	20.1	1.99
2100 (1149)	Brown	4	10.0	4.5	9.3	2.06
2200 (1204)	-	-	Expanded	-	-	-

Remarks / Other Tests Poor color. Potential Use: Building brick. Should fire to "SW" face brick specifications at about 2050°F (1121°C). However, the "shale is loaded with some calcium compound and it is not suitable for use in ceramic products so we did not complete physical tests on the bars."

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (N. cntr.). Lat. _____, Long. _____.

Field No. 155, ("new 7") , Collected by J.W. Smith. Date 1966.

Sample Method Composite of many grab samples. Weathering/alteration Highly weathered.

Structural Attitude Strike N. 15°E., dip 51°SE.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Weathered, yellowish-brown shale from roadcut 2080 ft. long, 18 ft. high. Sample from County Road S-829 (Kingston-Adairsville Road) 1.6 miles S. of Ga. Hwy. 140 about 1/2 mile S. of Btw. 64-5 and about 1.1 mile N. of Btw. 64-4 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 67-4

County Bartow. Sample Number No. 161

Raw Properties:Lab & No. USBM, Tuscaloosa, # G-10-1.

Date Reported 1-16-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 17.7 % Working Properties Low plasticity.
pH = 6.5. Not effervescent with HCl.

Color Yellow. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Orange-tan	No bond	-	-	-	-
1900 (1038)	Orange-tan	No bond	-	-	-	-
2000 (1093)	Orange-tan	No bond	-	-	-	-
2100 (1149)	Light brown	Poor bond	-	-	-	-
2200 (1204)	Dark brown	Poor bond	-	-	-	-
2300 (1260)	Dark brown	Poor bond	-	-	-	-

Remarks / Other Tests Low green strength. Poor ceramic bond. Not suitable for use as the principal component in vitreous clay products.

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) ___-___

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	_____
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
loss on Ignition	_____		
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (cntr.). Lat. _____, Long. _____.

Field No. 161, ("A"), Collected by J.W. Smith. Date 1966.

Sample Method Channel sample through beds. Weathering/alteration Highly weathered.

Structural Attitude Beds strike N. 22°E., dip 30°SE.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Highly weathered, reddish-brown shale from roadcut 150 feet long, 10 feet high and located on a N-S secondary road, S of Adairsville, about 0.2 mile W of Abernethy Lake, about 0.6 mile E of the L & N RR and about 2 miles NNE of Halls Station (after Smith, 1968? unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Clay (bauxitic ?). Compilation Map Location No. Btw. 67-5

County Bartow. Sample Number No. 162

Raw Properties: Lab & No. USBM, Tuscaloosa, #G-10-2.

Date Reported 1-16-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 34.7 % Working Properties Low plasticity. pH = 5.3. Not effervescent with HCl.

Color White. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Pink	Poor bond	2.5	-	-	-
1900 (1038)	Pink	Poor bond	2.5	-	-	-
2000 (1093)	Pink	2	2.5	32.3	46.5	1.44
2100 (1149)	Cream	2	5.0	29.1	43.9	1.51
2200 (1204)	White	3	10.0	17.6	32.4	1.84
2300 (1260)	Ivory	4	15.0	10.9	22.7	2.09

Remarks / Other Tests Might be used in artware or stoneware body mixes. Potential Use: Not suitable for use as the principal component in vitreous clay products.

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C)

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite	
MgO		vermiculite	
CaO		Montmorillonite	
Na_2O		Others	
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (NW. 1/4) . Lat. _____, Long. _____.

Field No. 162, ("B") , Collected by J.W. Smith. Date 1966.

Sample Method Composite of many grab samples from stockpile. Weathering/alteration Residual clay.

Structural Attitude -

Stratigraphic Assignment Lower Tertiary (?) residual clay.

Sample Description & Comments White to pink kaolin from a stockpile at bauxite pit of the American Cyanamid Corp. about 200 feet long and 50 feet deep. The stockpile is being sold to Chattahoochee Brick Co., and is about 2 miles SW. of Adairsville, N. of E-W. secondary road W. of Boyd Mt., about 1.1 mile NE. of Snow Springs and about 1 1/2 mile S. of Ga. Hwy. 140 (after Smith, 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Gp.) Compilation Map Location No. Btw. 67-6

County Bartow Sample Number No. 163.

Raw Properties: Lab & No. USBM, Tuscaloosa, #G-10-3

Date Reported 1-16-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 27.4 % Working Properties Low plasticity. pH = 5.9. Not effervescent with HCl.

Color Yellow. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Orange-tan	2	0.0	26.8	40.7	1.52
1900 (1038)	Orange-tan	2	0.0	24.9	39.1	1.57
2000 (1093)	Orange-tan	2	0.0	21.4	35.3	1.65
2100 (1149)	Light brown	3	2.5	16.1	29.1	1.81
2200 (1204)	Red-brown	4	7.5	10.1	20.3	2.01
2300 (1260)	Dark brown	5	7.5	7.6	15.3	2.04

Remarks / Other Tests Good color. Potential Use: Building brick. Should fire to "MW" face brick specifications at about 2150°F (1177°C). (Might be satisfactory for use in the manufacture of extruded structural clay products, Tyrrell, 1-20-67.)

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (E. cntr.). Lat. _____, Long. _____.

Field No. 163, ("C") , Collected by J.W. Smith. Date 1966.

Sample Method Composite of many grab samples. Weathering/alteration Slightly weathered.

Structural Attitude Contorted.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Contorted, slightly weathered, reddish-brown shale from roadcut 400 feet long and 5 feet high on a N-S secondary road S of Adairsville, about 2/3 mile SE. of Abernethy Lake, about 3/4 mile W. of U.S. 41 and about 1.6 mile NE. of Halls Station (Smith, J.W., 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 67-7

County Bartow. Sample Number No. 164.

Raw Properties: Lab & No. USBM, Tuscaloosa, #G-10-4.

Date Reported 1-16-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 29.2 % Working Properties Low plasticity.
pH = 6.1. Not effervescent with HCl.

Color - Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Orange-tan	2	0.0	29.2	43.2	1.48
1900 (1038)	Orange-tan	2	0.0	27.8	42.0	1.51
2000 (1093)	Orange-tan	3	2.5	24.2	38.5	1.59
2100 (1149)	Light brown	4	5.0	19.2	33.0	1.72
2200 (1204)	Red-brown	5	7.5	12.7	24.2	1.91
2300 (1260)	Dark brown	6	7.5	10.0	19.7	1.97

Remarks / Other Tests Good color. Potential Use: Building brick. Should fire to "MW" face brick specifications at about 2200°F (1204°C). (Also see "Extrusion Tests".) Might be satisfactory for use in the manufacture of extruded structural clay products.

Preliminary Bloating (Quick Firing) Tests: Negative.

TUSCALOOSA METALLURGY RESEARCH LABORATORY

Clay Evaluation: Extrusion Tests

Sender's identification: 164-Shale (Conasauga). Date 2-9-67

Tuscaloosa number: G-10-4

Body composition: Raw clay through 16 mesh: 100 percent.

Tempering water: 19 percent of dry batch weight.

Vacuum on machine: 22 inches of mercury.

Drying: 24 hours in air; 24 hours at 140° F (60°C).

Drying shrinkage: None.

Modulus of rupture, dry unfired: 180 psi.

Firing:

Time- 24 hours.
Temperature- 2100° F (1149°C).
Cone- 4 over.

Total shrinkage: 7.3 percent.

Absorption, 5-hour boiled: 6.3 percent.

Absorption, 24-hour soaked: 4.1 percent.

Saturation coefficient: 0.65

Apparent porosity: 13.9 percent.

Bulk density: 2.21 gm/cc.

Fired modulus of rupture: 3770 psi.

Mohs' hardness: 8

Color: Dark red.

Comments Should meet "SW" face brick specifications as processed; excellent color.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (E. cntr.) . Lat. _____, Long. _____.

Field No. 164, ("D") , Collected by J.W. Smith Date 1966.

Sample Method Composite of many grab samples from base of outcrop. Weathering/alteration Slightly weathered.

Structural Attitude Contorted.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Contorted, slightly weathered, reddish-brown shale from roadcut 400 feet long and 5 feet high and located on a N-S secondary road S of Adairsville, about 1/2 mile E of Abernethy Lake, about 0.8 mile N of Btw. 67-6 about 1/2 mile W of U.S. 41 and about 2.2 miles NE of Halls Station (after Smith, J.W., 1968?, unpubl. ms.).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Shale (Conasauga Group). Compilation Map Location No. Btw. 67-8

County Bartow. Sample Number No. 165.

Raw Properties: Lab & No. USBM, Tuscaloosa, #G-10-5.

Date Reported 1-16-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 27.3 % Working Properties Low plasticity.
pH = 6.1. Not effervescent with HCl.

Color Yellow. Drying Shrinkage 0.0 % Dry Strength Low.

Remarks No drying defects.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	Orange-tan	2	0.0	23.9	36.8	1.54
1900 (1038)	Orange-tan	2	0.0	19.7	32.3	1.64
2000 (1093)	Light brown	2	2.5	18.0	30.4	1.69
2100 (1149)	Red-brown	2	2.5	15.9	27.6	1.74
2200 (12040)	Dark brown	3	5.0	9.8	18.7	1.91
2300 (1260)	Black	4	5.0	5.6	11.1	1.99

Remarks / Other Tests Good color. Potential Use: Building brick. Should fire to "MW" face brick specifications at about 2150°F (1177°C). (Might be satisfactory for use in the manufacture of extruded structural clay products).

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. Adairsville (NE. top) . Lat. _____, Long. _____.

Field No. ("E"), 165 , Collected by J.W. Smith. Date 1967.

Sample Method Composite of many grab samples from base of outcrop. Weathering/alteration Weathered.

Structural Attitude Slightly contorted.

Stratigraphic Assignment Conasauga Group (Cambrian) shale.

Sample Description & Comments Near Adairsville on I-75, 0.4 mile south of Ga. and Highway 140 overpass. Slightly contorted, weathered, brownish-gray shale from roadcut 150 feet long and 20 feet high (after Smith, 1968? unpubl. ms).

Compiled by B.J. O'Connor Date 1-29-82

CERAMIC TESTS AND ANALYSES

Material Sand & Mica. Compilation Map Location No. Btw. 67-9

County Bartow. Sample Number A-2.

Raw Properties: Lab & No. USBM, Tuscaloosa, #G-12-2.

Date Reported 3-26-67 Ceramist M.E. Tyrrell, USBM.

Water of Plasticity - % Working Properties Nonplastic.
pH = 5.8. Not effervescent with HCl.

Color - Drying Shrinkage - % Dry Strength None.

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1800 (982)	No data	-	-	-	-	-
1900 (1038)	No data	-	-	-	-	-
2000 (1093)	No data	-	-	-	-	-
2100 (1149)	No data	-	-	-	-	-
2200 (1204)	No data	-	-	-	-	-
2300 (1260)	No data	-	-	-	-	-

Remarks / Other Tests No dry bond. This series was not fired.
Potential Use: None (ceramic).

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size - Retention Time -

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. - . Lat. _____, Long. _____.

Field No. A-2, Collected by J.W. Smith Date c.1967

Sample Method Grab (?) Weathering/alteration -

Structural Attitude -

Stratigraphic Assignment -

Sample Description & Comments Location unknown.

Compiled by B.J. O'Connor Date 4-6-82

CERAMIC TESTS AND ANALYSES

Material Shale (Rome Formation). Compilation Map Location No. Btw. 69-1

County Bartow. Sample Number BAR-1.

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; # BAR-1.

Date Reported March 1969. Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 14.0 % Working Properties -

Color Light gray. Drying Shrinkage 2.0 % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. g/cm^3
1900 (1038)	Medium tan	4.0	1.2	-	-	1.53
2000 (1093)	Dark tan	4.0	1.5	24.3	-	1.57
2100 (1149)	Dark tan	4.5	3.0	19.1	-	1.60
2200 (1204)	Dark tan	4.5	4.0	16.3	-	1.70

Remarks / Other Tests Results reported in Hollenbeck and Tyrrell (1969, p. 20).

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_5			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. White East (NE. 1/4). Lat. _____, Long. _____.

Field No. BAR-1, Collected by R.P. Hollenbeck. Date c.1967.

Sample Method Channel (?). Weathering/alteration Slightly weathered.

Structural Attitude -

Stratigraphic Assignment Rome Formation (Cambrian).

Sample Description & Comments Sample of light gray, slightly weathered shale (about 6 feet exposed) overlain by soil. Collected from roadcut on the south side of Ga. Highway 140, 2.6 miles east of intersection with U.S. Highway 411 (Hollenbeck and Tyrrell, 1969, p. 17).

Compiled by B.J. O'Connor Date 1-30-82

CERAMIC TESTS AND ANALYSES

Material Slate (Conasauga Formation). Compilation Map Location No. Btw. 69-2

County Bartow. Sample Number BAR-2.

Raw Properties: Lab & No. USBM, Tuscaloosa, Ala.; #BAR-2.

Date Reported March 1969. Ceramist M.E. Tyrrell, USBM.

Water of Plasticity 13.0 % Working Properties -

Color Light gray. Drying Shrinkage 0.0 % Dry Strength -

Slow Firing Tests:

Temp. °F (°C)	Color	Hardness (Mohs')	Linear Shrinkage, %	Absorption %	Appr. Por. %	Other data: Bulk Dens. gm/cc
1900 (1038)	Medium tan	5.5	0.0	12.6	-	-
2000 (1093)	Medium tan	5.5	0.0	12.2	-	-
2100 (1149)	Dark tan	5.5	0.0	-	-	-
2200 (1204)	Dark tan	6.5	1.0	10.4	-	-

Remarks / Other Tests Results reported in Hollenbeck and Tyrrell (1959, p. 20).

Preliminary Bloating (Quick Firing) Tests: Negative.

Crushing Characteristics (unfired material) -

Particle Size -20 mesh. Retention Time 15 min. draw trials (following 3-4 hr. to 1800°F, 982°C).

Chemical & Mineralogical Data: Not determined.

Chemical Analysis		Mineralogy	
Oxide	Weight %	Mineral	volume %
SiO_2			
TiO_2		Quartz	
Al_2O_3		Feldspar	
Fe_2O_3		Carbonate	
FeO		Mica	
MnO		Chlorite-vermiculite	
MgO		Montmorillonite	
CaO		Others	
Na_2O			
K_2O			
P_2O_3			
S (total)		Total	
C (org.)			
CO_2			
H_2O^-			
H_2O^+			
Loss on Ignition			
Total			

Analyst _____ _____

Date _____ _____

Method _____ _____

Sample Location Data:

County Bartow. Land Lot _____, Sec. _____, Dist. _____.

71/2' topo quad. White East (NW 1/4). Lat. _____, Long. _____.

Field No. BAR-2, Collected by R.P. Hollenbeck. Date c. 1967.

Sample Method Channel (?) Weathering/alteration Fairly fresh.

Structural Attitude -

Stratigraphic Assignment Conasauga Formation (Cambrian) shale.

Sample Description & Comments Sample of light gray slate (about 40 feet exposed) overlain by soil; collected from lower 6 feet of roadcut on east side of U.S. Highway 411, at intersection of Ga. Highway 140 - NW of BAR-1 (Hollenbeck and Tyrrell, 1969, p. 17).

Compiled by B.J. O'Connor Date 1-30-82

DATA SOURCES AND REFERENCES CITED

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- C13-69 (Replaced by C700-74) Specifications for standard strength clay sewer pipe, Part 16, p. 409-413.
- C24-72 Pyrometric cone equivalent (PCE) of refractory materials, Part 17, p. 9-14.
- C27-70 Classification of fireclay and high-alumina refractory brick, Part 17, p. 15-17.
- C43-70 Standard definitions of terms relating to structural clay products, Part 16, p. 33-35.
- C62-69 Standard specification for building brick (solid masonry units made from clay or shale), Part 16, p. 121-125.
- C216-71 Standard specification for facing brick (solid masonry units made from clay or shale), Part 16, p. 121-125.
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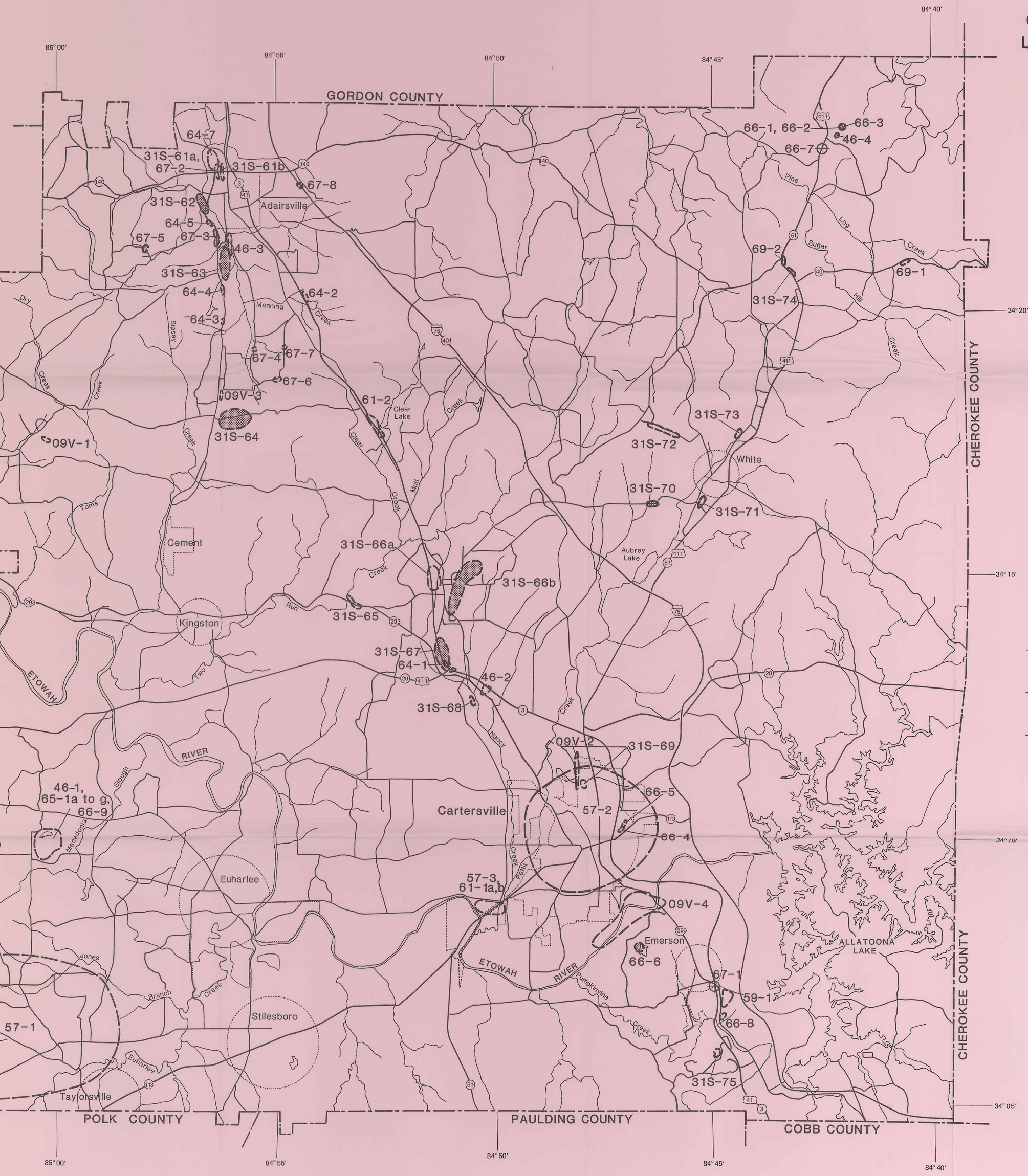
Georgia Geologic Survey
Information Circular 64
Plate 1

CLAY, SHALE, AND SLATE TEST LOCATIONS IN BARTOW COUNTY



EXPLANATION

61-2 Numbers correspond to the "Map Location No." in text.

Exact location for a single outcrop sampled.

Approximate location for a single sample.

Several samples collected over the enclosed area. Boundary dashed where approximate.

Streams and lakes

Highways and major roads

Minor roads

Location Numbers:

Btw. 09V-1 to 09V-4
Btw. 31S-61a to 31S-75
Btw. 46-1 to 46-4
Btw. 57-1 to 57-3
Btw. 59-1
Btw. 61-1a to 61-2
Btw. 64-1 to 64-7
Btw. 65-1a to 65-1g
Btw. 66-1 to 66-9
Btw. 67-1 to 67-9
Btw. 69-1 to 69-2

Not shown (location unknown):

Btw. 64-6
Btw. 67-9

SCALE
0 1 2 MILES

Modified after the 1979 General Highway Map of Bartow County, Georgia Dept. of Transportation