

GEORGIA
STATE DIVISION OF CONSERVATION
DEPARTMENT OF MINES, MINING AND GEOLOGY
GARLAND PEYTON, Director

THE GEOLOGICAL SURVEY
BULLETIN NUMBER 48

MICA-BEARING PEGMATITES
OF
GEORGIA

By
A. S. FURCRON
Assistant State Geologist

and

KEFTON H. TEAGUE
Junior Geologist
Tennessee Valley Authority



Published in Cooperation with the Tennessee Valley Authority

ATLANTA

1943

1910

RECEIVED TO BUREAU OF STATE



Sheet Mica from the Early-Vaughn mine, Lamar County.

7

LETTER OF TRANSMITTAL

DEPARTMENT OF MINES, MINING AND GEOLOGY

ATLANTA, April 28, 1943.

To His Excellency, Ellis Arnall, Governor

Commissioner Ex-Officio of State Division of Conservation

SIR:

I have the honor to submit herewith Georgia Geological Survey Bulletin No. 48, "The Mica-Bearing Pegmatites of Georgia," by Dr. A. S. Furcron, Assistant State Geologist, and Kefton H. Teague, Junior Geologist of the Tennessee Valley Authority. This bulletin has been prepared and published in co-operation with the Tennessee Valley Authority.

Strategic mica is one of the most critical minerals now in demand in connection with the prosecution of the present war. Georgia is one of four or five states in the nation which possesses known commercial deposits of high-grade sheet or block mica. It is our hope and belief that the results of more than six months' field work recorded herein will prove valuable in two ways. In the first place, it should stimulate the greatest possible production of strategic mica in the shortest period of time, and in the second place, it should tend to discourage worthless expenditure of time and money on prospects and mines which obviously are not potential sources of good mica.

The co-operation of the Tennessee Valley Authority not only has accomplished the publication of this bulletin in a much shorter period of time than otherwise would have been possible, but in addition has resulted in a saving to the State of several thousand dollars.

Very respectfully yours,

GARLAND PEYTON

Director

CONFIDENTIAL

CONFIDENTIAL - SECURITY INFORMATION

CONFIDENTIAL - SECURITY INFORMATION

CONFIDENTIAL - SECURITY INFORMATION

CONFIDENTIAL - SECURITY INFORMATION

CONFIDENTIAL

CONFIDENTIAL - SECURITY INFORMATION

CONTENTS

	PAGE
INTRODUCTION.....	1
Purpose of the report.....	1
Field work and acknowledgements.....	1
Location of deposits.....	3
Geology.....	3
THE MICA PEGMATITE.....	5
General features.....	5
Types of pegmatites.....	6
Minerals of the pegmatite.....	9
Muscovite.....	9
Biotite.....	10
Feldspar.....	11
Quartz.....	11
Other minerals.....	12
HISTORY OF MINING.....	12
Upson, Lamar, and Monroe Counties.....	12
Cherokee and Pickens Counties.....	13
Lumpkin and Union Counties.....	14
Rabun County.....	14
Hart and Elbert Counties.....	14
PROSPECTING AND MINING MICA.....	14
MINING AND PRODUCTION.....	16
Production of sheet mica.....	16
Possibilities for commercial production.....	17
LEASING.....	18
DESCRIPTION OF MINES AND PROSPECTS.....	18
Upson, Lamar and Monroe Counties.....	18
Upson County.....	19
T. J. Reeves prospect.....	19
The Old Bell mine.....	21
Miles B. Brown mine.....	23
King and Thurston property.....	25
The Old Cumbie place.....	26
Joe McKinley prospect.....	26
Mauldin mine.....	27
The Old Atwater Mine.....	28
F. E. Thompson prospect.....	30
L. M. Brooks prospect.....	30
W. M. Dallas prospects.....	31
Gibson prospect.....	32
Emmit Trice property.....	33
Bentley prospect.....	33
S. P. Cronheim prospect.....	33
Bennie Barron or Walker Wakefield mine.....	34
Duke mine.....	35

	PAGE
Mitchell-Creek mine	37
Charlie Nims mine	38
Short-Mitchell mine	39
Helen McDonald property	40
J. H. Reynolds mine	40
Stevens or Rock mine	41
Mrs. Aggie Castlen property	42
Cliff Middlebrooks property	43
Jack Walker prospects	43
W. E. Adams mine	44
D. K. Carter mine	45
Kelly O'Neal mine	46
J. M. Bevell property	46
J. A. Partridge mine	47
E. M. Thompson prospect	47
Nottingham prospects	48
D. C. Ellerbee property	48
Lamar County	49
H. S. Worsham property	49
H. B. Manrey prospect	49
Ingraham prospect	49
Early-Vaughn mine	51
Williams and Holmes properties	53
Perdue prospect	53
J. T. Means mine	54
George R. Swift estate	55
Col. A. J. Thomas mine	55
The Old Childs prospect	55
Doc Irwin prospect	56
J. W. Brown property	56
Mrs. J. I. Taylor Sr. prospects	56
Monroe County	57
O. B. Clements property	57
Rev. Thaddeus Persons mine	57
Haygood prospect	60
Holmes mine	60
Battle mine	61
F. H. Holloway mine	62
Homer Hardin mine	62
Ruffin prospects	63
Peters mine	64
L. D. Owen prospect	64
Dick Fletcher mine	65
Cox prospect	66
Rosa Fletcher prospect	67
L. P. Phinazee mines	67
L. P. Goodwin prospect	69
F. B. Willingham prospect	69
C. A. Ensign mine	70

CONTENTS

ix

	PAGE
Worsham and Goodwin prospect.....	71
Charlie Callaway prospect	71
The Old Callaway property.....	72
Willie Bowdoin property.....	72
New Ground mine.....	73
Owl Hollow prospect.....	74
A. T. Redding property.....	74
The Old Walker Smith mine.....	74
E. J. Goggins prospect.....	75
Goddard and Watson prospect.....	75
Marie Vaughn property.....	76
Coleman prospect	76
E. B. Butler property.....	77
Mrs. Mattie Smith mine.....	77
C. M. Sutton property.....	78
Mrs. W. H. Westbrook prospect.....	78
Dr. T. D. Thurman mine.....	79
Cherokee and Pickens Counties.....	80
Cherokee County	82
Wacaster mine	82
N. M. Cole mine.....	83
J. D. Hillhouse mines.....	84
Hause mines	85
J. F. Hillhouse prospects.....	87
Dean mine	88
Kuykendall prospect	89
J. V. Ledford mine.....	91
Waltz mine	91
G. W. Anderson prospect.....	93
Cook mine	94
J. T. Haley mine.....	95
R. W. Reece property.....	96
Bennett mine	96
Cochran mine	99
A. W. Amphlett prospect.....	102
Revis property	103
S. S. Densmore prospect.....	103
Pickens County	103
W. P. Stancil prospect.....	103
Jennie Burrell property	104
Allen Morton prospect.....	104
C. C. West prospects.....	105
F. M. Cagle mine	105
Denson mines	107
J. F. Carney prospect	109
Jones or Bozeman mine.....	110
Reynolds mine	111
Mrs. May Davis property	112

CONTENTS

	PAGE
Howell mine	112
Wilkie prospects	114
C. H. Fouts property.....	114
G. W. Worley property.....	114
C. H. Fouts and E. H. Kent properties.....	115
J. T. Worley property.....	115
Poole mine	115
Partain prospects	116
Scott Byees property.....	117
James Foster prospect.....	117
A. V. Reeves property.....	118
J. L. Mullinax prospect.....	118
W. J. Garrison property.....	118
Lumpkin, Union, Fannin, and Towns Counties.....	119
Lumpkin County	119
Tucker prospect	119
Garrett prospect	119
Tipton and Crane mines.....	120
Williams mine	122
Sain mine	123
Gaddis mine	123
Camp Wahsega prospect.....	124
Jones Creek prospect.....	124
Glassy Mine Top mine.....	125
Wash Walker or "Big" mine.....	126
Winn or Winnie mine.....	126
J. W. (Shotgun) Walker prospects.....	127
W. M. Gooch mine.....	128
The Old Scott mine.....	129
Captain Walker prospect.....	130
Sol Walden prospect.....	130
T. H. McDonald prospect.....	131
Prospects near Ward Gap.....	131
Ward Gap mine.....	132
Henry Lee mine.....	132
Long Mountain mine.....	133
Prospects southeast of Ward Gap.....	133
Green vein	133
Union County	134
Eph Lee mine	134
Ward Gap prospect.....	135
Thomason mine	136
Matt Gooch mine.....	136
James Gooch mine.....	136
Lot 301, Dist. 11 prospect.....	137
Joe Blue mine	138
T. H. Saxon mine.....	138
B. F. Schuler mine	139

CONTENTS

xi

	PAGE
Rogers and Rector property.....	139
J. M. Silvey property.....	140
Dyer mine	140
Archie Wimpy prospect.....	142
J. L. Weaver prospect.....	143
Mrs. Joe Stevens prospect.....	143
W. A. Sullivan mine	143
Davenport and Hedgecock properties.....	144
Thomas property	144
Fannin County	145
Springer Mountain mine.....	145
White mine	145
Towns County	146
Spanish Mountain mine.....	146
O. L. Burch mine.....	147
W. A. Henson mine.....	148
Rabun County	148
Norton mine	149
Bleckley prospect	150
Prospects near Hamby School.....	151
Kell mine	151
Tunnel or Creighton mine.....	153
Speed-Arrendale prospect	155
Mark Beck mine	155
Prospect on Westminster Road.....	157
Porter McCracken mine.....	157
L. W. Curtis property	159
Hick's mine	159
Rabun Bald mine	159
Hart and Elbert Counties	160
Hart County	160
R. L. Shiffett prospect.....	160
Mack Carter prospect.....	160
Mines between Airline and Macedonia Church.....	161
Harper-Pierman prospect	162
Mica in Western Hart County.....	163
Elbert County	164
Chapman mine	164
Alexander mine	168
Ward prospect	168
Rock Branch Church property (colored).....	169
New Bethel M. E. Church prospect.....	170
C. U. Gaines prospect.....	170
Cooley mine	170
Craft prospect	171
Dewey Rose prospect.....	171
Other Mines and Prospects.....	171
Carroll County	172
B. W. Treadway prospect.....	172

	PAGE
Cobb County	172
Mabry prospect	172
Luther Chalker property.....	173
Dawson County	174
G. W. Elkins property.....	174
DeKalb County	174
G. E. Vaughn property.....	174
Fayette County	175
Porter property	175
Forsyth County	175
Harrison property	175
H. D. Hansard prospect.....	176
O. P. Bennett prospect.....	176
Oscar McBrayer prospect.....	176
Franklin County	177
Prospects near Lavonia.....	177
Fulton County	178
J. L. Daniels prospect.....	178
Hall County	178
The Old Hope or Merck mine.....	178
Henry County	180
Maddox mine	180
Jasper County	182
Newton prospect	182
Mrs. Athen prospect	182
J. H. Barron property.....	182
Meriwether County	182
Ab. Snelson prospect.....	182
Rufus Martin prospect.....	183
Morgan County	183
Alliston property	183
Paulding County	184
Dr. C. W. Dean mine.....	184
R. S. Cole mine.....	184
B. F. Choran property.....	185
Pegmatite east of New Georgia Church.....	185
C. H. Miller property.....	186
J. F. Poole property.....	186
W. J. Miller property.....	186
Pike County	186
Rockdale County	187
Jack Bell prospect.....	187
Spaulding County	187
H. B. Melton property.....	187
Troup County	188
Hogg estate	188
Prospect west of Smith's store.....	188
The Old Ben Burts mine.....	190
W. B. Word property.....	190
Lee and Cline prospect.....	191
REFERENCES.....	192

INTRODUCTION

PURPOSE OF THE REPORT

This report discusses the mica deposits of Georgia. It describes the mica-bearing pegmatites as to location, size, mineral character, and other features. It is written to include a discussion of all the leading mines and prospects that are known.

The value and importance of our mica deposits in the present emergency are well-known, thus the report is prepared to satisfy an increased demand for information upon Georgia mica.

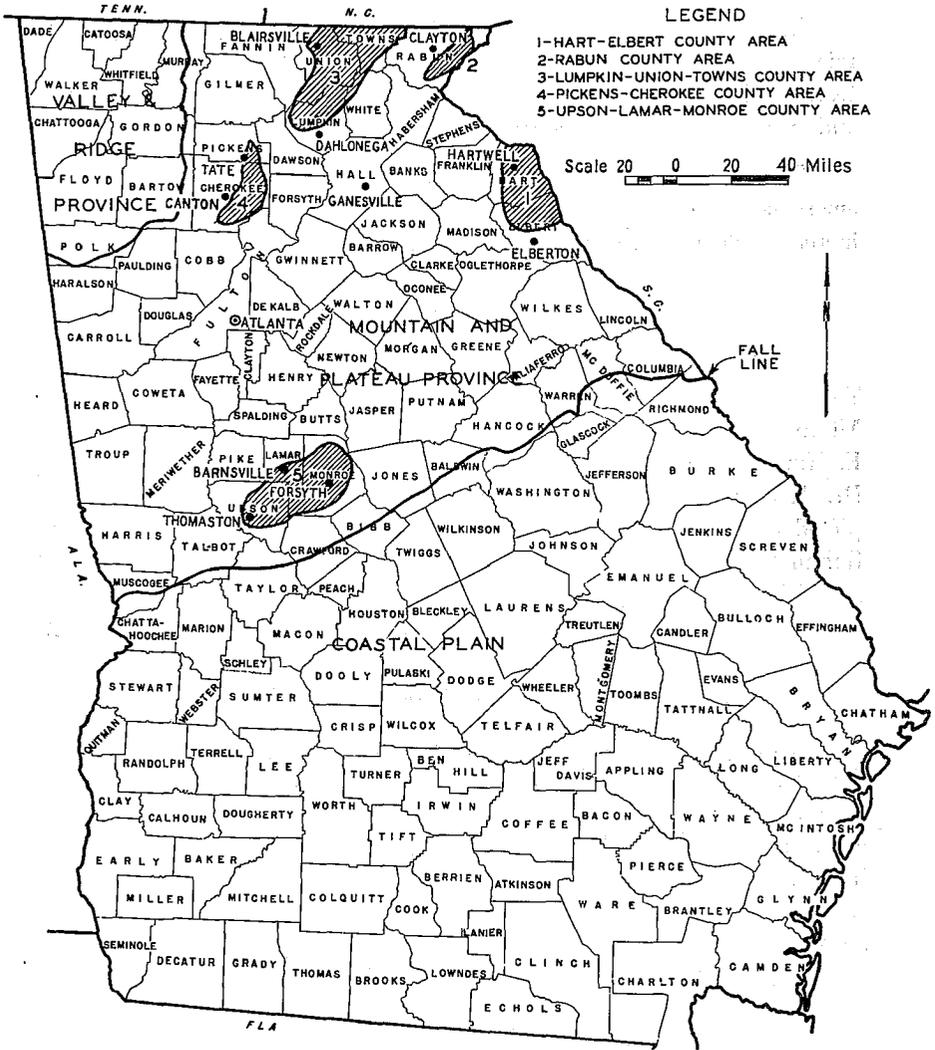
FIELD WORK AND ACKNOWLEDGMENTS

This work was undertaken as a co-operative project between the Tennessee Valley Authority and the Georgia Department of Mines, Mining and Geology. Work was begun in September, 1942, by Charles E. Hunter, Associate Geologist for the Tennessee Valley Authority, and Dr. A. S. Furcron, Assistant State Geologist. Furcron and Hunter completed the work in Hart and Elbert counties and most of the work in Rabun County. Hunter was called to work upon the mica deposits of Brazil by the Board of Economic Warfare, and was relieved by Kefton H. Teague, Junior Geologist, Tennessee Valley Authority, October 15, 1942. Field work and the preparation of the manuscript were completed by Furcron and Teague in March, 1943.

In the preparation of the report, the writers have drawn freely from the bulletins by Galpin^{3*} and by Sterrett¹⁷. These bulletins deal mostly with the deposits of Rabun, Lumpkin, Union, Pickens and Cherokee counties. Richard W. Smith,¹⁵ former Georgia State Geologist, visited a large number of mica mines and prospects in 1931-32, and deposited reports upon them in the Survey files. These records have been examined and used in preparation of the report.

The maps and diagrams in the report were put in final form by the Drafting Department of the Tennessee Valley Authority. The writers wish to express their appreciation for the cordial co-operation and assistance of Captain Garland Peyton, Director of the Georgia Department of Mines, Mining and Geology and Mr. H. S. Rankin, Senior Mining Engineer, Regional Products Research Division, Commerce Department, Tennessee Valley Authority. Miners and property owners have been cordial and co-operative throughout the course of the work.

* References are at the end of the report.



OUTLINE MAP OF GEORGIA SHOWING THE PRINCIPAL SHEET MICA PRODUCING AREAS

FIGURE 1

LOCATION OF DEPOSITS

Mica deposits occur generally throughout the Crystalline area of the State. Most of the mica, however, mined in Georgia has come from the five areas illustrated in Figure 1. The southern belt includes central and eastern Upson County, southeastern Lamar County, and the central part of Monroe County (Pl. 2 and 3). The principal mica belt in Cherokee and Pickens counties lies in the central and eastern parts of the area (fig. 1). Mica has been mined in the northern part of Lumpkin County and from scattered parts of Union and Fannin Counties. Sheet mica in Rabun County is derived from a pegmatite belt east of Clayton. The Hart-Elbert area includes the northern part of Elbert County and the central and eastern parts of Hart. The area extends eastward into South Carolina.

GEOLOGY

The mica pegmatites are found in the Crystalline area of Georgia (fig. 1). The distribution and the character of the crystalline rocks are portrayed upon the Geologic Map of Georgia, 1939.⁴ Most of the pegmatites in the Rabun, Hart-Elbert, Lumpkin-Union County areas intrude the Carolina gneiss and schist. This formation is one of the oldest in the Crystalline area, where it is metamorphosed, recrystallized, and intruded by granites and other igneous rocks. It is for the most part biotite gneiss and schist, partly sedimentary and partly igneous in origin. In Cherokee and Pickens counties, the pegmatites occur in Carolina gneiss, and micaceous schist of the Talladega series which is mapped as probably pre-Cambrian in age.

For the most part, the pegmatites are removed from proximity of large granite intrusions thus almost invariably occur in gneisses and schist. The dikes are much younger than the enclosing rocks which they cut, since they have not been appreciably affected by dynamic changes. The dominating type of igneous intrusion in the areas mentioned above, as well as over the Crystalline area in general, is the Lithonia type of granite. It is not improbable that the pegmatites in the above areas are derived from the parent magma which produced this granite.

The distribution of mica mines in Upson, Lamar and Monroe counties corresponds closely to the area mapped as augen gneiss,⁴ although the pegmatites in composition more closely resemble small intrusive bodies of garnet pyroxene granite found north of Thomaston. The

pegmatites in this area, for the most part, are found in included bodies of schist.

The geologic age of the pegmatites is not known, and it is very likely that the pegmatites among themselves are of different ages. They cut the schistosity of the enclosing rocks along both strike and dip, and are not regionally metamorphosed. These facts suggest that most of the dikes were intruded immediately after the profound period of regional movement at the close of the Paleozoic era. They are pre-Triassic for in numerous localities, pegmatites are cross-cut by Triassic diabase dikes.

THE MICA PEGMATITE

GENERAL FEATURES

Hess⁵ defines pegmatites as "rocks with coarsely and unevenly crystallized and segregated minerals occurring as dikes, veins, or metamorphic masses formed from the aqueous solutions of a freezing magma, or from the combination of the solutions with previously existing minerals." Most pegmatites are composed of feldspar, quartz, and mica; they are coarser-grained than granites. Commercial pegmatites are very coarse-grained. The coarse feldspar is microcline, except where albite or oligoclase have been introduced during later stages of injection. Coarse, granular quartz in grains or small lens-like masses is associated generally with the feldspar, and large lenses of quartz are common in many pegmatites. Muscovite mica, and locally, biotite mica, complete the composition of the usual pegmatite. These minerals may be generally intermixed but, as a rule, they are more or less locally concentrated in the dike. Tourmaline is frequently encountered, and beryl is less common. Columbite occurs in a few localities. Apatite is common to the pegmatites of Upson, Lamar and Monroe counties. Very little detailed work has been done upon the rare minerals in Georgia pegmatites.

Pegmatites in Georgia range in width from a fraction of a foot to over five hundred feet. Almost all commercial pegmatites have an average thickness of from three to ten feet. Some have been mined along the strike for a distance of at least half a mile, but mining operations seldom exceed a distance of two or three hundred feet. The pegmatite dikes may strike in any direction but the prevailing trend is to the northeast. Dips vary from 0° to 90°, but the prevailing dip is between 40° to 75°. Dips are subject to sudden and sharp variation in degree among associated pegmatites or in a single pegmatite. The general dip is southeastward, northwest dips are common, and dips in other directions occur. Side "veins" unite at depth with the major intrusion, thus may exhibit a reverse dip in the mine.

Many pegmatites, especially the thick ones, contain inclusions of wall rock. Most of the mica pegmatites in Georgia are enclosed in biotite schist and gneiss, less frequently in hornblende gneiss, granite, and other rock types. Inclusions of mica schist and gneiss tend to dip and strike with the pegmatite. Locally, the best sheet mica may be found near the wall rock or inclusions of country rock. Pegmatites tend to be conformable; i.e., to dip and strike with the country rock. However, there are many exceptions to this rule, and many dikes are only apparently con-

formable, since they cut the enclosing rocks at small angles along both the direction of dip and strike. Some pegmatite bodies have very definite walls, whereas others are scarcely more than zones of mica schist saturated with pegmatite. They are subject to great variations in thickness along the dip and strike. Many dikes divide and coalesce along both the direction of the dip and strike around "horses" of country rock. This is frequently the case where pegmatites divide in a mine. It may be seen from the above statement, that parallel dikes and stringers coalesce with the main zone of intrusion at depth.

TYPES OF PEGMATITES

There is no satisfactory classification of pegmatites because they are so variable in character and among them exceptions occur to most observations. Such features as genesis and mode of emplacement, shape of the body and arrangement of component parts, mineral composition, economic value and effect of metamorphism, must be considered in their classification. Types of pegmatites illustrated in Figures 4-11 occur in Georgia. The writers offer no apology for the classification since, obviously, it does not include many of the features listed above and is based mainly upon mode of emplacement, and arrangement of the principal parts of the pegmatites. The classification has practical value in the field where it is of assistance in mapping, and in determining the position of the best sheet mica in the dike.

Most mica pegmatites correspond to the type illustrated by Figure 4, and the general features of pegmatites discussed previously apply here as they do to most of the other types. In this type, lenses of smoky or milky quartz occur in all parts of the dike, but generally near the center. The lenses are larger than the quartz grains and nodules mixed with the feldspar, ranging in size from several inches in diameter or length to many feet in both length and diameter. Where lenses are large, they generally consist of granular, milky quartz. In many cases, sheet mica is imbedded in the sides of lenses, leaving flat, smooth impressions in the quartz, thus indicating a later age for the quartz lens. Although large quartz lenses are less abundant and important in albite-biotite pegmatites, the types here illustrated and described, occur with little respect to mineral classification.

In Figure 5, a pegmatite is shown similar to the one described in Figure 4, but having side lenses; and Figure 6 shows a pegmatite where the quartz lenses are concentrated near the center of the dike. In Figure 7, the quartz lens is continuous. Figures 8, 9, and 10, and 37

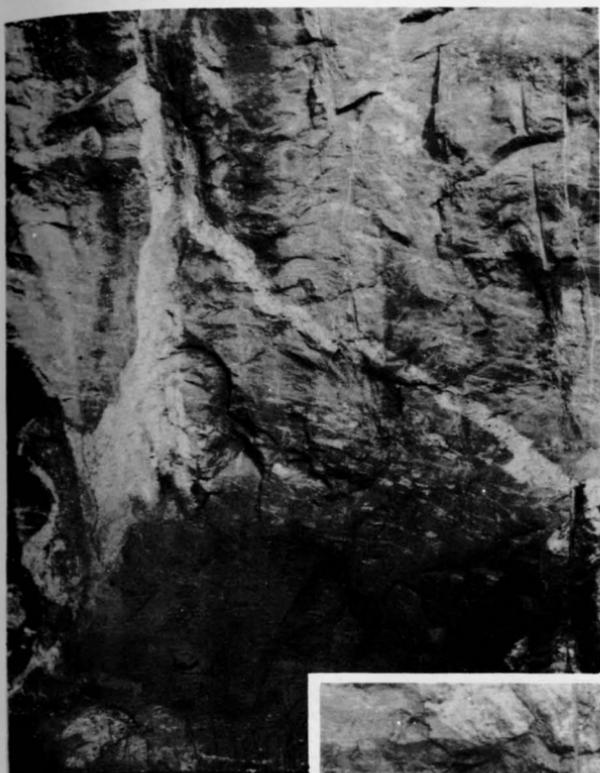


FIGURE 2, A dividing pegmatite viewed in the direction of the strike. Rock quarry below Dockery Gap, Lumpkin County.



FIGURE 3, Pegmatite viewed in direction of the strike, showing intrusive irregularities along the dip. Rock quarry below Dockery Gap, Lumpkin County.

TYPES OF PEGMATITES

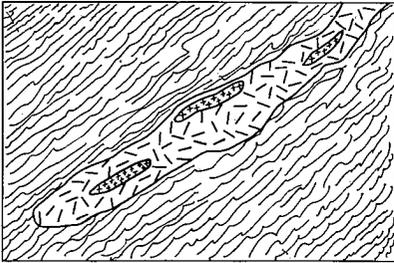


FIG. 4 MICA PEGMATITE WITH LENSES OF QUARTZ

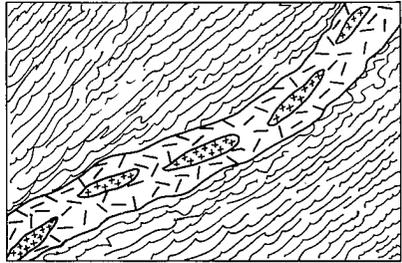


FIG. 6 MICA PEGMATITE WITH MEDIAL QUARTZ LENSES

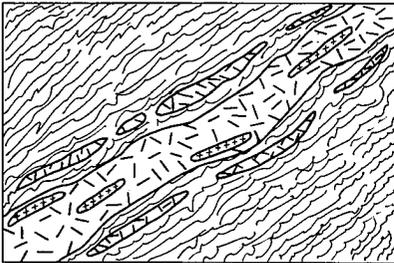


FIG. 5 MICA PEGMATITE WITH ACCOMPANYING DIKES AND STRINGERS

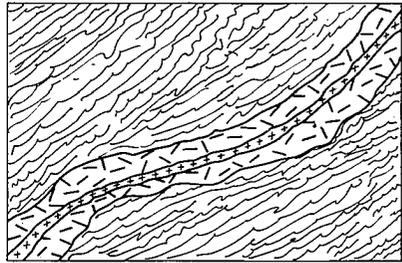


FIG. 7 MICA PEGMATITE WITH MEDIAL QUARTZ BAND

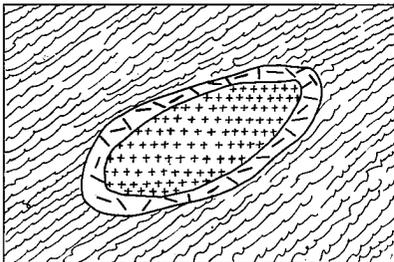


FIG. 8 MICA PEGMATITE ENVELOPING ENLARGED QUARTZ LENS

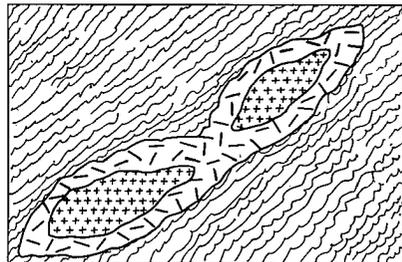


FIG. 10 MICA PEGMATITE ENVELOPING TWO LARGE QUARTZ LENSES

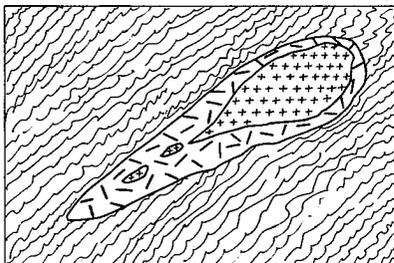


FIG. 9 MICA PEGMATITE WITH TERMINAL QUARTZ LENS

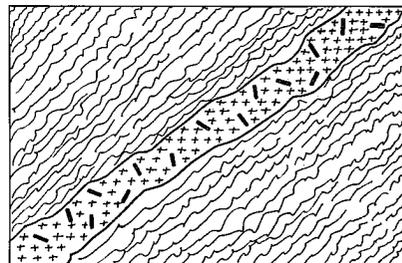


FIG. 11 "BURR-ROCK" PEGMATITE

LEGEND

	QUARTZ		"BURR-ROCK"
	PEGMATITE		SCHIST & GNEISS

all represent varieties of the condition wherein large quartz lenses, up to several hundred feet in length and of proportional width, as illustrated, occur surrounded by pegmatite. Since the pegmatite zone may be narrow locally, Type 8 may be mistaken in the field for a simple quartz "blow-out." This type rarely produces good sheet mica. Good mica has been produced from Type 9, but seldom occurs beyond the tail of the large terminating quartz lens. Type 10 is rare and may be regarded as a multiple example of Type 8. "Burr-rock" pegmatites (fig. 11) seldom produce sheet mica larger than punch. They consist of granular quartz, small books of mica, and the dikes are narrow. "Burr-rock" or "mica-capping" occurs frequently along the margin of larger pegmatites. A type of "burr-rock" pegmatite seldom encountered consists of vein quartz with little or no feldspar, and with mica books scattered throughout the vein.

MINERALS OF THE PEGMATITE

Muscovite

Muscovite ($2\text{H}_2\text{O.K}_2\text{O}.3\text{Al}_2\text{O}_3.6\text{SiO}_2$) is characterized by perfect basal cleavage by which it may be split into very thin elastic sheets. Strategic mica must be clear, flat, should split well, and must be free of the many physical defects found in mica. These defects are described at length in various reports listed in the References. They include such structures as "A" and "wedge-A," "herring-bone," "tangle-sheet," "hair cracks," etc. "Ruling" which produces "ribbon" may be found in the very best mica deposits; "ribbon" an inch wide or more, can be trimmed into pattern mica. Pattern mica can be obtained frequently from the central portions of books which contain "A" structures. Wavy, bent and twisted books, and cracks are common defects in mica deposits. Small inclusions of quartz occur in some books. Black spots, frequently magnetite, are common to mica in many localities. The sheets may be only slightly specked or very heavily spotted. This grade of mica, frequently referred to as smoky or black mica, can be used by the manufacturers of ordinary electrical equipment, thus it is often referred to as "electric" mica. Rum-colored mica from some localities includes minute specks of biotite, some of which are hexagonal in outline. The defects described above are inherent to the mica, although many prospectors have the mistaken idea that they will disappear at depth. Mica near the surface is generally stained by clay, iron and organic matter, but this stain will disappear at depth where rocks become hard.

Some mica is colorless, but usual colors are pale green, green, greenish-rum, light rum, rum and ruby. The best and hardest commercial mica is rum—or ruby-colored.

Sheet mica of strategic quality has been mined in all the principal producing areas of the State. The defects inherent to mica likewise occur throughout all the areas. In the Upson-Monroe-Lamar County area, the mica is noticeably free of "A" structure and spots, and is uniformly rum-colored. Beyond the borders of this area, spots, and "A" structures appear in the mica. There appears to be more variation in types and quality of mica among the deposits in other areas than in the one mentioned above. With a few exceptions, very little strategic mica has been produced thus far in Georgia outside of the five known areas illustrated in Figure 1.

All of the colors ascribed to mica may be found among the deposits of all the area. Pegmatite dikes which contain only a deep green mica have been observed locally, especially in Troup and Paulding counties. Most pegmatites produce a mica of uniform color, but not infrequently both green and rum-colored mica occur in the same dike. In such cases, the greenish mica is associated with, or lies against, quartz nodules or lenses, and the light rum-colored mica lies in the more feldspathic portions of the pegmatite. Green mica associated with quartz may exhibit "A" structure. Some pegmatite dikes produce both clear and spotted mica. In some cases, spotted mica occurs on one wall of the dike and clear mica on the other. Magnetite tends to occur in mica where the pegmatites intrude hornblende gneiss.

Most of the money made from the mining of sheet mica everywhere is made from the smaller sizes. Large books of mica have been reported from mines throughout the State. These books may be entirely of "A" mica, "A" mica inter-layered with flat sheet, or may be good flat sheet mica. Books of flat rum mica, weighing 8 to 12 pounds and measuring 10 to 12 inches in diameter, are removed often from the mines of Upson, Lamar, and Monroe counties. A book, which sold for \$756.00, was taken from the Bell Mine in Upson County around 1920; and one, weighing 439 pounds, is reported from the Kell Mine, Rabun County.

Biotite

Sheet biotite is commonly associated with muscovite in the Upson-Monroe-Lamar County area. It is less common, but locally abundant in the Cherokee-Pickens County area, and generally scarce in the other mica belts. Where biotite occurs, muscovite is rum-colored. The biotite

books are smaller than the muscovite books; both types may occur in the same book. In the Mitchell-Creek Mine, Upson County, muscovite books are often wrapped by biotite, and the outer portions of books are often sheet biotite. Biotite and muscovite are locally intergrown along planes parallel with cleavage, thus the two types may occur in conjunction in the same book. Biotite books are included frequently in books of muscovite and vice-versa. Minute inclusions of biotite occur in muscovite; books of biotite as large as 10 by 10 inches have been reported, and the writers have seen books as large as 5 by 7 inches at the Mitchell-Creek, Mauldin, The Rock, and other mines and prospects. "A" structures have never been observed in biotite but ruling is not uncommon. In many localities, biotite is partly or completely altered to hydro-biotite or vermiculite.

Feldspar

The dominating type of feldspar in the coarsely crystalline pegmatites is microcline. The usual colors are gray, light gray and pink. A pale green variety of Amazon stone is encountered in some dikes. The microcline is inter-crystallized with quartz and mica; coarse, graphic intergrowths with smoky quartz and common. Coarse, cleavable microcline is especially abundant in the pegmatites of Rabun County. A single crystal of microcline observed in a prospect in that county and which exhibits crystal faces, is two and one-half feet long and two feet thick. Locally, south of Atlanta, there is sufficient replacement to produce considerable soda microcline. A coarsely crystalline variety of microcline (dental spar) occurs in some of the pegmatites in the Upson-Monroe-Lamar County area in masses several feet in diameter. Pegmatite dikes over various parts of the State range in composition from nearly all feldspar to nearly all quartz.

Plagioclase, abundant south of Atlanta, is usually albite; oligoclase occurs. It is found as perthitic inter-growth in the potash feldspar or as crystalline masses inter-grown with or replacing the other minerals or as masses or bunches of very coarse crystallized plagioclase. Plagioclase feldspar is especially abundant in the Upson-Lamar-Monroe County area.

Feldspars weather to primary kaolin, which is a mixture of white kaolin, quartz and mica. Our primary kaolin deposits are extensive.

Quartz

Quartz is a common associate with feldspar and mica where it is inter-grown with them. This type of quartz is smoky to light smoky, or occasionally smoky-amethyst, in color. The occurrence and relationship

of quartz lenses to pegmatites have been discussed in other parts of the report. These lenses often carry the flat impressions of muscovite books on their exterior surfaces, and locally, biotite, feldspar or other minerals; thus they are of later origin. Locally, the mica has become bent and twisted during the growth of the lens. Small inclusions of quartz are common to the muscovite of certain areas, especially around Thomaston, Barnesville and Forsyth. In this area, quartz inclusions are much flattened, are marked by muscovite cleavage, and small radial cracks extend out from them into the mica. They are clearly of late origin.

Other Minerals

Tourmaline is a common mineral in Georgia pegmatites where it is found in well-formed black prismatic crystals in the pegmatite or in the quartz lenses. It is rare in the Thomaston-Barnesville-Forsyth area.

Beryl is not uncommon, although it generally occurs in small quantities. It is found usually in the pegmatite but occasionally in the quartz. The crystals are green in color, generally with well-formed prisms terminated by pinacoidal faces. In some localities, the crystals contain small local areas of clear aquamarine. Large crystals of beryl have been taken from the pegmatites of Cherokee and Troup counties. Beryl is generally of later age than most of the other minerals thus the crystals often include feldspar and sheet mica. Large crystals of brown and yellow beryl have been discovered south of Thomaston.

Green apatite is a common mineral in the pegmatites of Upson, Lamar, and Monroe counties. It is of late origin thus small well-formed crystals have formed in the books of muscovite, and less frequently in biotite and feldspar. At the Mitchell-Creek Mine, it is abundant, and inter-crystallized with the other minerals.

Garnets are not uncommon in pegmatites. Well-crystallized garnets occur in mica, although usually they are much flattened.

Columbite occurs in Fayette County, two miles northeast of Storr's Mill on the property of B. D. Porter; at the mica mine near Hiram, Paulding County; and on the Will Stevens property, three miles south of LaGrange, Troup County.

HISTORY OF MINING

UPSON, LAMAR AND MONROE COUNTIES

Mica mining began in this district about 1917 when many mines were opened and operated until 1924, yet the publication of the United States Geological Survey by Sterrett,¹⁷ published in 1923, makes no mention of

mining in this district. Burleson and Howell mined here in 1918-20 and mica was also mined by other North Carolina miners and, to a certain extent, by local operators. Mica was mined by Lambert and Way at numerous places, some of which was sheeted and trimmed at a mica house in Forsyth. Reports are sufficiently reliable to show that a large amount of valuable mica was removed from some of the local mines. It is probable that around a million dollars worth of mica was taken from this district during this period but since the mica was marketed in North Carolina and Chicago, there are no official records of production.

Mica mining was resumed in this area when the Early-Vaughn Mine was opened in 1941 by Meyer and Brown of New York. The Battle Mine was re-opened by J. J. Egan and Oliver Howell in 1942. The Brown Mine has been re-opened recently by the Gomillas. The Asheville Mica Company has done some prospecting upon various properties and is now mining successfully at the Adams Mine. S. P. Cronheim recently has converted a prospect into a successful mine known as the Mitchell-Creek Mine. Other localities are being prospected.

The first mica house in this district was opened at Barnesville by Meyer and Brown. Egan and Howell have recently opened a mica house at Culloden, where mica is sheeted and trimmed, and S. P. Cronheim, of the Upson County Mica Company, has opened a mica house in Thomaston, where a similar type of work is done. The Colonial Mica Corporation, a branch of Metals Reserve, has opened a mica house in Thomaston. This organization is authorized by the Federal Government to purchase strategic mica, and to otherwise assist and encourage the production of strategic mica in Georgia.

CHEROKEE AND PICKENS COUNTIES

The earliest record of mining in this area is at the old Dean Mine, Cherokee County, where work dates back to 1889. The old Cook Mine was operated in 1907 by the Pittsburgh Mica Mining Company. Most of the mica mining in this area took place about 1918-19, when numerous mines were operated by J. S. Burleson and Oliver Howell of Spruce Pine, North Carolina. There has been some mining locally since that period. Recent prospecting and mining has been done in this area by Edwin M. Clapp and Frank B. English. Sheet mica taken from this area was sold in North Carolina, therefore records of production in past years are not available. There have been several attempts to wash and grind mica in the vicinity of Holly Springs. Since there is a large amount of mica suitable for scrap available in this district, failure was not due to lack of material.

LUMPKIN AND UNION COUNTIES

Records of production are not available for this area. Between 1898 and 1907, a large amount of mica was mined in Lumpkin and Union counties from the Tworun and Yahoola districts. Many of these old openings have fallen into decay thus are difficult to locate. Most of them are now within the boundaries of the Chattahoochee National Forest area. Most of the mining done here around 1900 was done by or for the Pitner Mica Mining Company of Chicago, Illinois. Mica was trimmed and sheeted on the Cooper Gap Road at the old Bridges place, three-quarters of a mile south of the home of Captain Williams. There was another mica house southeast of Gaddistown. About 1907, the Pitner Mining Company established a mica grinding mill upon a tributary of Toccoa River, northwest of Cane Creek. The mica was wet-ground and the process used has been described by Galpin.³

Mica was later mined in this district shortly after the World War when there was a mica house in Dahlonga. The operation was later removed to Gainesville. Some prospecting has been done in this area in the past few years, but very few of the old mines have been re-opened.

RABUN COUNTY

Several mines were opened at an early date in a pegmatite belt east of Clayton, where it is reported that mica was discovered by the Bleckleys, and worked as early as 1882. Most of the mica in this area was mined in the first years of the century from the Kell, Mark Beck, Porter-McCracken, and other mines. Sporadic mining has taken place to the present time. Some of the mines were prospected recently by W.P.A. workers. Most of the mica from Rabun County was marketed in North Carolina, thus no records of production are available.

HART AND ELBERT COUNTIES

Numerous prospects and unprospected pegmatites occur in Hart and Elbert counties. Most of the mining was done at the Chapman Mine, where mica was removed in 1907, 1910, and again in 1924.

PROSPECTING AND MINING MICA

Most mica mines and prospects are opened up where the farmer, prospector, or hunter discovers loose pieces of mica in the soil. In some localities, especially in the more mountainous sections of north Georgia, hard mica-bearing pegmatites are exposed at the surface. Before any

extensive prospecting is done, the quality and commercial possibilities of the mica should be determined for there is no point in mining a type of mica which cannot be sold at a profit. It is true that clay, iron, and organic stains in sheet mica will disappear at depth, but black spots and serious "A" structure will probably continue to depth, the opinion of the "old-timer" notwithstanding. If the pegmatite is consistently narrow, or of the "burr-rock" type, and all the mica is small, it is unlikely that commercial sheet will be produced. The prospector should remember that in most cases, Mother Nature has accomplished the equivalent of thousands of dollars worth of prospecting upon almost every deposit.

In soft material, pits and trenches are dug where mica is discovered in the soil. This work should be guided generally by the nature of the outcrop and the use of good judgment. When the pegmatite has been exposed, and samples of mica collected, the mica should be submitted to someone competent to pass upon its commercial value. It is of special importance at this stage to determine the percentage, size and quality of trimmed sheet mica which could be obtained from the deposit. If the amount is less than the cost of mining and sheeting, mining at this locality is obviously a bad business venture. Where books of good mica are taken from the prospect, they should not be left beside the pit where they will deteriorate by rain and frost, or become trampled under foot. The good books should be separated from the scrap at the prospect, and removed to a secure place under cover.

If the deposit proves to be commercial, the prospector will probably develop the pit into a shaft. The course of this work will be determined by the thickness of the pegmatite and by its dip and strike. Some dikes which dip at an angle near 90° can be mined from vertical shafts. In many cases, pegmatites dip less than 65° so that a vertical shaft begun upon the outcrop will rapidly reach the footwall of the dike, at which point it will be necessary to run drifts along the vein or to start an incline down the dip of the vein. A large amount of mica has been mined by drifting along the vein in soft ground. The mica in this condition is easy to mine but is liable to be stained. Many miners prefer to sink a vertical shaft to intersect the vein in the direction of its dip. Such a shaft may be planned to cut the vein at depth, where it has become hard, and timbering will not be required. Since pegmatites are subject to great variation in thickness along both strike and dip, all available features of the dike should be studied before the site of the shaft is selected.

All works in soft ground should be timbered, if they are to remain permanent and safe. In most cases, the shaft will encounter the permanent

water table at between 30 and 60 feet below the surface. If the pegmatite is still soft and kaolinized at water level, the ground will be difficult to hold, and a careful timber job will be necessary. This situation is seldom encountered in North Carolina and North Georgia, but it is not infrequent south of Atlanta. In some places where the pegmatite is soft below water level and the country rock hard, it is advisable to sink a shaft in the country rock to intersect the pegmatite below the depth of kaolinization. An example of the above conditions is the Brown Mine, Upson County, where the pegmatite is soft and kaolinized to a depth of over a hundred feet.

In soft ground above the water table, mining may be carried on simply by pick and shovel, bucket and windlass. A mechanical hoist will be more efficient than a windlass if the shaft is to go to any depth. Below the water table, it will be necessary to add a pump to the equipment. Where the rocks become hard, hand drills may be used, but this method is slow and tedious. At this stage, it would be advisable to use a compressor and jack-hammer.

In many cases, it is advisable to open abandoned mines. A large amount of mica has been produced in the past from mines by operators who came from outside of the State and who left with us no record of production. In most cases, the old works are inaccessible, partly or completely filled. It is known that many of them were not worked below water level. In some of these localities, it is not possible to see the pegmatite, yet many of these old mines undoubtedly would produce good mica if re-opened. The miner should proceed cautiously so that his plan of development is based upon a careful study of the geology of the deposit, and upon all available information regarding its past history of operation and production.

MINING AND PRODUCTION

PRODUCTION OF SHEET MICA

The mica industry in Georgia is still in the development stage. Renewed interest in mica mining began early in 1940, at which time mines were opened and systematic prospecting was begun by other groups. Interest in mica production has grown until at present there are approximately 100 men and women engaged in mining and processing mica. Of the total number employed in the mica industry, about 60 men are engaged in mining mica, and 40 men and women (mostly women) prepare the run-of-mine or block mica for marketing.

A great incentive for the increased production of mica has been the increase in price of processed and unprocessed mica. The present price of sheet mica is approximately three times as great as was the price in the pre-war period. On the other hand, certain difficulties such as shortage of miners, sheeters, and lack of equipment, have greatly retarded production. It is not unreasonable to believe that with increased interest and experience, with the continued great demand for high grade mica, and the stimulus of high prices, the production of mica will continue to increase. Potentially, Georgia ranks as one of the few important mica producing states.

Accurate estimates as to the total gross value of the sheet mica produced in the period from 1940 to 1943 are impossible. Considering the data that the writers were able to obtain on production from the various mines, it is reasonable to believe that about \$175,000 worth of sheet mica was produced in Georgia during the past three years. The figure represents only the gross sales of punch and sheet mica classified as strategic. Present market demands are limited for other grades of mica, such as scrap mica and spotted or "electric" mica, consequently there are few sales of other grades.

The following figures on sales of strategic mica from Georgia for the last five months (September, 1942-April 15, 1943) were supplied by Mr. B. C. Burgess of the Colonial Mica Corporation:

MINES	POUNDS & OUNCES	VALUE
Early-Vaughn	29,878—15	\$22,862.20
Battle	9,603— 8	11,861.84
Brown	3,799—12	1,765.97
Mitchell-Creek	1,691— 7	5,747.08
Miscellaneous mines	9,703— 2	2,883.18
TOTAL	54,676—12	\$45,120.27

POSSIBILITIES FOR COMMERCIAL PRODUCTION

Of the five principal mica areas in Georgia, the one in Upson, Lamar and Monroe counties undoubtedly offers the most promising possibilities for the production of strategic mica. Mica from this area is seldom spotted, is hard, flat, rum-colored, and "A" structures are rare. A very high percentage of the mica occurring in this area is of strategic grade. It is estimated that probably \$1,000,000 worth of sheet mica was mined and sold from this locality during and shortly after the first World War.

Many of the mines and prospects in the area are undeveloped, thus, undoubtedly, additional work will develop many of the mines and prospects described in this report.

A large percentage of the mica mined at an early date in Georgia prior to the first World War came from the Cherokee-Pickens County area, the Lumpkin-Union-Towns County area, and from Rabun County. Some mica was mined in Elbert and Hart counties during the previous war period. It is probable that all together at least \$1,000,000 worth of mica has been sold from these districts. Only one of the old producing mines has been re-opened to date.

LEASING

Mica deposits are widely scattered over the crystalline area where many farmers have found it profitable to mine mica between crop seasons. It is generally customary, however, to lease the property to an operator because any extensive mining development upon mica will require the use of equipment, and demand continuous attention. It is customary to lease mica property upon a royalty basis. The lease usually requires the miner to return to the owner 10-12 per cent of the sales price of the mica as a royalty. The mining lease should be drawn up fairly for both parties. The miner incurs certain risks of operation, pays the labor, rents or buys the necessary equipment, and sheets and trims the mica. The lease should be a written one and, of course, is not valid unless it is recorded in the County Court House. The owner should avoid "long time," "until the end of the War," and "five-year" leases. If the operator is serious, he will begin his work as soon as it is feasible. Under the present arrangement strategic mica must be sold to the Colonial Mica Corporation which will supply a bill of sale for all purchases.

DESCRIPTION OF MINES AND PROSPECTS

The important known mica mines and prospects of the State are described in the following pages. This discussion will begin with the properties in the principal areas from which mica was produced in the past, or where production is of importance at the present time. Some other mines and prospects are discussed in the final list of counties, although almost all the mica mining activity thus far has been confined to the five principal areas. In the course of the work, a very large number of unfavorable prospects were examined which are not here described.

UPSON, LAMAR AND MONROE COUNTIES

This area lies 50 to 60 miles south and southeast of Atlanta, and about 10 miles north of the Fall Line. The mica-bearing section centers around

Thomaston, Barnesville, and Forsyth. Important mines and prospects extend over an area of approximately 600 square miles. This is the most important mica mining section of the State and one of the most important in the country.

Thus far, few good mica deposits have been discovered north of the over-thrust which limits the Pine Mountain area on its northern side. North of this structural line, in Pike and Lamar counties, "burr-rock" pegmatites are common and in other dikes the mica may be spotted. Northeastward in Jasper and Morgan counties where mica of good quality occurs, it is liable to be curved and cracked. The good mica-producing area is interrupted to the southwest by sedimentary rocks of the Pine Mountain area.

This part of the Central Upland is characterized by flat and rolling topography. Accessibility is good so that it is possible to drive directly by car to most of the mines and prospects. Most of the mica mining in the State at the present time is located here where strategic mica is produced from old re-opened mines (Battle, Brown, Adams), and from mines developed recently from prospects (Early-Vaughn, Mitchell-Creek). Undoubtedly, many other mines and prospects of this district could be developed to increase the production.

Upton County

T. J. REEVES PROSPECT

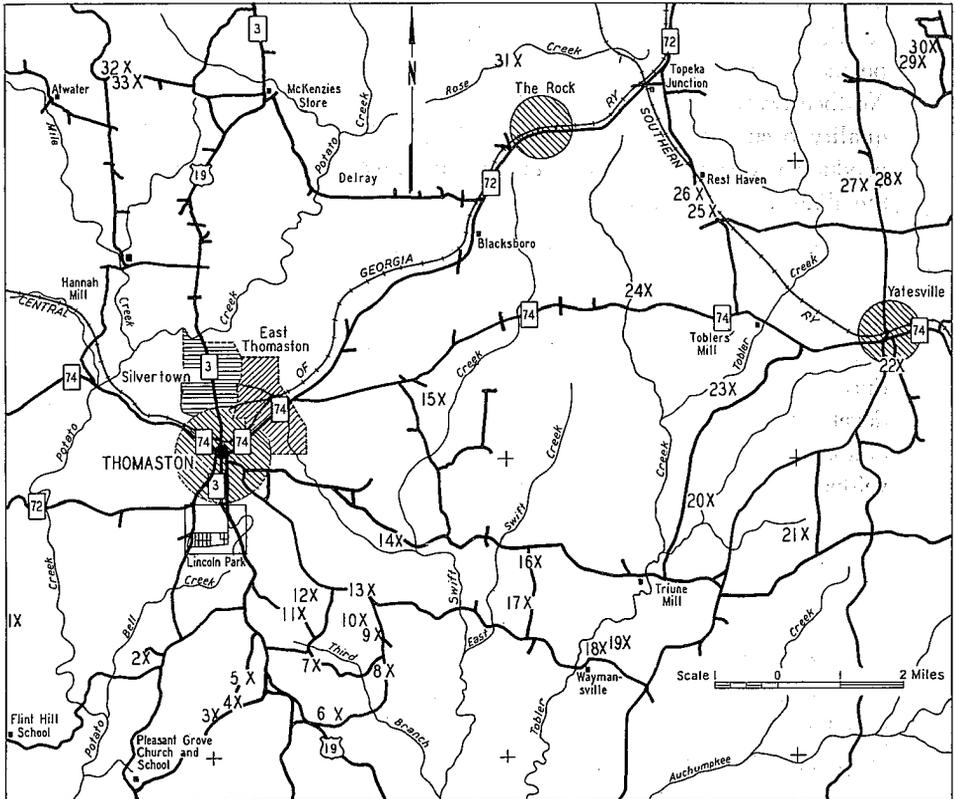
Some prospecting for mica was done in 1940 on the T. J. Reeves property. This prospect is located 4.25 miles (airline) and 5.5 miles by road S. 50° W. of Thomaston. It is about one mile N. 35° W. of the junction of Potato and Womble creeks and between the two creeks. The property is owned by T. J. Reeves of Thomaston.

An opening was made near the crest of a large hill on a medium-textured pegmatite. The shaft, about 20 feet deep, exposes a pegmatite which is about three feet thick. The pegmatite strikes N. 40° W. and has a near vertical dip. It consists essentially of smoky quartz in small lenses, kaolinized potash feldspar, and muscovite and biotite mica.

The muscovite is of a good rum color, hard, free of spots, flat and splits well. Some of the mica near the surface is slightly clay-stained. Books of muscovite up to four inches across can be found around the opening.

This property deserves further work.

MICA DEPOSITS OF UPSON COUNTY, GEORGIA



MINES AND PROSPECTS

- | | | |
|-------------------------------|---------------------------------|---------------------------------|
| 1- Reeves Prospect | 12- The W. M. Dallas Prospect | 23- J. H. Reynolds Mine |
| 2- The Old Bell Mine | 13- R. S. Gibson Prospect | 24- The Stevens Mine (The Rock) |
| 3- The Miles Brown Mine | 14- Emmit Trice Prospect | 25- Mrs. Aggie Castler Mine |
| 4- The King and Thurston Mine | 15- The Bentley Prospect | 26- Cliff Middlebrooks Property |
| 5- The J. L. Cumbie Prospect | 16- S. P. Cronheim Prospect | 27- Jack Walker Mines |
| 6- Joe McKinley Prospect | 17- The Bennie Barron Mine | 28- The Adams Mine |
| 7- The Mauldin Mine | 18- The Duke Mine | 29- The Kelley O'Neal Mine |
| 8- The Old Atwater Mine | 19- Mitchell Creek Mine | 30- D. K. Carter Mine |
| 9- The Thompson Property | 20- Charley Nims Mine | 31- J. M. Bevell Property |
| 10- The L. M. Brooks Prospect | 21- The Short-Mitchell Mine | 32- J. A. Partridge Mine |
| 11- The W. M. Dallas Mine | 22- The Helen McDonald Property | 33- The E. M. Thompson Property |

THE OLD BELL MINE

This mine is located 3.5 miles (airline) and 4.5 miles by road S. 20° W. of Thomaston via the Talbotton road. The mine lies 0.5 miles due east of Bell Creek, and 1.3 miles N. 30° E. of the junction of Bell and Potato creeks. It is on the Davis estate and Jim Davis of Thomaston is in charge of the property. The mine is in an old terraced field grown into pines, near the top and on the south side of a gentle slope 40-50 feet above a wet weather branch. It is a quarter of a mile S. 75° W. of the tenant house on the property.

The present works consist of a heart-shaped open cut near the crest of the ridge, now somewhat caved and filled. The cut at present is 25 feet long, 20 feet wide and has a maximum depth of 12 feet. In a S. 5° W. direction and 50 feet away, an inclined cross-cutting drift has been made in a N. 5° E. direction into the hill. The opening is inclined 22° and is accessible for 38 feet on the incline. At the head the incline is caved and filled. Entrance to the incline is by way of a 20-foot open cut. It is reported that this drift intersected a shaft made in the open cut but, at present, the shaft is completely filled.

In the incline, the country rock is well-exposed, striking N. 42° E., dipping 40° SE. It consists of biotite gneiss intruded with pegmatite. The composition of the dump below the incline indicates that this operation intersected the main pegmatite.

The pegmatite is incompletely exposed in the open cut. It consists of potash feldspar, smoky and milky quartz, and mica. Milky quartz lenses occur; coarse, cleavable feldspar occurs locally; "burr rock" is common. Two types of mica—clear "A" mica and flat, rum-colored mica—occur. Mica books, exposed in the present opening, are small and are considerably cracked and bent. They appear to be inferior in quality to material found in the dump. Small biotite books occur in the dump. Some schist fragments saturated with pegmatite contain black tourmaline prisms. The country rock in the open cut seems to dip about 25° S. 25° E., and the pegmatite, except for cross-cutting stringers, appears to be generally conformable to it.

The mine was first opened by Tom Bell during the last war. It is reported that Mr. C. A. Nichols of Spruce Pine, North Carolina, removed from this mine in 1918 one of the largest blocks of clear mica ever mined in Georgia. The reported weight was 350 pounds, and the book sold for \$756.00. The largest clear sheet from this book measured 10 by 20 inches. It is said that mining was done by drifting along the vein in either direction from the shaft.

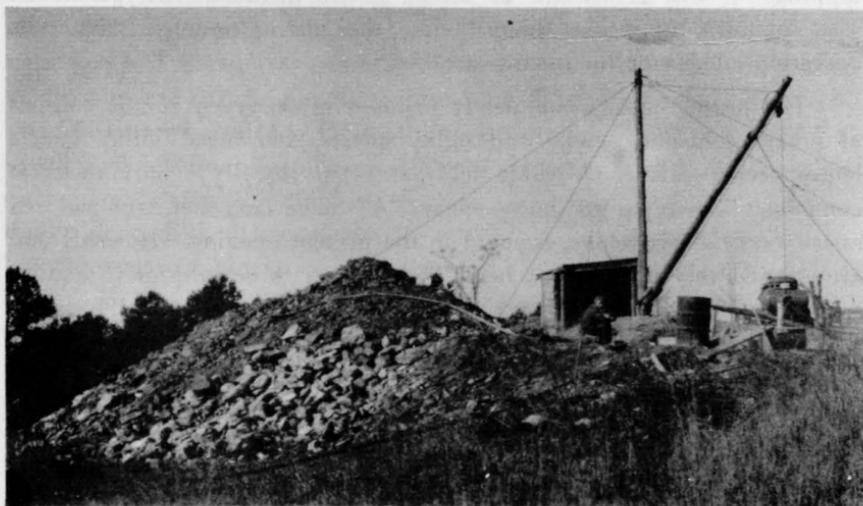
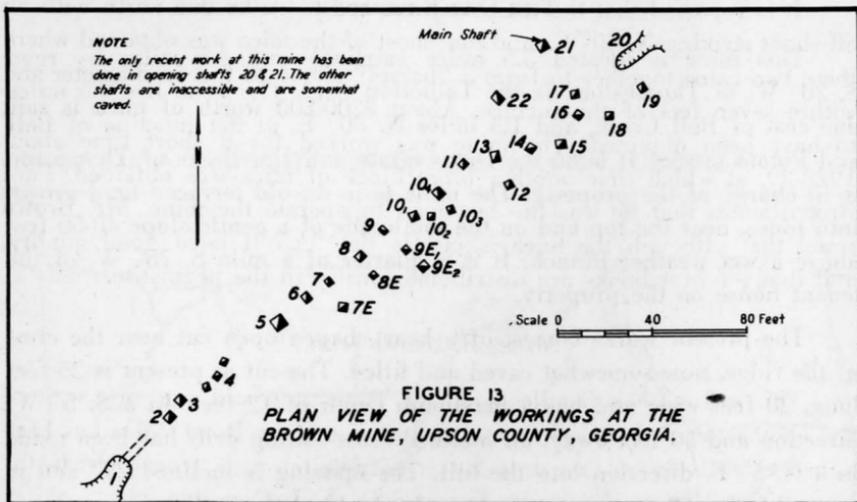


FIGURE 14, Dump and exterior equipment, Mauldin mine, Upson County, January, 1943.

It is reported that the main vein seemed to strike due north with an off-shoot striking N. 40° E., and that most of the mica was obtained where these two came together to form a "barrel" about 20 feet in diameter and within seven feet of the surface. About \$3000.00 worth of mica is said to have been obtained. The mine was worked for a short time about 1928-29, at which time another large block of mica was obtained. Paul Brown states that he was the last man to operate the mine. Mr. Brown states that although the mica is mostly flat "A," it is of good quality, and that the best books are distributed locally in the pegmatite.

MILES B. BROWN MINE

This old mine is 5 miles south of Thomaston and one mile west of the Thomaston-Butler Highway on the Parker Ferry Road. Mica has been mined extensively on this property at various intervals from 1916 to the present time. The mine is now operated by A. J. Gomilla.

The pegmatite has been mined extensively from certain shafts and underground drifts for a distance of 400 feet or more (fig. 13). The pegmatite is not a simple one because side veins occur which also contain good mica. The dike, or dikes, strike about N. 55° E. and the dip of the principal vein is steeply to the northwest. An inclined drift follows the vein from the northeast end of the works southwestward for 280 feet or more, but in the lower part the drift is somewhat caved. The pegmatite is kaolinized to the depth of the workings. A new shaft (21), now about 110 feet deep, has been made recently by the Gomillas who plan to carry this shaft down to intersect the vein. The enclosing biotite gneiss is less weathered than the pegmatite. Its dips are variable and, although frequently cross-cut by pegmatite, the dike is generally conformable to it in dip and strike. There is a cross-cut to the northwest, 55 feet southwest of the entrance of the inclined drift, made at right angles to the incline and about 16 feet long. From the head of this cross-cut to the southeast face of the inclined drift, the following rocks are exposed: Pegmatite, 2-6 inches; mica schist, 2 feet; pegmatite, 3 inches; mica schist, 10 inches, and pegmatite 14 feet with an inclusion of mica schist, 6 inches to 3 feet in thickness near the middle. The pegmatite and schist bands dip 60°-70° SE. in this cross-cut.

Another cross-cut, 118 feet southwest of the entrance of the incline, is 15 feet long and made to the southeast. Pegmatite is exposed here separated by schist from the main part of the vein. This pegmatite contains good mica. It dips northwest in the roof of the cross-cut but rolls to the southeast at the bottom end of the cut.

The pegmatite is not exposed in many places along the incline below this point where it is concealed by timbering and back-fill. At a point 128 feet southwest of the entrance, pegmatite occurs, where it appears to dip about 75° to the southeast. Both pegmatite and country rock dip to the southwest at the head of the inclined drift.

A plan view of the position of shafts and surface workings is given in Figure 13. At the southwest end of these workings, there is a tunnel (1) which extends northeastward into the hill. The country rock strikes N. 40° E., dipping 45° SE. Pegmatite is not exposed at the mouth of the tunnel but mica and pegmatite occur in the dump. This drift extends into the hill in a N. 12° E. direction for about 20 feet, where it is caved.

The following is a brief description of the other workings: (2), A square pit 10 feet deep with a short drift N. 65° E. Small mica books and considerable biotite occur on the dump; (3), Two pits about 20 feet apart connected by a tunnel now collapsed. Some pegmatite is exposed in the west wall, and biotite and muscovite books occur on the dump; (4), Three pits connected by collapsed tunnels; (5), A caved pit with drifts N. 35° E. and S. 35° W. The pit was originally about 15 feet deep. The northeast drift extends for about 18 feet. The pegmatite contains schist inclusions and is split into two or three stringers. The dike dips about 70° NW. Mica on the dump is small. The drift to the southwest is caved; (6), A collapsed pit near a moderately large dump. The mica books on the dump are not very flat and do not split very well; (7), A collapsed pit now 12 feet deep with a filled drift to the southwest; (7-E), A small pit with some muscovite and biotite on the dump; (8), A new pit about 7 feet deep in soil; (8-E), A small filled pit with some drifting to the northeast; (9), A square pit about 40 feet deep; (9-E₁), A small open cut; (9-E₂), A 15-foot pit in pegmatite. About 10 feet of pegmatite is exposed. The mica books are not very large and are somewhat cracked, but in general are of good quality. There is a short cross-cut into the pegmatite towards the northwest; (10), Four pits, all mostly filled except 10₃, which is about 20 feet deep with cross-cuts at the bottom. Small mica books and biotite occur in the dumps; (11), A shaft 60 feet deep; (12), A collapsed incline begun in country rock with pegmatite exposed in the bottom; (13), A shaft apparently in country rock; (14), A shaft, 16 feet deep with drifting from the bottom; (15), A shaft, 18 feet deep with drifting from the bottom; (16), A shaft, 18 feet deep with drifting from the bottom; (17), An inaccessible shaft at least 60 feet deep; (18), A filled pit now 6 feet deep; (19), An 8-foot pit, probably filled; (20) is the mouth of the inclined drift described above, and (21) is the location

of the new shaft described above. It appears from the above described workings that most of the pits and shafts towards the southeast end of the works are rather shallow, that at least two pegmatites have been worked here, and that most of the mica has been produced from the northeastern end where workings have gone to water level.

The mica from this mine is flat, hard, rum-colored and of good quality, although some of the books are stained because mining has not been carried to sufficient depth. In general, the books are not as large as those from some other mines but they are numerous. Mr. Brown reports a book which weighed 37 pounds and sheeted up to 6 by 8 inches. It is estimated that between \$75,000 and \$80,000 worth of mica has been produced from this mine.

KING AND THURSTON PROPERTY

This property is located four miles (airline) and five miles by road due south of Thomaston. It is one mile west, by road, of the Thomaston-Butler Highway. The property lies 800 feet northwest of the dirt road to Talbotton near the crest of a small ridge. The mine is now owned by Grant King and Hugh Thurston of Thomaston, and is known locally as the Old John Robbards place.

The mine consists of seven shafts 15-30 feet deep over an area of about 50 by 80 feet. The two northwesternmost shafts were made in biotite gneiss thus do not expose pegmatite. Southeast of the two above mentioned shafts and in a N. 35° E. direction are three shafts which contain pegmatite material in the dump. One shaft, 15 feet southeast of the three in line, exposes pegmatite. From the nature of the shafts, the pegmatite appears to strike N. 30° E., dipping to the southeast. The dike appears to be conformable to the biotite gneiss wall rock which is deeply weathered.

According to Paul Brown, this mine was opened and worked in 1920 by Otis Franklin and Johnson, who removed considerable mica. Mr. Brown also stated that he worked the mine for a short time about 1930. Muscovite and biotite books, fragments of hard, cleavable feldspar, and nodules of smoky quartz occur in the dump. Some of the mica books contain small quartz inclusions. Some of the mica is cracked, but bent or wavy books are rare. The mica is clear, flat, hard, rum-colored and splits exceedingly well. The property has possibilities for the production of mica.

THE OLD CUMBIE PLACE

This prospect lies 4.5 miles south of Thomaston on the west side of the Thomaston-Butler Highway. It is on the west side and adjoining the Buford Jones place. Mrs. Maggie Fossett Noll owns the property. Mica was taken from a 12-foot hole, now 8 feet deep, 250 yards west of Buford Jones' Tourist Court. The mica on the dump is small, clear and rum-colored.

About a quarter of a mile south of the above locality and on the west side of the "Old Florida Road," an 8-foot hole, now 4 feet deep, was dug by Mark Hancock. The pegmatite strikes N. 52° E. and, where exposed in the road bank, is only two feet thick. The mica is small and rum-colored.

A trench, 20 feet long, now nearly filled and 300 yards west of the above-described pit, was dug by Joshua Slaughter. The mica here is rum-colored and small. A similar type of mica is found around a 4-foot pit which is 50 yards N. 10° W. of the trench.

A 40-foot shaft was dug by Joshua Slaughter eight or ten years ago about 70 yards N. 10° W. of the last-mentioned pit. This hole is now five feet deep. According to Harry Fossett, most of the mica was obtained from this shaft and from the pit first described, which produced several hundred pounds of mica. The mica was small but the quality good.

On the west side of the Thomaston-Butler Highway between the highway and the east side of the Talbotton Road, three holes were dug here close together upon the old Buckles place on land bought from Jim Anderson by Buford Jones. The pegmatite strikes N. 56° W., dipping 50° SW. The enclosing biotite gneiss strikes N. 55° E., dipping 50° SE. The mica is hard, flat and rum-colored, but all of it is very small.

JOE MCKINLEY PROSPECT

This prospect is located five miles (airline) S. 24° E. of Thomaston and six miles by road via the Thomaston-Butler highway and the Atwater Mill Road from Thomaston. The prospect is one mile east of the highway by way of the Atwater Mill Road. It is 150 feet northwest of the road and 200 feet N. 20° E. of the old dwelling. The prospect is near the top and on the east side of a considerable hill, about 350 feet from a spring branch, and 50 feet above the branch in a field now growing up in small pines.

A prospect pit was started here after the first World War. It is said that mining was stopped before much mica was removed because of a

disagreement between the miner and the owner. R. W. Smith¹⁵ visited the property, May 2, 1932, where he found a pit about 8 feet deep. He states that the vein appears to be striking N. 65° E. and that it is about four feet thick. The pegmatite contains some moderately large quartz lenses in the middle. He found mica books on the dump 4 by 6 inches which would sheet about 4 inches square. When this locality was visited by the writers, January 13, 1943, the pit was almost entirely filled and no pegmatite was exposed. There are no exposures around the site of the prospect although biotite gneiss with variable dips intruded by granite and pegmatite crop out in the banks along the country road.

Only small mica books may be seen at present in the dumps. The mica, however, is hard and is light rum in color. Defects noted in some of the books consist of traces of curvature, cracks, and traces of "A" structure. Small books of biotite mica occur also. There is little to be seen about the prospect, except perhaps the occurrence of biotite, to recommend it at the present time. However, the more favorable report made by Smith when the pit was open and the small amount of work necessary to re-expose the dike, suggest that further prospecting should be done here.

MAULDIN MINE

This well-known mine is on the Whittle Road four miles east of Thomaston, and about one mile off the Thomaston-Butler Highway. The property is now owned by the Reconstruction Finance Corporation and the Northwestern Bank. Mica was first mined here by Martin and Frazee. It was purchased by C. A. Nichols, of Spruce Pine, N. C., in 1919 and was sold by him to Mr. Burleson. It is said that Mr. Nichols did not mine below water level but mining was continued by Mr. Burleson. The total value of mica produced is reported to be between \$75,000 and \$100,000 worth. The works lie close to and on both sides of the dirt road, the older workings being just north of the road. The property was leased recently by the Asheville Mica Company which sank a new shaft to a depth of about 100 feet, where it intersects the bottom of the old shaft. It is reported that not much mica has been discovered thus far by these operators, who are at present working a different mine.

At the surface, the works strike about N. 10° E. The vein is well-exposed in the old shaft and at the bottom of the new shaft. At the 75-foot level, the vein is seven feet wide. It consists of coarse pegmatite which strikes N. 16° E., dipping 73° SE. The walls of the vein are quite definite. At the 90-foot level, the vein maintains its width, dipping about 77° SE. The vein is generally conformable in strike to the enclosing biotite-

granite gneiss. Most of the mining done by the Asheville Mica Company recently was done at the bottom of the two main shafts. There has been no attempt to work in the old drift in hard rock which extends at the 75-foot level northward across the road to the old smithy. Some mica was removed by the present operations from a side vein about two feet thick, which may be seen on the hanging wall at the 90-foot level. In general, at this level, the mica appears to be close to the walls of the vein and especially to the hanging wall.

The Mauldin pegmatite, composed of albite, glassy gray microcline, muscovite, and smoky quartz, is coarse-grained. Apatite and large biotite books are common here. The mica is clear, flat, rum-colored and of excellent quality. The recent inspection of the mine made by the writers indicates the presence of a very definite vein which, if followed, should produce good mica. Sheet mica is not evenly distributed in the pegmatite, and the fact that not very much good mica was obtained from the one locality in the mine recently prospected, should not condemn the mine.

THE OLD ATWATER MINE

This old mine is located 4.4 miles (airline) and 5.3 miles by road S. 37° E. of Thomaston. The mine is 400 feet east of the dirt road between the Waymanville Road and the Thomaston-Butler Highway, and 1.4 miles south of the Waymanville Road. It is 0.6 miles due north of the Atwater Cemetery. Most of the operations lie on a wooded slope which terminates to the northeast at a branch. The extensive group of pits and underground drifts at this locality comprise a belt 100-150 feet wide, which extends from near the upland surface for a little less than an eighth of a mile N. 70° E. to the branch.

Martin and Frazee first opened the mine in 1918. It is reported that \$15,000.00 worth of mica was removed. During the early mining operations, all of the openings shown in Figure 16 were made except Nos. 1 and 4. The early mining did not go beyond a depth of 40 feet. Shafts Nos. 2, 5, 6, 8 and 10 were made in wall rock and did not expose the pegmatite. All of these old workings are now badly caved and filled, and are inaccessible. From the size of the dump, it appears that Shaft No. 7 was the principal hoisting shaft and is probably the deepest one. In 1942, the Asheville Mica Company did a limited amount of prospecting at this mine. Shafts Nos. 1 and 4 were put down to a depth of about 35 feet. In Shaft No. 1, the pegmatite is exposed in the extreme bottom. Shaft No. 4 is not accessible at present; however, pegmatite material is found in the new dump. The writers do not believe that any of the shafts, either old or new, extended below water level.

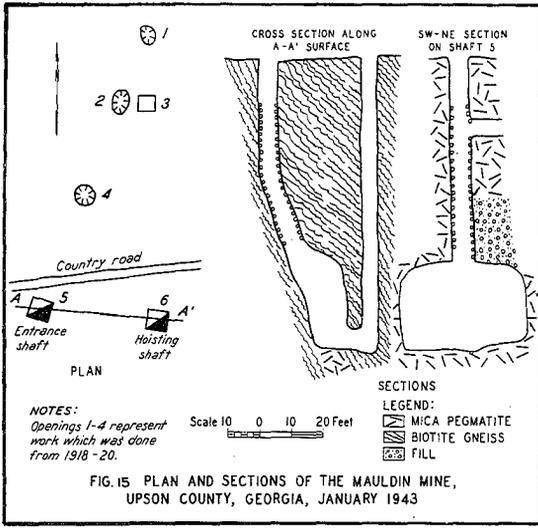


FIG. 15 PLAN AND SECTIONS OF THE MAULDIN MINE, UPSON COUNTY, GEORGIA, JANUARY 1943

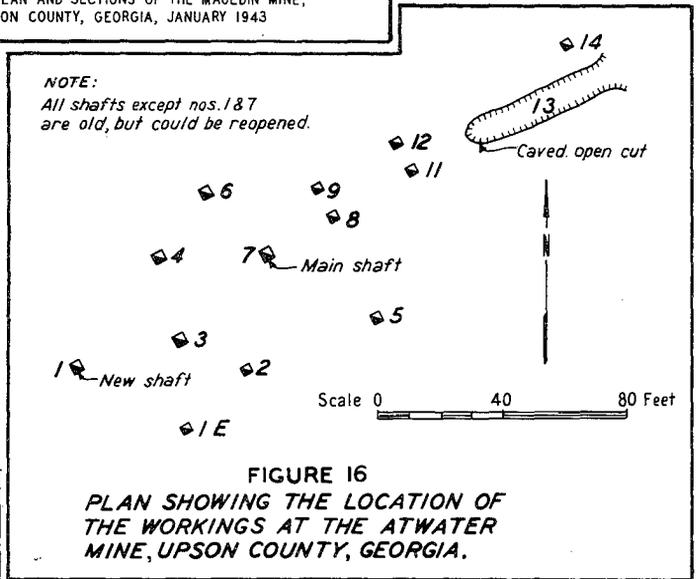


FIGURE 16
PLAN SHOWING THE LOCATION OF THE WORKINGS AT THE ATWATER MINE, UPSON COUNTY, GEORGIA.

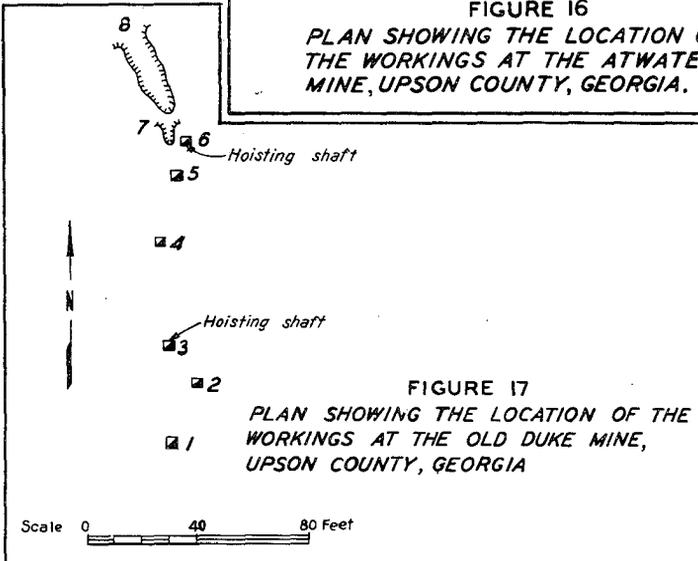


FIGURE 17
PLAN SHOWING THE LOCATION OF THE WORKINGS AT THE OLD DUKE MINE, UPSON COUNTY, GEORGIA

The width of the pegmatite is difficult to determine from the present works, although it is exposed in several of the pits. It may be at least 15 feet thick. The apparent strike is about N. 55° E. and the dip to the southeast. The enclosing rock is biotite gneiss saturated with granite and pegmatite, striking about N. 70° E. with a variable dip.

The pegmatite and country rock are generally soft. The dumps consist of kaolin, kaolinized feldspar, quartz and a considerable amount of scrap mica. Lenses of milky quartz occur locally in the pegmatite. The mica is light rum to rum in color and generally of good quality. Most of the mica left in the dumps is small, although some pieces will trim 2 by 2 inches. Some of the discarded books exhibit crystal outline and some of the books are cracked and bent. Some of the mica contains flat quartz growths with their exterior surfaces marked by the cleavage planes of the mica.

About a fifth of a mile southwest of the above described locality and just east of the road in a pine woods, there is another old opening. Small books of flat rum-colored muscovite, biotite, and fragments of smoky and milky quartz occur around the pit.

F. E. THOMPSON PROSPECT

This prospect is located 4.0 miles (airline) and 5.0 miles via the Waymanville and New Harmony Church roads S. 40° E. of Thomaston. It is an eighth of a mile due south of New Harmony Church. A small hole 8 feet deep was dug recently 100 feet west of the road. The pegmatite is two feet thick, strikes N. 28° E. and dips 65° SE. It is kaolinized and is enclosed in weathered schist. The mica is rum-colored, the larger books up to punch size.

L. M. BROOKS PROSPECT

This property is located 3.5 miles (airline) and 4.5 miles by road S. 40° E. of Thomaston. The prospect lies near a branch 0.5 miles south of the Waymanville Road and one-half a mile S. 60° W. of the L. M. Brooks home.

The property was leased by H. H. Arnold and opened by the National Mica Company, March, 1942. L. W. Thomas states that 1600 pounds of mica were on hand August, 1942. The main workings at this prospect consist of a circular open pit 15 feet in diameter which extends below water level. Two drifts to the east and one to the south of undetermined length extend from this pit at water level. Entrance to the pit is gained by an open cut, 20 feet long, and a 12-foot drift west of the pit. Twelve feet west of the open pit and extending north, there is a cross-cutting drift

15 feet long, which intersects a shaft or pit to the north of the main opening.

The pegmatite is large with irregular walls. It consists of coarse feldspar, lenses of smoky quartz, and some mica. In the cross-cutting drift dikes occur which may unite at depth. The northernmost one is 8 feet thick and the southernmost one 4-8 feet thick, where they are separated by about 10 feet of schist. The pegmatites appear to strike about E.-W., dipping 40° S. In the branch below the mine, the country rock is a hard, fine-grained granite gneiss striking N. 50° E., dipping 50°-70° SE. The wall rock and the pegmatite in the prospect are weathered to the extent of the works.

Very little mica may be seen around the mine; it is clear, but of the "A" variety. The prospect appears to offer better opportunities for the production of feldspar than of mica.

W. M. DALLAS PROSPECTS

One of the prospects is located 2.75 miles (airline) and 3.0 miles via the Waynmanville Road, S. 35° E. of Thomaston. This prospect is 800 feet south of the road near the W. M. Dallas tenant house. About 300 feet west of the tenant house is an open field, a pit was dug for mica in 1942 by S. P. Cronheim. The pegmatite is three or four feet thick, consisting of coarsely crystallized pink feldspar, smoky quartz nodules, and numerous small books of rum-colored mica. No large quartz lenses are observed. The pegmatite is irregular in shape, lies nearly flat and is enclosed in biotite augen gneiss which is garnetiferous. Immediately southeast of the pit, the gneiss strikes N. 80° E. The pit at present is about 12 feet deep and exposes the complete thickness of the pegmatite. The mica is rum-colored, hard, flat, and splits well, but most of the books are small. Punch and some 1½ by 2 inch sheet were obtained here, but not enough was found to justify the continuation of mining.

On the east side of the dwelling, due east of the above locality, a pit was made 15 feet deep. The pegmatite here tends to break up into stringers; it dips about 75° E. The mica is similar to that described above and is smaller than punch.

About a half a mile S. 25° W. of the above described locality, near a dirt road going east from the Thomaston-Butler Highway and near a peach orchard, some recent work for mica has been done. This work is on the same property as the above. Two localities near the peach orchard have been prospected. The easternmost openings were made on

the north side of the road. Two periods of prospecting are represented here. No details are known of the early work, but the last work was done in 1942 by S. P. Cronheim. The pits are made in a N. 41° E. direction and have been made on the pegmatite for a length of about 400 feet, and to a probable depth of 25 feet. The pegmatite here is 4-5 feet thick and is enclosed in weathered mica schist which strikes N. 47° E., dipping 60° SE. The pegmatite is composed of kaolinized feldspar in crystals up to 6 inches in diameter, lenses of smoky quartz, and muscovite; some biotite books occur at the southwest end up to three inches in diameter. The muscovite is hard, flat, and rum-colored, but some of the books show "A" structure, and other books split poorly. The largest books seen would trim up to 1½ by 2 inches. Records of production at the time of the early work are not available but in the recent work, very little mica was produced.

About 500 feet west of the previous locality and between the peach orchard and dirt road, S. P. Cronheim in 1942 put a shaft down on a pegmatite. This pegmatite is northwest of the above-described one. At the time of the writers' visit, the openings here had been filled and the pegmatite was not exposed. The mica here is similar to that described above.

GIBSON PROSPECT

The prospect is located 3.2 miles (airline) and 4.0 miles by road S. 50° E. of Thomaston. It is 200 feet north of the Waynmanville Road in a cultivated field near the home of B. S. Gibson, the owner of the property.

Some work was done upon this property in 1942 by H. H. Arnold. Two pits were dug about 100 feet north of the Waynmanville Road, one of which is about 6 feet deep. A three-foot thickness of pegmatite is exposed in the deepest pit, but the actual thickness is not known since the hanging wall is not exposed. The pegmatite strikes N. 40° E., dipping about 78° NW. The dike is enclosed in coarse-grained biotite-granite gneiss. The pegmatite consists of hard potash feldspar, quartz, muscovite and some biotite. The mica is hard, flat and rum-colored, but is of the "A" type. Books of punch size and a small amount of 1½ by 2 inches are found around the opening.

On the other side of the hill and about 300 feet northeast of the above-mentioned locality, a pit was made in kaolinized pegmatite. The pegmatite generally conforms to the wall rock schist which dips 66° SE. and strikes about E-W. An opening five feet deep with an 8-foot drift southwest into the pegmatite has been made at this place. The dike is

about two feet thick. The mica is light rum-colored, cracked, not very flat, and exhibits "A" structure.

Most of the work on this property was done about 300 feet west of the Gibson home. Here, a 20-foot shaft was sunk on a 5-foot pegmatite. A drift extends southwest from the bottom of the shaft along the dike. An open pit, made about 15 feet southwest of the shaft, probably was intersected by the drift, but the pit is now filled. The dike, as exposed in the shaft, strikes N. 55° E., dipping 85° SE. In the shaft, the pegmatite narrows from a thickness of 5 feet at the surface to 3 feet at the bottom. A lens of milky and smoky quartz up to 15 inches in thickness and 10 feet long occurs near the center of the dike. Mica left around the shaft is of the "A" variety. A few books would sheet 2 by 2 inches. Not much mica was obtained from these prospects. Beryl has been reported from this locality.

EMMIT TRICE PROPERTY

A pit 15 feet deep was made in the summer of 1942 upon the south side of the Thomaston-Triune Mill Road. The property is located 3.6 miles by road and 3.2 miles (airline) S. 65° E. of Thomaston. The pegmatite strikes N. 56° E., is almost vertical but dips slightly to the northwest. It consists of narrow bodies which intrude weathered, granitized biotite schist. The thickest intrusion observed in the pit is about 6 inches wide. The books of mica are flat and rum-colored, but all of them are smaller than punch, thus the prospect is not promising.

BENTLEY PROSPECT

This prospect lies four miles northeast of Thomaston and a half mile south of the Yatesville-Thomaston Highway. Several small pits, about 10 feet deep, were dug about 15 years ago in a narrow pegmatite dike on the property of J. W. Bentley. Some biotite and muscovite may be found in the dumps. The property was not seen by the writer, but Smith¹⁵ was unable to find any mica larger than a silver dollar.

S. P. CRONHEIM PROSPECT

A pit was dug for mica recently by S. P. Cronheim 5.4 miles (airline) and 6.5 miles by road S. 70° E. of Thomaston via the Triune Mill Road. The prospect is located 0.25 miles south of the Triune Mill Road and just east of the dirt road from Gatlin Church to the Triune Mill Road.

The square pit at this place is 10 feet deep with a short drift at the bottom which extends in a N. 27° E. direction. The pegmatite strikes

N. 53° W., dipping 38° NE. The middle portion of the pegmatite contains a quartz lens about 8 inches thick; the dike has a total thickness of 4.5 feet. The country rock is deeply weathered schist.

Green "A" mica occurs in the quartz lens. In the pegmatite proper, there is a concentration of mica towards the foot and hanging wall sides of the dike. The mica associated with quartz nodules and lenses is green, but otherwise the mica of the pegmatite is light rum in color. Some books contain "A" mica and flat, clear mica; and in some books, the mica is rum-colored on one side, grading into pale green on the other side. The prospect is not promising.

BENNIE BARRON OR WALKER WAKEFIELD MINE

This old abandoned mine is located in Jug District 5.5 miles (air-line) and 7 miles by road S. 68° E. of Thomaston. It is 30 feet west of a dirt road and 0.5 miles north of Gatlin Church, which is on the Waynmanville Road. The mine is now owned by the Reconstruction Finance Corporation and the Northwestern Bank.

The history of this mine is incomplete. Mica was first mined here by Mr. Hancock in 1918-20. The mine was later operated for J. S. Burleson by C. A. Nichols in 1921-22. Shortly before mining operations ceased, a man was killed by a cave-in on the main shaft.

The mine consists at present of a large conical-shaped pit 25 feet deep and 40 feet in diameter. This is the site of the original main shaft. On the northeast edge of this pit, there is a smaller partly-filled pit 10 feet deep and 10 feet in diameter. A short distance to the northeast and on the west bank of the road, there is a 12-foot inclined shaft made in the pegmatite. Much caving has gone on here. An untimbered shaft about 35 feet deep and 7 feet square was made in country rock in the spring of 1942, 10 feet west of the small shaft, by Mr. Mayberry of North Carolina.

The pegmatite is partly exposed in the north wall of the large pit. At this place, it consists of weathered feldspar, nodules and lenses of smoky quartz and small books of ribbon mica. In the inclined shaft on the road bank, the pegmatite also is exposed. Here, it consists of kaolinized feldspar, nodules of smoky quartz, and small books of mica. The dike here seems to strike N. 10° E. The pegmatite appears to dip about 75° SE., where it is exposed in the partly filled pit. The strike of the dike, according to the alignment of the old workings, is about N. 15°

E. It is assumed that the new shaft was sunk with the intention of cross-cutting to the dike. Smith states that the vein, according to Mr. J. W. Roper, strikes N. 25° E. and dips about 85° SE., averaging about 10 feet in thickness and containing several off-shoots. Most of the mica is said to have come from a very rich "barrel" or "shoot." Nichols and Burleson worked the mine by the "hub-shaft" method with drifts along the dike and following the off-shoots. This shaft is believed to have been carried to a depth of 110 feet. According to reports, this was one of the largest mica mines in the area, and at least \$100,000.00 worth of mica is said to have been removed from this place.

The mica removed from the mine was clear, flat, hard, rum-colored, and of excellent quality. Part of the mica contains inclusions of quartz, and some contains light green hexagonal crystals of apatite. Some of the books in the dump are cracked, wavy and twisted. Books left in the dump will sheet 1½ by 2 and 2 by 3 inches. Some books as large as 4 by 6 inches occur in the dump.

DUKE MINE

This mine is located 7 miles (airline) and 8 miles by road S. 60° E. of Thomaston via the Waynmanville Road. The mine is 0.5 miles N. 50° E. of the bridge across Tobler Creek on a flat ridge about 300 feet north of the road on the northeastern outskirts of Waynmanville. It is owned by F. H. Duke, Route 2, Thomaston. The mine is about three-eighths of a mile northeast of his home.

The mine was opened by R. L. Duke. Mica was mined here in 1917-18 and again in 1926-27. Clarence E. Tucker, of New Hampshire, operated the mine after Mr. Duke. The history of production is not known, although \$2000.00 worth of excellent sheet mica is said to have been removed. A small amount of random prospecting was done here in 1942.

An inspection of the works (fig. 17) reveals a series of shafts up to 45 feet in depth. Pegmatite was not exposed in Shafts Nos. 2 and 4. Judging from the alignment of the other shafts, the pegmatite strikes from due north to N. 10° E.; it is reported to dip to the southeast. The mining operations extended over a total distance of 350 feet. Most of the pits are now fallen in. According to reports, the miners drifted along the dike from the bottom of the shafts. The pegmatite is exposed in Shaft No. 6. It is coarse-grained, consisting of coarse, cleavable microcline, mica and some smoky quartz. Most of the mica seems to be near the hanging wall.



FIGURE 18, Drilling at the Mitchell-Creek mine, Upson County.



FIGURE 19, Mining face, Mitchell Creek mine, Feb., 1943.

Photos by S. P. Cronheim

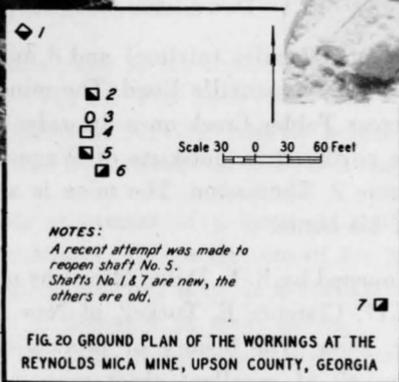


FIG. 20 GROUND PLAN OF THE WORKINGS AT THE REYNOLDS MICA MINE, UPSON COUNTY, GEORGIA

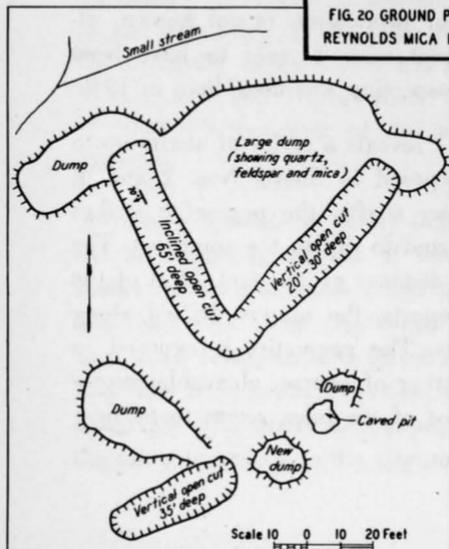


FIG. 21 GROUND PLAN OF THE OPENINGS AT THE STEVENS OR ROCK MINE, UPSON COUNTY, GEORGIA

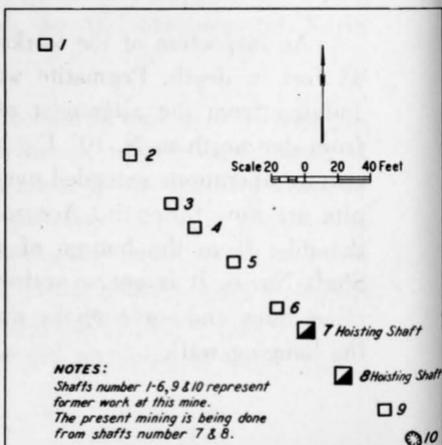


FIG. 22 PLAN SHOWING THE LOCATION OF THE OPENINGS AT THE ADAMS MINE, UPSON COUNTY, GEORGIA, FEB 1943

The pegmatite is kaolinized to the bottom of the works. Kaolinized feldspar, quartz, and small books of muscovite and biotite compose the dumps. The biotite is partly altered to vermiculite. Occasional muscovite books contain the usual marginal quartz inclusions, inclusions of small books of biotite, etc. It is probable that the best and largest books of mica are not equally distributed in the pegmatite in the direction of the strike.

The mica here has a deep rum color, is flat, hard, and splits well. Mr. F. H. Duke recently removed about 50 pounds of block mica from Shaft No. 6. It is not likely that mining operations extended much below water level at this locality and, since good mica is known to have come from here, the mine deserves additional investigation.

MITCHELL-CREEK MINE

This mine is located 7.25 miles (airline) and 10 miles by road S. 65° E. of Thomaston. The mine is one mile northeast of Waynmanville on a small branch of Tobler Creek. It is accessible via a woods road north of the Waynmanville road.

This property was purchased by S. P. Cronheim from J. T. Mitchell. The mine is located in a valley and in the bed of a small branch. The rocks are hard thus the usual mining equipment is used. The mine has been developed recently from a prospect. At the present time, the mine is in the shape of an open cut which follows the pegmatite along its dip and strike. The country rock is an old biotite gneiss (usually garnetiferous) thoroughly saturated and recrystallized by pegmatite which tends to follow the original planes of metamorphism, producing a lit-par-lit type of injection. There is one strong joint direction which runs S. 35° W.

The pegmatite is four to five feet thick, containing included bands of biotite schist which dip with the pegmatite. It tends to conform along dip and strike to the country rock, but locally replaces it and cuts across it. In January of this year, the average strike of the pegmatite, where exposed in the open cut, was about N. 70° E. and the dip was 20°-30° SE. Since that time, variations in dip and strike have increased. The vein shows a tendency to divide around inclusions of schist, and locally the walls are not definite. The pegmatite is unusually coarse, consisting of several types of feldspar, rum-colored muscovite, biotite, and quartz. Green apatite is unusually abundant. The mineralogy at this mine rather closely resembles that of the Mauldin Mine. Large, cleavable masses

of oligoclase, and of microcline occur locally in the pegmatite. Coarse, cleavable soda microcline is common, and a coarse cleavable glassy variety of microcline, referred to as "dental spar," is rather abundant. Biotite occurs in large books, especially associated with books of muscovite. In some cases, the outer portions of the books consist of sheet biotite, the inner portions of hard, flat, rum-colored mica. Biotite books are included within the muscovite and vice versa. Apatite crystals are frequently included in the muscovite as well as are small growths of later quartz. Apatite is less common in the biotite books but is abundant in the pegmatite in general. Mica from this mine is hard, flat, rum-colored and of excellent quality. At present writing, the mine is in the development stage, thus is just coming into production.

CHARLIE NIMS MINE

This property is 3.8 miles (airline) S. 46° W. of the center of Yatesville. The mine is about 200 feet east of Israel Creek upon a rocky slope about 25 feet above creek level. This point is about half a mile east of the Nims home which is located on a soil road between Yatesville and Triune Mill. The mine is about two miles northeast of Triune Mill. The prospect is owned by Charlie Nims (colored) Yatesville, Route 2.

The site of this small mine is in a cultivated field where small pines have grown up since it was abandoned. Some work was done here in 1917-18 by C. E. Sewell; the foreman in charge of the mining was a Mr. Green of North Carolina. The total amount of work consisted of three pits in line and close together, sufficiently connected to produce a trench about 40 feet long, now somewhat filled. The deepest pit was probably not more than 25 feet in depth. According to the owner, a small pump was used; the mine was abandoned because the water could not be handled.

The pegmatite is not well exposed at present, but the trench strikes about N. 78° W. which may be also the strike of the pegmatite. The country rock is biotite gneiss rather thoroughly saturated with granite. It strikes about E-W, dipping about 30° N. The pegmatite is about 4 feet thick, but is irregular in shape, and off-shooting dikes and stringers cut, parallel, and more or less saturate the country rock. A pit, about 10 feet deep, dug in pegmatite and schist during the summer of 1942, reveals the presence of sheet mica in the schist where it is associated with very little pegmatite material. Although the schist is rather thoroughly weathered,

"burr-rock" and fragments of pegmatite in the dump are fresh and hard. Rather small, nodular lenses of smoky quartz occur in the pegmatite. The pegmatite is medium-textured.

The mica here is rum-colored, hard, flat and splits well. There is very little ruling although some of the books contain cracks. A few books of weathered mica contain small holes produced by the removal of some mineral, and some unweathered books contain small inclusions of clear, green apatite.

Books of punch size remain still upon the dump, and there are some books which will trim 2 by 2 inches. Nims states that books 5 by 5 inches, or larger, were taken from the mine, some of which sold for \$10.00 or more in 1918. The owner received a 10 per cent royalty and was paid \$58.00 for mica removed from this small opening in about a month's time. It is reasonable to believe that if the pits were cleaned out and work was resumed, more good mica could be obtained here.

About 250 feet N. 30° W. of Nims' home, books of mica, punch size and larger, occur in the soil of a cultivated field. These books are associated with some quartz and "burr rock." The mica is similar in character to that described above. It is reported that mica books 2-3 inches across have been picked up here. This place should be prospected.

SHORT-MITCHELL MINE

The mine is located 3.4 miles (airline) and 4 miles by road S. 20° W. of Yatesville via the Yatesville-Butler Road. It is 0.25 miles west of the dirt road and 300 feet N. 26° E. of the Short home. The land is owned by Henry Short.

Work was started here in the summer of 1942 by J. T. Mitchell, and work was carried on by M. S. Black, who has leased the property and plans to mine it in the near future. The works are in the shape of an inverted cross. The shaft is 5 by 5 feet, has a total depth of 58 feet, and is timbered to the bottom. There is about 15 feet of water in the shaft. At about water level, there is a 16-foot drift made in the direction of N. 10° E., but curving north of the entrance slightly to the northwest. The second opening in the side of the shaft, at about the same level, is 7 feet high and 8 feet long.

The pegmatite is enclosed in weathered biotite schist. The total thickness of the dike could not be determined at the time of the visit. The dike includes schist bands which have a southeast dip, thus suggesting a similar dip for the pegmatite. Mica appears to be concentrated in the

vicinity of the schist bands. The pegmatite is thoroughly weathered, thus the shaft should be carried into hard rock. A large amount of mica was obtained from this shaft and was of excellent quality, but it is badly clay-stained. The mica is flat and rum-colored, and ruling is common. One 35-pound book was removed. Biotite books, as large as 6 by 6 inches more or less altered to vermiculite, are usually associated with the muscovite. This is a very promising prospect.

HELEN McDONALD PROPERTY

This property is located half a mile south of Yatesville on property formerly owned by Helen McDonald. It is now owned by H. P. Edwards of Yatesville. This locality was not visited by the writers, but Smith¹⁵ states that a prospect pit was dug in a field in 1931 to a depth of 23 feet. The dike is about 5 feet thick, striking N. 70° W. with a northeastward dip. Some good mica was encountered near the surface against quartz; near the bottom of the pit, the quartz was near the center of the dike with mica on each side. The mica, although in large blocks, is broken, twisted, and of the "A" type.

J. H. REYNOLDS MINE

This mine (fig. 20) is located 2.5 miles (airline) and three miles by road S. 70° W. of Yatesville. It is 1.25 miles due south of Tobler Creek. It is half a mile northwest of the dirt road from the Yatesville-Thomas-ton Road to Triune Mill where it is on a wooded hillside on the east side of a small branch. The property is owned by the Reconstruction Finance Corporation and the Northwestern Bank.

The mine was operated by J. S. Burleson about 1917-18. The works consist of several old shafts considerably caved and filled which line up in a N. 55° W. direction. Both country rock and pegmatite are considerably weathered, the dumps consisting of kaolin, quartz fragments and mica. The property was recently leased by the Asheville Mica Company which made a new shaft in schist (1.) 15 feet to water. They also made an attempt to re-open Shaft No. 5, but found the ground difficult to hold. The thoroughly weathered wall rock is said to be more difficult to hold than the pegmatite. After an unsuccessful attempt to timber the shaft at water level over a period of two weeks, the mine was abandoned. According to Alexander, of the Colonial Mica Corporation, they had removed 100 pounds of mica August 1, 1942.

The pegmatite is poorly exposed here so that it was impossible to determine its width. The dike appears to dip to the southwest and has

a northwest strike. The mica is flat, hard, rum-colored and of excellent quality. It is stated that \$40,000 worth was removed formerly. Good miners should be able to re-open this mine and produce mica here.

About 300 feet S. 65° E. of Pit No. 6, there is a new pit 10 feet deep. The pegmatite here is four feet thick, strikes N. 65° W., and has a nearly vertical dip; it is enclosed in biotite-granite gneiss. It is composed of semi-kaolinized feldspar, smoky quartz, and considerable biotite and rum-colored muscovite. The muscovite books show traces of radiating "A" structure. This pit appears to be in a different pegmatite from the one where the main workings are located.

STEVENS OR ROCK MINE

This mine (fig. 21) is on the Stevens' estate and is 3.5 miles west of Yatesville and a quarter of a mile north of the Yatesville-Thomas-ton Highway. It is two miles west of Tobler's Mill. The mine is about 150 yards northwest of the home of Paul Sullivan. Mica was mined here in 1919 by J. T. Boyt. The mine was later operated by J. S. Burleson of North Carolina. The present owners are the Reconstruction Finance Corporation and the Northwestern Bank.

The principal part of the mine consists of a curved, inclined cut about 80 feet long and 8 to 15 feet wide, and with a reported depth of 65 feet; it strikes in a N. 25° W. direction. The pegmatite is 9 to 13 feet wide, dipping about 80° SW. at the northwest end of the cut and at about 75° SE. at the northeast end. According to Mr. J. B. McDonald of Yatesville, the best mica came from the north end of the cut and \$45,000 to \$50,000 worth of mica was mined here. It is reported that 840 pounds of 4-by 6-inch sheet was disposed of at one sale. About 100 feet to the south and slightly up the slope from this locality, there is another opening which strikes N. 40° E. This opening is about 6 to 8 feet wide, 35 feet deep, 50 feet long, and contains water. It is not improbable that the pegmatite mined here is connected at depth with the one described above.

The pegmatite upon this property is very coarse-grained, consisting of microcline, some plagioclase and locally, quartz lenses. Some of the quartz contains black tourmaline crystals; large books of biotite up to 4 by 3 inches may be found in the dump. The country rock is garnetiferous biotite-granite gneiss, and the pegmatite has induced recrystallization of biotite and other minerals in the wall rock. The dike, mineralogically, resembles the Battle Mine, but contains more plagioclase and biotite. It contains less apatite than the dike at the Mauldin Mine. The mica is hard, flat, rum-colored and splits well. The mine should produce good mica.

Several outcrops have been prospected just west of the home of Paul Sullivan. According to Smith¹⁵, the mica is in red "burr-rock". He states that at a place one-half to one-eighth of a mile due west of the house, there is another series of mica pits and prospects. These are on a vein about two feet in width that is composed of hard "burr-rock" with some quartz and some feldspar. About 2,000 pounds of mica are said to have been taken from these pits. About a quarter of a mile N. 70° W., there is a prospect pit about 8 feet deep. Some good mica was obtained here next to quartz in a vein about two feet wide. Mica books occur at several places in a field between this pit and the places described above.

MRS. AGGIE CASTLEN PROPERTY

This property, known as the old Mark Lions place and formerly owned by Mrs. Aggie Castlen, is now owned by Sarah Colbert, 793 Piedmont Avenue, N. E., Atlanta, Ga. The property is located 3.5 miles (airline) N. 55° W. of the center of Yatesville. It is two miles (airline) N. 25° W. of Tobler Mill and four miles by road from Yatesville. The site of an old shaft may be seen on the northeast side of the soil road between the road and the Southern Railroad.

Mica was mined here after the first World War by John McDonald of Yatesville for J. S. Burleson, Mica was said to have been mined from three pits about 20 to 25 feet apart and two of the pits were on a N. 60° W. strike. The original holes are said to have been 15-20 feet deep, but at present the pits have been completely filled. It is reliably reported that 75 loads of rock were thrown into the mine.

The pegmatite crosses the road near the site of the old mine where it is 4 to 5 feet thick and is exposed in the northeastern bank. It appears to strike N. 15° E. and dips nearly vertically, but slightly to the southeast. The dike consists of granular quartz, small quartz lenses, kaolinized feldspar and small books of rum-colored mica. Outcrops in this area are rather poor, but granite is exposed in a field on the southwest side of the road. Here, also, some fragments of blue vein quartz may be found.

The old dump has been leveled down and scattered about the locality of the mine. Small fragments of milky and smoky quartz are common in the soil, and many of them contain prisms of tourmaline, some as large as 2.5 inches in diameter. No fresh feldspar occurs, thus it is assumed that the dike is rather well kaolinized to the depth of the old workings. A considerable amount of scrap mica is scattered about. The mica is rum-colored; books are generally flat but may be slightly wavy, and

books that represented good sheet up to 2 by 3 inches may be found.

Judging from the character of the scrap around the mine, large books of commercial mica were obtained from this mine.

CLIFF MIDDLEBROOKS PROPERTY

This property is located on the dirt road between Yatesville and Topeka Junction at Rest Haven. A pegmatite 4 feet thick, striking N. 52° E. and dipping 83° NW., crosses the dirt road near the residence. It has not been prospected, but all of the mica seen is smaller than punch.

JACK WALKER PROSPECTS

These prospects are on the old Jack Walker (colored) estate located 2.5 miles due north of Yatesville via the Yatesville-Barnesville Road. One opening has been made 100 feet west of this road. Another shaft has been put down about half a mile northwest of the above-mentioned one near an old saw mill, and is accessible by a wood's road.

Early prospecting on this property was done about 1920 by John McDonald, of Yatesville. At the pit near the road, there is an old partly-filled shaft which is not accessible at present. A recent opening nearby was made in 1942 by C. M. Wacaster. This pit is about 15 feet deep made in soft pegmatite with drifts along the dike from the bottom. The dike is about 8 feet thick and includes schist bands. It strikes N-S and dips near vertical. It contains lenses of smoky and milky quartz. The mica is flat, hard, rum-colored and exhibits some ruling.

At the locality near the saw mill, there is an old shaft which was re-opened and timbered by Wacaster in 1942 for J. R. Whitman. It is reported that the pegmatite is kaolinized to a point below water level, thus the operator was unable to hold the ground and the shaft was abandoned. The shaft is about 26 feet deep, and from the bottom there is a 5-foot drift to the west and a drift 4-5 feet long to the south. It is reported that McDonald took the original shaft to water level and obtained some good mica from it. Biotite and muscovite books occur in the dumps which also contain kaolinized feldspar, and fragments of smoky quartz lenses which includes prisms of black tourmaline. Very little mica is showing in the dump, but that which is found is of good quality.

In a field about a fifth of a mile due south of the pit near the road, there is an old filled pit and a new pit 6 feet deep now partly-filled. Very little work has been done at this place. The country rock is a biotite

augen gneiss. In the dump, there are fragments of smoky quartz, semi-kaolinized feldspar, and books of flat, rum-colored mica smaller than punch.

W. E. ADAMS MINE

This mine lies three miles north of Yatesville, east of the paved road to Barnesville. It is accessible from the paved road by a woods road, which runs east from the highway and which leaves the highway at an old chimney. The mine is about 0.8 mile east of the paved road via the woods road.

Mica was mined here in 1918 by J. M. McDonald of Yatesville, a year or two later by C. M. Wacaster and B. M. Willis and again in 1931, by the Howell brothers. It was leased recently to the Asheville Mica Company, which is removing good mica from the mine at the present time (February, 1943).

The pegmatite strikes N. 45° W., dipping southwest at about 60° and is from 3½ to 4 feet thick. It has been worked over a distance of 328 feet by numerous shafts and drifts. Most of the shafts are said to have attained a depth of about 45 feet, but one shaft is said to have been 72 feet deep. Mr. McDonald told Smith¹⁵ that it was necessary to pump water continuously during the period of mining, and that at one time water was pumped at the rate of 3,600 gallons per hour.

Pit No. 1 (fig. 22), at the northwest end of the works, is about 35 feet deep. The pit is dry and the pegmatite is exposed at the bottom. The dump consists of kaolin, smoky quartz and books of mica smaller than punch. Pit No. 2 is about 35 feet deep. No commercial mica was obtained here, and the dump is similar to Pit No. 1. Pits 3, 4 and 5 are old pits, mostly filled. The size and character of the dumps indicate that they were carried for some distance into the pegmatite. Number 6 is an old filled pit now six feet deep. Shaft No. 7 is a newly timbered shaft 40 feet deep with 10 feet of water in the bottom. The Asheville Mica Company plans to deepen this shaft. Number 8 is a new shaft now 60 feet deep, from which the lessees are removing an average of 500 pounds of good block mica per day. They are operating three shifts a day and are pumping water continuously. Other mechanical equipment around the mine consists of a hoist, compressor and jack hammer. Number 9 is an old partly-filled shaft now about 25 feet deep. Pit No. 10 is eight feet deep and is made in a blue garnetiferous biotite granite. No pegmatite is exposed. This pit appears to be slightly east of the strike of the dike.

In Shaft No. 8, the pegmatite becomes hard between 50 and 60 feet below the surface. Mica books up to seven inches across are exposed in the pegmatite. The country rock is a garnetiferous biotite-granite gneiss, striking N. 40° W. and dipping 70° SW. Biotite has been reported from this mine but its occurrence is rare. The muscovite has a deep rum color; cracks and small ruling constitute the principal defects. It is hard, splits well and is of excellent quality.

D. K. CARTER MINE

Recent mining has been done on the D. K. Carter property, located 5.2 miles (airline) and 6.5 miles by road S. 15° E. of Barnesville. The mine is accessible via the Barnesville-Culloden Highway and a dirt road going west from the highway. The mine is half a mile west of the highway in an open field, and is in the extreme northeastern part of Upson County.

Mining for mica first began on this property in 1941 by D. K. Carter and D. C. Smith. L. W. Thomas reports that 500 pounds of mica were on hand August 27, 1942.

This property adjoins the Kelly O'Neal property to the west. Several of the openings described here were caved and inaccessible, when visited. Several pits extend from the O'Neal line in a N. 60° E. direction for a distance of about 1,100 feet. The shaft on the O'Neal line was covered with boards and was inaccessible. This pit is about 15 feet deep with a short drift towards the south at the bottom. The mica here is rum-colored and flat, but clay-stained. Some of the books are cracked. Punch and some 1½ by 2-inch mica could be sheeted from the small amount which remains around the pit. A short distance to the east a shallow square pit has been made in the pegmatite; some stained punch and sheet were obtained here. Two pits about 10 feet apart occur in the field about 100 feet N. 55° E. of the above. One of these pits contains water at about 20 feet from the surface. The other pit, slightly to the north, is from 25-30 feet deep and contains water in the bottom. The two pits are connected by a short tunnel. In the latter mentioned pit, the dike is well exposed. It is 6-9 feet thick, strikes N. 10° E. and dips 61° NW. Near the bottom of the pit, the pegmatite contains a lens of smoky quartz near its middle portion about 5 feet thick which thins out 8 feet higher up. Small lenses of quartz are common throughout the pegmatite. The country rock is weathered mica schist and bands of schist are included in the dike. The pegmatite re-

mains soft and kaolinized below present water level, which is about 20 feet from the surface. The mica here is hard, clear, light rum-colored and splits well; but it is badly clay-stained.

A filled pit occurs about 1,000 feet N. 65° E. from the above. The ground is very soft at this locality and water stands at the present writing about 12 feet from the surface, although the static water level here should be several feet lower. The pegmatite as exposed at the mouth of the shaft is 4 feet thick, strikes about E.-W. and dips 66° S. The dump consists of kaolin, small lenses of smoky quartz, muscovite and biotite. The muscovite here is clay-stained, but otherwise, it is hard, flat, light rum-colored and splits well. Many of the books have been "ribboned." "Ribboned" books, up to 4 by 6 inches, can be found around the shaft. This end of the property should be prospected further.

KELLY O'NEAL MINE

Southwest of the D. K. Carter and on the adjoining property owned by Kelly O'Neal (colored), there are two pits close together. One pit is about 20 feet and the northernmost one is 12-15 feet deep. The 20-foot shaft was made by W. P. Buckner. The other was made shortly after by the O'Neal brothers. The country rock is mica schist, striking N. 70° E. and dipping 50° SE. Granite crops out nearby to the north. The pegmatite is four feet thick and off-shooting stringers occur. Little mica is reported to have been removed from these pits, although O'Neal states that one book measuring 6 by 10 inches was removed.

Other pits were made by the O'Neals in the field southwest of this locality in 1942. Two pits, about 1,000 feet southwest of the above pits, occur. The country rock is biotite gneiss striking N. 60° W. and dipping 52° SW. The pegmatite strikes N. 28° W., dipping 57° SW. and is 4 feet thick. The pits here are from 10 to 15 feet deep, and the pegmatite is completely kaolinized. Large books of biotite, some of which exhibit ruling, are found in the dump. Some of the muscovite books in the dump contain small quartz inclusions. The mica here is of good quality and O'Neal states that he obtained from \$40.00 to \$50.00 for mica shipments to North Carolina from his place.

J. M. BEVELL PROPERTY

This property lies one and one-half miles due north of The Rock on the road to Piedmont. Mica has been found in a cultivated field an eighth of a mile west of the Bevell home and south of Rose Creek. Pieces of mica

several inches across have been reported from an area about 25 feet in diameter. The writers were not successful in their search for mica upon the property.

J. A. PARTRIDGE MINE

This mine is located 6.2 miles (airline) and 8.4 miles by road N. 16° W. of Thomaston via the Thomaston-Griffin Highway and a dirt road going northwest from the highway at Shiloh Church and School. It is 2.5 miles due west of McKenny store. Work has been done on the north side of the road near the crest of a hill. The property is owned by Z. E. Thompson of Meansville.

N. L. Baxter opened the mine in 1914-15 and is reported to have removed some good mica. Mr. W. H. Sanders, Sr. has done some recent prospecting here. Several old pits along a N. 60° E. strike were dug to about 28 feet (water level) and mica is said to have been recovered by drifting and stoping. The old pits are filled at present. The recent workings consist of a trench-like cut 20 feet long, 4 feet wide and 15 feet deep made in the pegmatite on the north side of the road. About 18 feet west of the cut, a small pit was made in the dike. On the south side of the road and 75 feet southwest of the main cut, a small open pit has been made in a narrow pegmatite.

In the present openings, the pegmatite is from 6-8 feet thick with a quartz lens 1½ feet thick in the middle. The dike strikes N. 50° E., dipping 70° NW. The mica appears to be concentrated near the quartz lens. The pegmatite is thoroughly weathered. Mica from the recent works, associated with the quartz lens, is of the green "A" type and many of the books are bent. The dump from the old pit contains both green "A" and rum-colored mica which indicates that a better grade of mica may have been obtained from the dike some distance from the quartz lens.

E. M. THOMPSON PROSPECT

About 600 feet S. 45° E. of the J. A. Partridge mine and on the adjoining property, C. M. Wacaster did some prospecting for mica in 1942. He is reported to have removed 2 or 3 tons of scrap.

The opening here is about 200 feet south of the road. The pegmatite strikes N. 10° W., dipping 77° NE., and crosses the road just east of the dwelling. The dike is 6-18 feet thick with numerous stringers and offshoots into the mica schist. A shallow drift, about 55 feet long, was made in the hillside in a northwest direction along the strike of the pegmatite.

The country rock strikes N. 12° E., dipping 60° SE., and both the country rock and the dike are weathered and kaolinized.

Mica is abundant locally in this pegmatite and books as large as 6 by 6 inches occur around the prospect, but most of the books are small and badly ruled. The prospect offers little encouragement for the production of sheet mica.

NOTTINGHAM PROSPECTS

Some prospecting has been done recently on the Nottingham property. These prospects are located 7.8 miles (airline) and 10 miles by road S. 20° E. of Thomaston. The northernmost prospect is located 1.8 miles S. 50° W. of the junction of the Yatesville Road and the Thomaston-Butler Highway. This opening lies 300 feet east of Tobler Creek and near the tenant house. Recent work here has exposed a medium to coarse-textured quartz-feldspar pegmatite having a N. 40° E. strike and dipping to the southeast. The dike is about three feet thick and is enclosed in a biotite gneiss which strikes N. 80° E., dipping 39° SE. This is a poor prospect for mica, but some commercial feldspar might be produced here.

About 0.6 mile due south of the above described locality and 200 feet east of Tobler Creek, some recent work has been done for mica. The work here has been done on a small hill about 20 feet above the creek level. The workings consist of an open pit 8 feet in diameter and 14 feet deep made in the pegmatite. Entrance to the pit is by way of a narrow open cut made from the down-hill side. The entrance cut is made in biotite gneiss and is 30 feet long.

The pegmatite, as exposed in the open pit, strikes N. 35° E., dipping 67° SE. It is from 6 inches to 4.5 feet thick and is very irregular in shape, along both the strike and dip. It consists of kaolinized potash feldspar, small lenses of smoky quartz, and mica. The dike is enclosed in a deeply weathered granitized biotite gneiss, striking N. 40° E. and dipping 65° SE.

The mica in the dike is hard and rum-colored; however, it is badly cracked and ruled, and bent and curved books are unusually common. Much of the mica splits poorly. The prospect has little promise for the production of sheet mica.

D. C. ELLERBEE PROPERTY

This prospect is reported to be on the west side of Hendricks Road, 2 miles southwest of Crest, where Smith¹⁵ states that a pegmatite was prospected in 1917-18. In 1932, he found a pit about 4 feet deep and 15

feet long which strikes N. 35° W. The dump is composed mostly of "burr-rock". Books of mica, as large as 3 inches across, some badly ruled, occur. It is reported that no mica was sold from this place.

Lamar County

H. S. WORSHAM PROPERTY

This property, known also as the Manrey or Pond property, is located 1.5 miles northeast of Barnesville and half a mile due east of the Barnesville reservoir. A small pit exposes a fine-grained pegmatite striking E.-W. and dipping 45° N. The mica is hard, greenish-rum in color and splits well, but it is very small, curved and contains spots. The dike is enclosed in a coarse-grained mica schist.

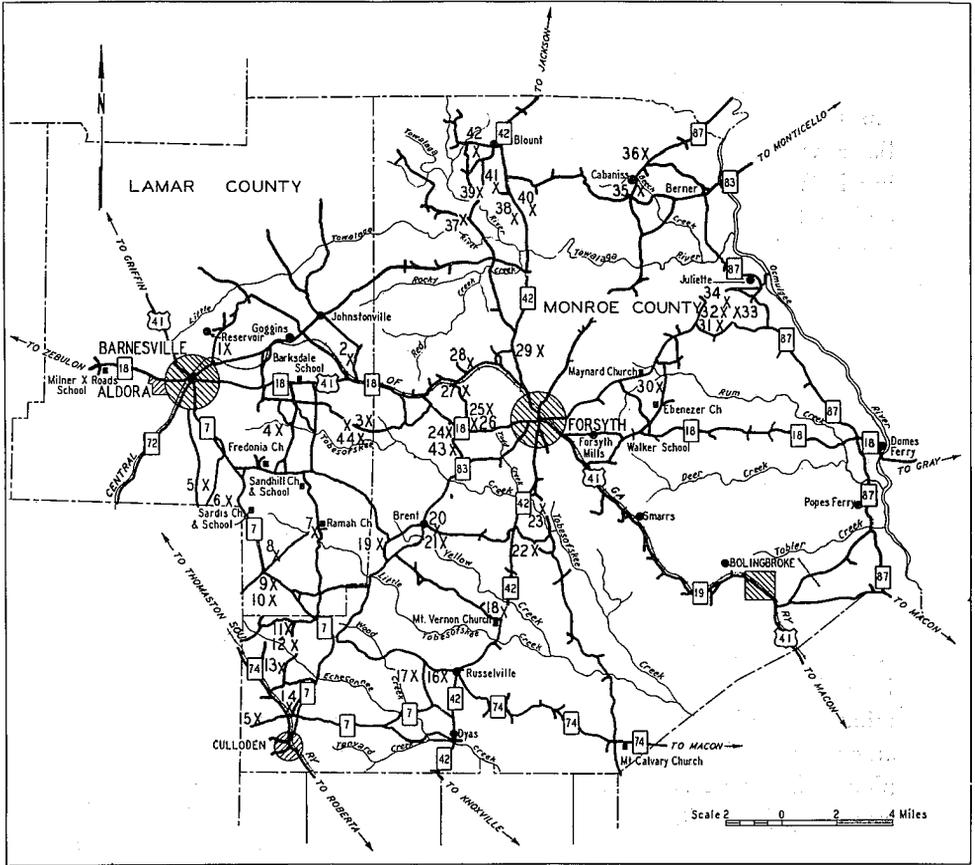
H. B. MANREY PROSPECT

This prospect is located seven miles east of Barnesville, and is 0.8 miles north of the Forsyth-Barnesville Highway. It is 0.8 mile due north of Rocky Mount Church. An old mine shaft on the northwest bank of the road which was opened in 1917-18 was originally 20 feet deep. The shaft is now filled but a small trench has been made at this locality by recent prospectors. Biotite gneiss and schist are exposed in the east wall of the trench where nearly vertical layers strike N. 26° E. The feldspar in the dump is kaolinized. About 8 feet southwest of the little trench, there is a recently made pit about 10 feet deep. The pegmatite is exposed in the east side of the pit. Books of flat rum mica 2 by 2 inches, which will trim 1 by 1 inches may be dug from the dike. Some books contain a few minute six-sided specks of biotite. The west wall of the pit exposes biotite augen gneiss. There are no available records of production from this place. The owner stated that if any commercial mica were obtained, he was not paid for it.

INGRAHAM PROSPECT

The O. W. and O. B. Ingraham prospect, known as the old Potts Estate, lies on the Lamar-Monroe County line, seven miles (airline) S. 80° E. of Barnesville. It is 1.5 miles due south of the Barnesville-Forsyth Highway at the point where it crosses the county line, and on the old dirt road from Barnesville to Forsyth. Mica was mined upon this property in 1917-18 by Lambert, where filled pits occur about one-sixth of a mile N. 8° W. of the Ingraham home. There is little to be seen at this locality now except some scrap mica and some large pieces of white quartz which contain the impressions of mica books and some included crystal of

MICA DEPOSITS OF MONROE AND LAMAR COUNTIES, GEORGIA



MINES AND PROSPECTS

- | | | | |
|--|--------------------------------|--------------------------------------|-------------------------------------|
| 1- H. S. Worsham Property (Manrey or Pond) | 12- Rev. Thaddeus Persons Mine | 23- The Rosa Fleisher Prospect | 34- The Old Walker Smith Mine |
| 2- Col. H. B. Manrey Prospect | 13- The Haygood Prospect | 24- The L. P. Phinazee Mine | 35- The Goggans Property |
| 3- The O. W. and O. B. Ingraham Mine | 14- The Holmes Mine | 25- The L. P. Goodwin Mine | 36- The Goggard and Watson Prospect |
| 4- Early-Vaughn Mine | 15- The Battle Mine | 26- The F. B. Willingham Prospects | 37- The Marie Vaughn Property |
| 5- Williams and Holmes Property | 16- F. H. Holloway Mine | 27- C. E. Ensign Mine | 38- The Coleman Mine |
| 6- Perdue Prospect | 17- Homer Hardin Mine | 28- The Goodwin and Worsham Prospect | 39- The Butler Property |
| 7- J. T. Means Mine | 18- The Ruffin Prospects | 29- Old Calloway Mine | 40- The Mattie Smith Mine |
| 8- Geo. R. Swift Property | 19- The Palers Mine | 30- The Bowdoin Property | 41- The Sulton Prospect |
| 9- Geo. R. Swift Property | 20- The Owens Prospects | 31- Owl Hollow Mine | 42- The W. H. Westbrooks Mine |
| 10- Col. A. J. Thomas Mine | 21- The Dick Fletcher Mine | 32- New Ground Mine | 43- The Dr. T. D. Thurman Mine |
| 11- O. B. Clements Property | 22- The Cox Prospect | 33- The Redding Prospect | 44- The Old Childs Property |

feldspar. The mica is clear, light rum-colored, flat and of good quality. The pegmatite is exposed in one place where it is about 4.5 feet thick, striking about N. 25° E.; a quartz lens is in the middle.

Smith¹⁵ visited this property December, 1931, and states that mica was mined by drifting between the pits which were originally 30 to 40 feet deep. He found a pit across the road which was not seen by the writer. He believes that this pit was made in a different pegmatite, but the pit was filled at the time of his visit. About one-eighth of a mile to the north in the field he found another pit 15 to 20 feet deep. There is a pit one-eighth of a mile N. 35° W. of the residence. The pit is now in the edge of a woods and is 10 feet long, 8 feet wide and 10 feet deep. The pegmatite is about 5 feet thick, striking N. 55° E. and is nearly vertical. The dike contains some small schist inclusions, and there is some "burr-rock" on the northwestern side of the dike. The mica is variable in quality; some "A" mica is present; some of the books are very flat and are hard; the color is green to greenish-rum; and most of the books are too badly cracked to produce any sheet. It would appear that some good mica was obtained from the first-described locality, but since the holes are filled and the records are vague, no definite conclusions can be drawn.

EARLY-VAUGHN MINE

This mine is located 6 miles southeast of Barnesville and 1.8 miles south of the Barnesville-Forsyth Highway. It is located on the edge of a valley south of a small stream. The mine is owned and operated by Meyer and Brown of New York. This was the first successful mine to be opened up in this district during the recent mining period. It has been developed from a prospect since 1941 and, to date, has produced over \$100,000 worth of mica. The first prospecting was done at this place by Vaughn. After this L. M. Johnson mined here until the property was sold to Meyer and Brown.

This is a hard rock mine using the usual type of equipment; the pump is used intermittently. The works consist of a nearly vertical open cut about 60 feet long and 100 feet deep, which follows the strike and dip of the pegmatite. A new shaft was started recently at the northeast end of the cut but it was abandoned at 35 feet. The pegmatite is quite variable in thickness and is subject to changes in direction along the strike and dip. The general strike is N. 15° E. and the pegmatite dips steeply to the northwest. The average thickness is three to six feet, but locally, it may attain a thickness of 12 feet or more. Quartz lenses as thick as 6 feet may occur in the pegmatite. The vein rolls considerably as traced down-



FIGURE 23, Teaching Georgia women to sheet mica, Barnesville, Lamar County.



FIGURE 24, Sheet mica in place. Early-Vaughn mine, Lamar County.

Photos by Joe Stearns

ward, which accounts for the numerous changes in dip. At the present writing, the vein is divided in the lower part of the mine by a "horse of slate". The pegmatite is composed of coarse, cleavable albite, smoky quartz, and rum-colored mica. It is generally conformable to the country rock, a coarse, garnetiferous biotite gneiss which has been recrystallized near the pegmatite. The mica is rum-colored, hard, flat and of excellent quality. The mine has been a steady producer since the time it was opened up, and has accounted for a large amount of the recent production in this district.

WILLIAMS AND HOLMES PROPERTY

A small amount of prospecting has been done in the past, 3.5 miles south of Barnesville and one-half of a mile east of the paved road to Yatesville. Several small pits were dug on the slope and on the southeast side of a branch for a distance of about 100 yards where they are lined up in a N. 70° W. direction. No mica is showing around the pits at present. The country rock is granitized garnetiferous biotite gneiss, striking N. 30° E. and dipping 70° SE.

Smith¹⁵ states that about 100 yards S. 70° E. of the Holmes property, there are outcrops of white vein-quartz and fragments of mica books. One piece that he found was four or five inches across.

PERDUE PROSPECT

Recent work has been done on a mica prospect which is located 5.75 miles (airline) and 7 miles by road S. 20° E. of Barnesville and 75 feet north of a dirt road on the Lamar-Upson County line. The prospect is one-eighth of a mile west of the Barnesville-Culloden Highway and a quarter of a mile S. 13° W. of the Perdue home. The property is in charge of S. V. Millner, Barnesville, Route 1 and is owned by Mr. B. F. Perdue.

Mica was first discovered by R. V. Millner and it was leased to L. M. Johnson in 1942. When visited January 26, 1943, the prospect had been abandoned since a negro worker was killed by a cave-in, December, 1942. At the time of the cave-in, the pit was about 25 feet deep but at present writing, it is 20 feet long, 10 feet wide and 6 feet deep. A short, inclined shaft where the collapse occurred extended to the northeast under the compressor and is now completely caved.

The dike probably strikes with the pit, that is, N. 45° E. and dips to the southeast. The pegmatite is not exposed. Quartz lenses, milky to smoky in color and from two to three feet thick, are associated with the

pegmatite as evidenced from the dump. In normal seasons, the water table here stands 15-20 feet below the ground surface but fragments of coarse, cleavable potash feldspar found in the dump indicate that the pegmatite should become hard below that depth.

The mica is flat, clear, splits well and is from light to deep rum in color. Some books removed from the opening would square six inches and Mr. Millner states that several books worth \$25.00 were taken out in his presence. Some of the books in the dump indicate a slight suggestion of "A"-structure. A few, small quartz inclusions occur in some books and ruling is rather common. Biotite books are rather numerous in the dump. The quality and amount of mica removed indicate that this prospect should be re-opened. In this event, the new shaft should be timbered carefully to hard rock.

J. T. MEANS MINE

The old mine is located 7.2 miles (airline) and 9.5 miles via the Culloden-Barnesville Highway and a dirt road S. 40° E. of Barnesville. It is half a mile due west of Ramah Church and 0.4 miles northwest of Tobesofkee Creek. The pit is about 500 feet S. 25° E. from the cross-roads and the site of the old burned home. The present owner of the property is H. S. Worsham of Forsyth.

Mica was mined here by Mr. Burleson, of Spruce Pine, North Carolina, in 1917-18. The original shaft is said to have been about 30 feet deep and drifts were made along the vein from the shaft for a distance of about 30 feet in each direction. Water was encountered at 24-30 feet. The pit is now about 10 feet deep and the pegmatite, where exposed, is about 4 feet thick, and strikes about N.-S., dipping 52° NW. It contains a smoky quartz lens in the middle that is about one foot thick.

The country rock near the mine is weathered biotite gneiss saturated with granite. It strikes N. 46° E., dipping 60° SE. Green "A" mica is concentrated in the pegmatite along both sides of the quartz lens. The mica in other parts of the dike is light greenish rum-colored and some of it also is "A" mica. Some biotite occurs in the dump and some muscovite books contain minute inclusions of biotite. Books, which do not exhibit the "A" structure, split well. Smith¹⁵ states that most of the mica mined here was of the "A" type and that blocks, as large as 12 by 14 inches and weighing up to 75 pounds, were removed. At the time of his visit, Mr. Means had at his house some green and yellow beryl from the mine. One piece of yellow beryl was two inches long and three-quarters of an inch thick. Several prospect pits are reported a short distance south of this locality, but no production of mica has been reported from them.

GEORGE R. SWIFT ESTATE

Some prospecting was done on this property in 1918 by Mr. McDonald of Yatesville. Mr. McDonald dug a small pit 200 feet west of the Culloden-Barnesville Highway, 8.4 miles by road southeast of Barnesville. This pit was made in an open field near the second cross-roads southeast of Sugar Hill Church. The pit is reported to have been originally about 4 feet deep, but it is now filled and only a little pegmatite material can be seen. The mica seen here is rum-colored, hard and flat, but all of it is small and some is of the "A" type. A 4-foot pegmatite is exposed in the highway road cut 200 feet N. 25° E. of the above described locality. The mica here is similar to that described above and is probably in the same pegmatite.

About 0.6 miles northeast of the Swift dwelling in an open field, fragments of biotite and muscovite occur in the soil associated with a quartz lens. The mica here is flat and rum-colored, but some "A" mica occurs. If the property is prospected, the mica should be found near the borders of the quartz lens.

COL. A. J. THOMAS MINE

This mine is located 8.5 miles (airline) S. 25° E. of Barnesville on the west side of the Barnesville-Culloden Highway. It is 1.5 miles southeast of Sugar Hill School on property owned by Col. A. J. Thomas of Macon. A small pit, four feet deep, has been made in a fine-grained "burr rock" pegmatite half of a mile N. 70° E. of the tenant house. The dike is about two feet thick, striking N. 20° E., and is enclosed in granitized biotite gneiss. The mica is hard, flat and rum-colored; but it is all smaller than punch size.

Mr. McDonald of Yatesville mined mica here in 1921 from several small pits and one shaft 20 feet deep. He told Smith¹⁵ that the vein is about two feet thick and at the point where mining began, the vein dips 45° or more SW., but flattens out returning to the surface about 40 feet from the above-mentioned outcrop. Mica, some in large books, was scattered throughout the dike. A considerable amount of it was badly stained, but about 1400 pounds of saleable mica was removed.

THE OLD CHILDS PROSPECT

This prospect, owned by Colonel B. H. Manrey, is located six miles (airline) S. 73° E. of Barnesville and half a mile south of the old highway between Barnesville and Forsyth. It is two miles due south of Rocky Mount Church. An old shaft in an open field was made about

1917-18 by Mr. Roy Tangle. The shaft was 25 feet deep with drifting in a N. 75° E. direction. The dump consists of fragments of milky quartz, kaolin, small pieces of semi-kaolinized feldspar, and a little mica. The mica in the dump is rum-colored but is curved and smaller than punch, and a considerable part of it is of the "A" type. It is reported that several hundred dollars worth of sheet mica was removed from this shaft, but available indications for the production of commercial sheet mica here are not especially promising.

DOC IRWIN PROSPECT

This prospect is located 4.5 miles northwest of Milner and one mile west of the Barnesville-Griffin Highway. It is one mile northwest of the Lighthouse. Two pits were dug recently on the northwest side of a quartz "blow-out." One pit is 15 feet deep with drifting in a N. 40° E. and S. 40° W. direction. The mica left around the pit is clear, flat, and free of spots. Some of the books are cracked. About 80 feet northeast of this pit, there is another pit 9 feet deep. The pegmatite is about 2 feet thick here and strikes N. 60° E., dipping 75° SE. Mica is abundant here but it is cracked, ruled and stained. Very little "A" mica is present. All of the rocks except the quartz are thoroughly weathered, and water is encountered at 35 feet below the surface in a nearby well. The associated quartz lens is about 500 feet long and from 75 to 100 feet wide, but here has been insufficient prospecting to determine accurately the relation of the pegmatite to it. It is reported that \$275.00 worth of mica was sold in 1942 to L. M. Johnson from this prospect.

J. W. BROWN PROPERTY

This property is located 4.5 miles northwest of Milner. It is three-quarters of a mile southwest of the Lighthouse, which is on the Barnesville-Griffin Highway. Fragments of mica have been plowed up in the road and field near the house. Flat books split well and books as large as four inches across are reported by Mr. Brown. The mica is spotted and some of it is of the "A" type.

MRS. J. I. TAYLOR SR. PROSPECTS

This prospect is located six miles (airline) and eight miles by road N. 20° E. of Barnesville. It is in an open field two miles S. 40° E. of Liberty Hill cross-roads. About half a mile due west of the Taylor home, a pit was dug recently by J. I. Taylor, Jr. The pegmatite is enclosed in granitized mica schist, the nearly vertical layers of which strike

E-W. The pegmatite strikes about N. 10° W. The mica is clear and free of spots; hand-sized books were removed from the small pit, but it is all of the "A" type. Some punch and possibly some 1½ by 2 inches could be obtained here.

A trench about 15 feet long and 5 feet deep along the strike of the pegmatite was made recently by Mr. Taylor a quarter of a mile N. 30° E. of the above described pit. The dike strikes N. 30° W., dipping 45° SW. It is about four feet thick and in the middle contains a lens of milky to smoky quartz one and one-half feet thick. The dike is semi-kaolinized and thus should be hard a short distance below the surface. Books as large as 6 by 8 inches are obtained, but the mica is all "A" type. It is badly ruled and cracked; some of the books contain garnets. A little biotite occurs.

Monroe County

O. B. CLEMENTS PROPERTY

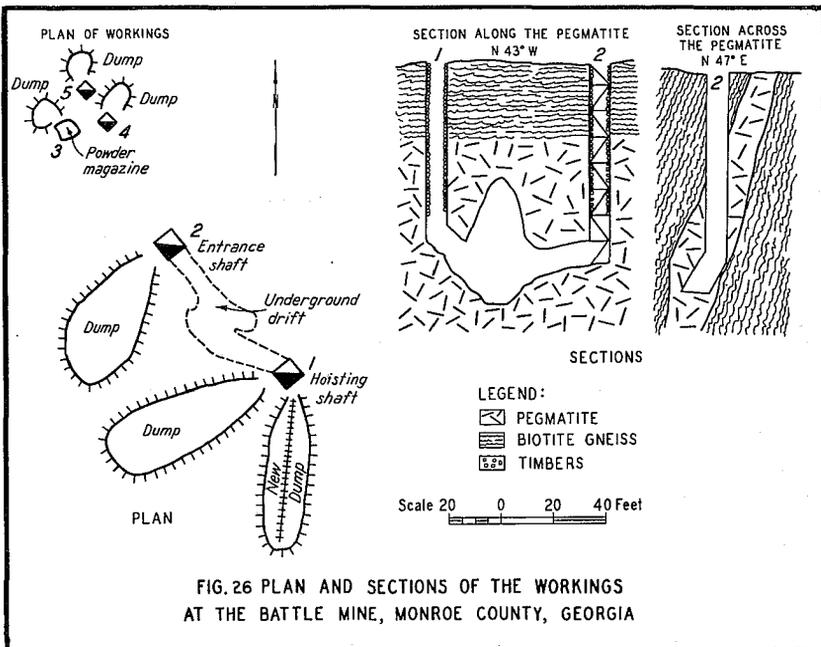
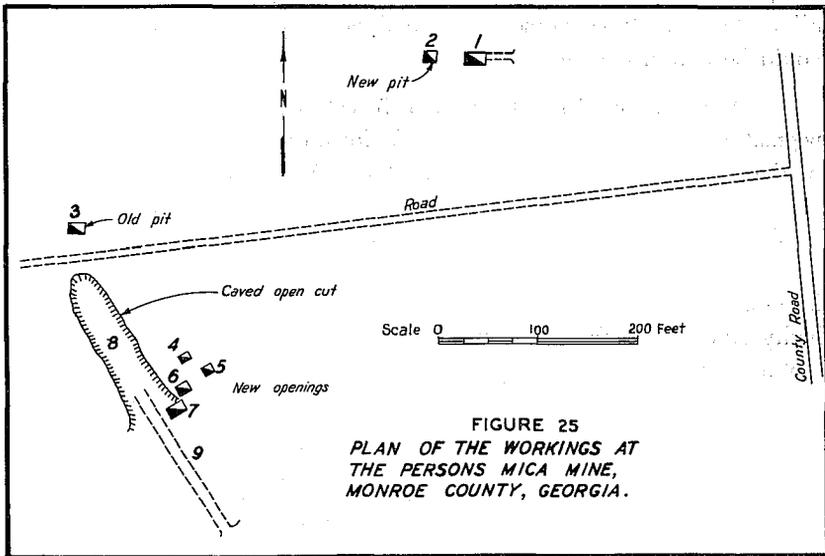
This property is located 4.5 miles (airline) due north of Culloden near the Monroe-Lamar County line. It is between the Yatesville-Culloden road and the Culloden-Barnesville Highway. Mica has been mined here from several pits southeast of the road, but the pits are now filled. The pegmatite is exposed in the south bank of the road. The dike is about six feet thick, consisting of kaolinized feldspar, smoky quartz, and mica. It also contains lenses of milky quartz. The country rock is weathered, granitized mica schist.

Books of mica, as large as 3 by 4 inches, occur in the pegmatite but most of the books are bent and do not split well. Much of the mica is of the "A" type, ruling is common, and the books are badly cracked.

REV. THADDEUS PERSONS MINE

This mine lies four miles (airline) due north of Culloden and one mile south of the Monroe-Lamar County line. It is one and three-quarters of a mile due west of Stroud, and 0.7 miles south of the Yatesville-Stroud road.

This was the site of extensive mica mining by Mr. Burleson of North Carolina. Mining was done in a large open cut within which shafts were sunk with drifting along the vein. The operation was carried below water level and pumps were used. The most conspicuous part of the mine is the large cut (fig. 25) which is now 150 feet long, 40 feet wide and 18 feet deep, striking N. 55° W. The remains of old pits and caved shafts may be seen in the open cut near the entrance and on the northeastern



side, but no records are available concerning their depth and general character. This open cut is shown on the sketch map as No. 8. There are large dumps which contain considerable scrap mica on the southwestern side southeast from the entrance. The tunnel (No. 9) enters the hill 15 to 20 feet below the open cut level. It extends N. 37° W. for a distance of 165 feet where there is a cross-cut N. 45° E. 10 feet long and filled at the end. This undoubtedly intersected the vein which lies to the east of this tunnel, and it connected probably beneath the open cut with one or more exterior shafts. The country rock is well-exposed in the tunnel. It is biotite-granite gneiss which contains numerous intrusions of pegmatite and granite parallel to the schistosity. It strikes N. 50° E., dipping 20°-50° SE. The rocks are cut by a strong joint direction in which the planes strike N. 35° W. dipping 70° NE. The pegmatite is not well-exposed at the present time, but it is best exposed at the northwest head of the open cut. The strike is probably N. 55° W. which is the direction of the open cut. This pegmatite probably corresponds to the type represented by figure 9 for it terminates in a quartz "blow out" at the northwest end. At the northwestern terminus of the open cut, the quartz lens is six feet thick with seven feet of pegmatite on either side of it. It is doubtful if commercial sheet mica will be obtained beyond this point where the quartz lens becomes very thick.

The mine was leased recently by H. R. Grindstaff and W. S. Blalock. They put down four new shafts near the southeastern terminus and just east of the open cut (Nos. 4, 5, 6, 7). Pits 4 and 5 were sunk to a depth of 22 and 15 feet respectively, in country rock and do not cut the pegmatite. Pit 6 is 20 feet deep and the pegmatite was encountered at the bottom. Shaft 7 extends below water level which is 25 feet below the ground surface. This shaft is timbered below the 20-foot level and appears to be the only one from which mica was obtained. Later prospectors may find it more profitable to concentrate their efforts upon a single well-directed shaft.

It is reported that Burleson produced \$50,000 worth of mica from this mine. The mica is hard, flat, rum-colored and of excellent quality. Small inclusions of late injected quartz occur in some of the books. Cracks are the principal defect of the mica.

About 150 yards N. 60° E. from the head of the open cut, there is a pit 15 feet deep (No. 1) in pegmatite which is at least seven feet thick, striking N. 62° E. The enclosing biotite gneiss layers are nearly horizontal; the dike contains schist inclusions. The wall rock strikes generally N. 28° W., dipping 18° SW. Lenses of milky quartz occur in the pegma-

tite. The dike is rather coarse-grained; some graphic granite, and some "burr-rock" occur along the walls. Green "A" mica is found next to the quartz lenses. Rum-colored mica occurs in the pegmatite, but it is considerably cracked and ruled. Most of the mica books are small, but generally flat and hard, and the best books come from a zone six inches thick on the northwestern wall.

HAYGOOD PROSPECT

A small pit has been recently made for mica on the farm of John and Ben Haygood. The prospect is located three miles (airline) and 3.5 miles by road N. 17° W. of Culloden on the northeast side of the Yatesville-Culloden road. The prospect is in an open field 0.4 miles N. 15° E. of the Haygood home.

The small trench 8 feet long, 4 feet wide and 3 feet deep was dug during the first part of January, 1943, by Mr. Boone of North Carolina. The pegmatite is not exposed, but from surface indications it probably strikes N. 45° E. with the direction of the trench. A milky quartz lens, at least 8 inches thick, is associated with the pegmatite. The "A" mica obtained here is rum-colored, hard, flat, and splits well. The books are unusually large. They are composed of alternate "A" mica and flat, clear mica. The larger books will measure 8 by 11 inches and will sheet 3 by 6 inches. Insufficient work was done by Boone at this locality to determine the width, dip and extent of the pegmatite. Wacaster dug a hole at this point, removed mica and left the pit partly filled.

HOLMES MINE

This mine is located 1.25 miles due north of Culloden on the east side of the Southern Railroad and Highway 74 to Thomaston.

It was first worked by Lyles and Battle in 1917-18, who are reported to have produced \$5,000 worth of mica at this place. It has been operated recently by J. J. Egan and Oliver Howell. The old works consist of three caved shafts made in the pegmatite. A new shaft, 60 feet deep, was made recently in wall rock on the hanging wall side of the dike, and is now used as a hoisting shaft. The northeasternmost old shaft has been recently cleaned out and is now being used as an entrance shaft; it is connected with the new shaft. The country rock is biotite gneiss saturated with pegmatite and granite. The pegmatite strikes about N. 70° E., dipping 60°-70° SE. and is 4-6 feet thick. The dike is considerably kaolinized in the upper part of the mine, but much less at water level. It consists of kaolinized feldspar, smoky quartz, and mica. Black tourmaline crystals

occur in some of the quartz. Lenses of quartz occur locally in the dike. Some of the mica books are ruled and badly cracked, and inclusions of late quartz occur frequently in the mica. The mica is deep rum in color, hard, flat, and of excellent quality.

BATTLE MINE

This mine is located near the Monroe-Upson County line, three miles west of Culloden. It is accessible via a dirt road going west from the Yatesville-Culloden Highway, one mile northwest of Culloden.

The mine was opened and operated about 1918. It is in hard rock below water level, and was worked through two shafts connected by drifts along the vein. These two shafts are 54 feet apart lined up approximately with the strike of the vein, which is about N. 44° W. Sixty feet northwest of the older shaft, there is a group of three pits 8 to 12 feet deep made in the pegmatite. Small books of muscovite and biotite occur in the dumps around these pits. During the first stage of operation, it is stated that the producing length along the strike of the pegmatite amounted to about 75 feet. When mica mining ceased after the closing of the World War, the mine was abandoned by Oliver Howell. It was reopened in 1942, and has been operated since then by J. J. Egan and Oliver Howell. They have cleaned out, deepened and timbered the south-western shaft and taken out a considerable amount of mica from the pegmatite. The workings now extend to a depth of about 100 feet.

A very coarse pegmatite intrudes biotite gneiss at this locality. The country rock is thoroughly saturated with granite which injects the gneiss in lit-par-lit fashion, also cross-cutting it so that the gneiss in the vicinity of the mine is at least one-half granite. This facies is cut and injected by the pegmatite.

The pegmatite dips 85° SW. It is quite variable in width, ranging from 8 to 24 feet. It occasionally contains large lenses of milky, light rose, or smoky quartz which do not appear to have any definite arrangement in the pegmatite. The essential minerals of the pegmatite are coarse, cleavable potash feldspar, quartz and mica. Plagioclase does not seem to be especially conspicuous in this mine. Coarse, graphic intergrowths of quartz and feldspar are common. Small red garnets are common, especially in the even-textured, finer-grained parts of the pegmatite. They tend to occur as clusters of small grains. The mica is ruby-colored, flat, hard, and of excellent quality.

F. H. HOLLOWAY MINE

The old mine lies 5.5 miles (airline) N. 75° E. of Culloden. It is 1.25 miles S. 70° W. of Russellville and 2.5 miles N. 30° W. of Dyas. The mine is accessible via a dirt road southwest from Russellville. Some mining has been done in the past on the east side of the dirt road a quarter of a mile due south of Piney Grove colored church and school. Mr. Abercrombie of Dyas owns the property at present. The original work was done here by Gus Weldon, and work was done later by another man.

This property was described by Smith,¹⁵ December, 1931. At this time, he found four pits about 25 to 50 feet from each other, arranged in a curved line striking N. 70° E. near the road and N. 45° E. near the northeastern end. It was reported that the two pits nearest the road were about 30 feet deep and connected by a tunnel. The thickness of the pegmatite could not be determined at that time. At the present writing, all of the pits are filled. Mica may be found in the soil near the site of the old pits, and a dump still remains near the northeast end of the works which consists of fragments of milky and smoky quartz, kaolin and kaolinized feldspar, muscovite and biotite, and some "burr-rock." The muscovite is flat, rum-colored, hard and of good quality, and books up to punch size were left in the dump. Some of the books show perfect crystal outline, contain minute muscovite books as inclusions, and small inclusions of smoky quartz of late origin. If any considerable amount of mica larger than that found in the dump could be obtained here, the deposit should be profitable. Some mica may be found on the west side of the road, but there are no records of prospecting there.

HOMER HARDIN MINE

The mine is located 5 miles (airline) N. 64° E. of Culloden. It is 1.75 miles southwest of Russellville and 3 miles northwest of Dyas; also, it is 0.5 miles due west of Piney Grove colored church and school. The mine is accessible by a dirt road southwest of Russellville. The present owner of the mine is Homer Hardin. The workings are found at the edge of an oak woods, a short distance east of the tenant house.

Mica was mined here in 1917 by Calvin Battle of Culloden. Later, some prospecting was done on the property of Gus Weldon, but it is not believed that he obtained much mica. The pegmatite appears to be rather thick with irregular walls and off-shooting branches. In the central part of the operation, there is a large open pit now somewhat filled by wash but accessible. An inclined drift extends down and along the pegmatite from the open cut in a northeast direction. The pegmatite appears to

strike N. 40° E., dipping 64° SE. The dike is medium-coarse, semi-kaolinized and mica books, as large as 3 by 3 inches occur in the open cut near the entrance of the inclined drift; however, at this locality the mica is badly cracked. Bands of schist which dip and strike with the dike are exposed in the walls of the incline. The mica is concentrated usually near the nodules and small lenses of smoky quartz. The lenses tend to dip and strike with the pegmatite. The incline mentioned above is 30 feet long and the head is about 20 feet below the ground surface. Near the head of the incline there is a cross-cut to the northwest which connects with an exterior shaft that is about 20 feet away. Another exterior shaft is just southwest of the one above mentioned. At 40 feet S. 53° E. of the open pit, there is an old untimbered shaft now 12 feet deep, the walls of which are in pegmatite. The dike here is more than five feet thick. There is evidence in this shaft of an incline extending down in a northeast direction from the bottom of the shaft, and also a drift to the northwest toward the open pit. Both the incline and drift are now caved. A short distance south of this shaft, there is a 6-foot pit exposing a 4-foot pegmatite striking N. 30° W., dipping 75° NE.

The walls of the present openings do not contain much good mica, however, the workings are unusually limited in extent, specimens of mica in the dump are flat, rum-colored, split well, and some will trim out 1 by 1 and 1¼ by 1¼ inches.

RUFFIN PROSPECTS

Recent prospecting for mica was done by B. F. Ruffin on his farm, located 7.25 miles (airline) and 8 miles via the Forsyth-Knoxville Highway, S. 7° W. of Forsyth. The prospects are on the west side of the Highway in a cultivated field about 500 feet northwest of Mt. Vernon Church. Two pits, about 200 feet apart, were made in biotite gneiss and pegmatite. The northwestern pit is 30 feet deep with some water in the bottom of the shaft. Country rock and pegmatite are soft, but the pegmatite is only partly kaolinized at water level. This dike strikes N. 58° W. with a nearly vertical dip. Two stringers of pegmatite are exposed at the mouth of the shaft, but they unite at about 10 feet below the surface to form a dike about three feet thick, which is composed of feldspar, quartz, small books of rum-colored mica and with a definite lens of smoky quartz. Some of the mica books exhibit "A" structure, and cracks are common in many of the books. Most of the mica here is smaller than punch. Ruling is a common feature; some of the mica contains quartz inclusions.

Several shafts, not over 30 feet deep, were dug close together southwest of the above-described one. The pegmatite is not now exposed; however, the country rock near the mine strikes N.-S., dipping 80° W. Mr. Ruffin has removed about 300 pounds of mica, the best and largest of which came from these openings. Both country rock and pegmatite are deeply weathered and the mica is generally clay-and iron-stained. Books, as large as 3 by 5 inches which will trim sheets up to 2 by 3 inches, occur. There is some biotite. The quality of mica at this locality is superior to that described above.

PETERS MINE

This mine is located 7.25 miles (airline) and 9.0 miles via the Forsyth-Culloden Road S. 47° W. of Forsyth. This mine is three miles southwest of Brent, and is owned by L. E. Peters, Route 3, Forsyth.

Mica was mined here after the World War by North Carolina miners. Several old shafts close together occur about 200 feet east of the dirt road to Forsyth. Scattered around the old openings, there is some scrap mica, masses of white and light rose-colored quartz, and 7 or 8 tons of slightly kaolinized potash feldspar in large lumps. Most of the old openings are filled or partly filled. One shaft, about 35 feet deep, was re-opened and deepened in 1942 by Marshall Black of Thomaston. The bottom of this shaft seems to be above the static water level, although water stands in the shaft after rainy periods. Five old openings, more or less filled and with drifting between them and close together are found immediately to the north and northwest of the shaft opened by Black. Books of "A" mica, flat rum-colored mica and biotite occur around the mine openings. Impressions of mica books, as large as 5 by 7 inches, are found against some of the quartz fragments. The "A" mica appears to occur associated with the quartz. Some rum-colored "A" mica contains inclusions of biotite. No records of production from this mine are available to the writers, but large books of mica are reported to have been taken from the mine. Fragments of flat rum-colored mica, found in the dump, are of good quality.

L. D. OWEN PROSPECT

This prospect is located 5.5 miles southwest of Forsyth via the Forsyth-Culloden Road. It is in a pasture on the south side of the dirt road three-quarters of a mile southeast of Brent and only one-half of a mile west of Hopewell Church (colored). The property is now owned by Ray McNealy and was formerly owned by L. D. Owen.

A kaolinized pegmatite two and one-half to three feet thick was prospected recently 200 yards southeast of the tenant house. The country rock is mica schist, striking N. 25° E., dipping 45° SE. The pegmatite contains schist bands and seems to be generally conformable to the country rock. About a ton of scrap mica is piled near the pit. The mica is rum-colored, but badly twisted and does not split well. Quartz inclusions are unusually abundant and leave numerous holes in the books after they are sheeted.

Mica of better quality was found in the yard of the tenant house, but its source is unknown. In 1931, Smith¹⁵ found two prospect pits 18 feet deep and 25 feet apart in the woods south of the road. The pits were dug in 1929 by C. B. Owen. Smith states that the vein is apparently about six feet thick, striking N. 85° E. and dipping about 45° SE. The largest books of mica found were about three inches across.

DICK FLETCHER MINE

This mine is located 5.6 miles (airline) and 7 miles by road S. 40° W. of Forsyth. It is one mile S. 45° E. of Brent and one-eighth of a mile S. 10° W. of Hopewell Church (colored) in Land District 12 and on land which is called locally "Hopewell Farms." The present owner of the mine is Mr. Lawrence W. Cobb of Atlanta. It is now leased to L. R. Hetrick.

Considerable mining for mica took place upon this property about 1918-19, where several old pits occur in line presumably upon the same pegmatite. The opening in the woods nearest the church is a square untimbered shaft. It is about 35 feet deep at present. The pegmatite here is about 10 feet thick containing a two-foot lens of milky quartz near the middle. The pegmatite strikes about N.-S. dipping 45° W. Fragments of milky quartz, smoky quartz, kaolinized feldspar and small books of mica occur in the dump. No water was observed in the shaft at the time of the visit; the feldspar is semi-kaolinized in the lower part of the shaft. The mica is clear, flat, splits well and is clear to light rum in color. Small quartz inclusions occur in some of the books. A few books contain small muscovite inclusions crystallized at right angles to the cleavage of the large books. Small books are frequently diamond-shaped.

From 200-250 feet S. 20° E. of the above described shaft, another old shaft occurs. It is said to be about 35 feet deep, but now covered with brush. Quartz fragments and small mica books occur in the dump.

About 100 feet S. 5° W. of the above are two filled shafts surrounded by large dumps. One shaft is now six feet deep and the other is from three to four feet deep. Smoky quartz fragments, kaolinized and semi-kaolinized feldspar, and books of muscovite and biotite mica occur in the dumps. Biotite books up to 3 by 3 inches may be found, and small biotite books are included in the muscovite books or occur in conjunction with them. The muscovite books are flat, hard, split well and have a deep rum color. Books of muscovite which will trim up to 2 by 2 inches can be found in the dump. It is reported that this was one of the largest mica mines in the State, but the record of production is not known to the writers. Smith¹⁵ reported in 1931 that most of the mining was from two large pits about 100 feet apart with a drift along the vein between them, and that the pits were about 50 feet deep. The excellent quality of the mica and available reports indicate that good sheet mica might be obtained by re-opening the southwesternmost workings.

COX PROSPECT

This prospect is located 4.5 miles (airline) and 6 miles via Forsyth-Knoxville Highway and the first dirt road south of Tobesofkee Creek to the east from the highway, due south of Forsyth. It is a quarter of a mile due south of a family cemetery which is on the north side of the dirt road. The opening is on the old Jerry Cox place, on the northeast slope of a hill, 75 feet from and 30 feet above a small stream. The property is owned by the Bramlette Hardware Company of Forsyth.

Mica was discovered here recently by B. F. Ruffin. Some recent prospecting has been done by Mr. Childs of Griffin, who dug a pit 15 feet deep. The wall rock is hard biotite gneiss in which the biotite is coarsely crystalline in the vicinity of the pegmatite. The pegmatite is at least 7 feet thick, but some of it was concealed by water at the time of the writers' visit. It consists of hard, coarsely cleavable potash feldspar, smoky quartz and books of muscovite and biotite. Flat books of biotite, as large as 2 by 3 inches, are found, some of which are altered on the edges and internally along fractures to vermiculite. The muscovite is hard and of a light rum-color, but some of it has a tendency to be curved. Cracking and ruling are common. Some muscovite books contain inclusions of biotite and very small muscovite books with their cleavage nearly at right angles to the parent book. Small flattened quartz inclusions and small crystals of green apatite are found in some books. Mica at this locality is of good quality, but not much has been produced.

ROSA FLETCHER PROSPECT

A prospect for mica was opened in the winter of 1942 by B. F. Ruffin on the Rosa Fletcher property. This opening is located 3.5 miles (airline) and 4.0 miles via Forsyth-Knoxville Highway and a country road, due south of Forsyth. It lies 300 feet northeast of Tobesofkee Creek and about 400 feet south of the dirt road. The prospect is on the southwest side of a wooded hill.

Mr. Ruffin exposed a 3.5 foot pegmatite by an open pit, 20 feet deep and 10 feet long. The pegmatite stands in a nearly vertical position, striking N. 49° W. The dike is coarse-grained, containing considerable coarse graphic granite, coarsely crystalline potash feldspar, muscovite and some books of vermiculite. The muscovite is scattered throughout the dike; no quartz lens is evident in the opening. The quartz, including that in the graphic granite, is smoky-colored. The minerals of the dike are completely fresh, but the feldspar is somewhat kaolinized along the walls. The vermiculite is more abundant along the borders of the vein. A few red garnets are associated with the vermiculite. The country rock is completely weathered and structureless.

The mica books are rather small; books as large as 3 by 4 inches may occur, but little mica, larger than punch, can be sheeted from them. A considerable amount of one-inch square mica could be obtained here. Vermiculite occurs locally in conjunction with the muscovite books and is occasionally included in them. Some "ribbon" is present and traces of "A" structure are common to many books but, for the most part, the mica is flat and rum-colored.

L. P. PHINAZEE MINES

Two openings have been worked for mica in the past on the old L. P. Phinazee farm. These openings are located four miles (airline) S. 80° W. of Forsyth. They are south of the Forsyth-Barnesville Highway and are 4.5 miles by this road west of Forsyth. The property is now owned by H. H. Hardin of Forsyth.

Mica was mined in 1917-18 and again in 1922 at a point 3.5 miles (airline) S. 83° W. of Forsyth and about half a mile S. 22° E. of the Phinazee home. Several untimbered shafts were sunk at this place 30 feet to water level. The miners then drifted along the vein and stoped to the surface. The principal pits are said to have been made by Lambert and Charles Dale. At the present time two square shafts, one a relatively new shaft about 25 feet deep and an old filled shaft, occur close to-

gether. The main vein is said to have been four feet thick, striking N. 30° W. There were several off-shoots, however, from which most of the mica is supposed to have come; but this spot is now covered by the largest dump. About 100 pounds of mica is reported to have been obtained about 100 yards S. 30° E. of this locality. Not much can be seen around the old workings at present. Evidently, the pegmatite is almost completely kaolinized. Small nodules of smoky quartz and small books of rum-colored mica are mixed with kaolin to compose the dumps. The mica is hard, but no large sheets were left around the mine. The small books are frequently cracked, some of them are bent on the edges, and the largest book seen at the time of the writers' visit would measure 1½ by 2 inches. Records of production are not available. It is believed that the pegmatite was not mined below water level.

About a third of a mile N. 55° W. of the above locality and about the same distance south of the highway, mica was mined in low ground in 1917-18 and in 1922. Mr. L. P. Phinazee was in charge of the operation. Several shafts were made with drifting from the bottom, most of which were filled with debris during the working. Smith¹⁵ visited the property, December 4, 1931, when he found the last pit to be filled with water. The pit was worked to a depth of 35 feet, and, although the water was pumped night and day, the shaft could not be completely de-watered. He reports that the dike strikes N. 10° E. and that it dips about 75° SE. It is said to be four feet thick, containing a great deal of vein quartz with mica in the center. The mica is rum-colored; some of it is flat and some "A" mica occurs. According to reports, the largest book is said to have trimmed 8 by 10 inches. It weighed over 90 pounds and is said to have sold for \$317.68. Most of the mica is said to have been trimmed into 2- to 6-inch squares. According to Mr. Phinazee, 10-15 tons of mica were sold from this mine.

A shaft about 35 feet deep was made on the vein by William P. Buckner, Jr. in the summer of 1942, with a drift to the south about 15-20 feet long at the bottom. Water now stands level with the mouth of the shaft. Some good sheet mica was taken from this shaft, but the venture was not profitable. Fragments of mica around the shaft are light rum in color, but many of them show "A" structure. Fragments of coarse pegmatite with potash feldspar, and large fragments of smoky quartz occur around the shaft.

Undoubtedly, some good sheet mica could be obtained from this mine. The rock is hard thus mechanical equipment will be required for

mining. The water problem here would be almost unsurmountable during most seasons of the year.

L. P. GOODWIN PROSPECT

Mica has been mined in the past on the L. P. Goodwin property. The mine is located 2.5 miles (airline) due west of Forsyth and a quarter of a mile north of Barnesville-Forsyth Highway. It is a third of a mile N. 62° W. of the home of the owner, L. P. Goodwin. The mine is in a field about 400 feet northwest of a small branch and about 35 feet above water level.

The opening at present is considerably filled; it is 40 feet long, 9 feet wide and 6 feet deep. It extends in the direction of N. 42° W., which is probably the strike of the unexposed pegmatite. According to reliable reports, the dike dips from 75° to 80° NE. There is said to have been about 18 inches of good mica between hard "burr-rock" on the hanging wall side, and quartz on the foot wall side. Fragments of pegmatite around the opening are fresh and hard, and it is said that the rock had to be shot out with explosives. The country rock in the sides of the trench is completely weathered but appears to dip to the northeast.

The mine was opened and worked in 1918 by a Mr. Lambert of North Carolina who worked several men there from August to November. The original opening was a shallow shaft near the southeast end of the opening, which became filled with water during winter rains. After this event, the miners followed the pegmatite northwestward. The total amount of work was not large. Several tons of mica are said to have been taken from the mine. This included numerous books of large size, one of which is reported to have weighed several hundred pounds. According to the owner, Mr. Goodwin, the mica was removed and he did not receive his royalty or any payment for his day labor.

The pegmatite is coarse-grained, consisting of potash feldspar, some albite, smoky quartz and mica. Some specimens contain apatite. The mica is of excellent quality, flat, hard, splits well and is light rum in color. The history of prospecting and the appearance of the pegmatite and mica fragments around the trench justify its re-opening.

F. B. WILLINGHAM PROSPECT

This prospect is located one and three-quarters miles due west of Forsyth. It is 100 feet north of the Forsyth-Barnesville Highway, a half of a mile east of L. P. Goodwin's home and on the same side of the road,

and just west of Todd Creek. A hole, now 12 feet deep with 15 feet of drifting southwest along the strike of the dike, was made by W. W. Way in 1920. The pegmatite is coarse-grained and contains potash feldspar, smoky and milky quartz, muscovite, and biotite. It is at least eight feet thick and contains some schist inclusions. The country rock is biotite gneiss striking N. 10° E., dipping 30°-60° SE. The dike strikes N. 30° E. dipping 50°-70° SE. Southwest of this locality, the pegmatite is exposed on the south side of the highway where it breaks up into small stringers in the schist. Here, it contains small books of muscovite and biotite. The pegmatite exposed in the opening is fresh and hard; water probably would be encountered at 20-25 feet below the ground surface.

The muscovite is hard and rum-colored; some books are curved and a small amount of "A" mica is present. Not much mining has been done here.

About a quarter of a mile N. 20° E. of the above pit, there is a small hole, formerly three or four feet deep, but now filled. Small mica books similar to that described above are found in the vicinity of the pit.

C. A. ENSIGN MINE

This mine is located three miles (airline) N. 63° W. of Forsyth, 0.25 miles south of the dirt road from Forsyth to Colliers, and on the south side of the Central of Georgia Railroad. The site of the old opening is in an open field 0.25 mile due south of the Old Ensign home.

According to L. P. Phinazee, pegmatite was first discovered and worked for sheet mica here by Ed. White. White is said to have purchased the property which later reverted to Ensign. Mica was mined from a single shaft 18 to 25 feet deep. The property was later sold to Governor Eugene Talmadge who filled the hole up with the materials of the dump.

It is reported that the rock enclosing the pegmatite is hornblende gneiss, but neither country rock nor pegmatite are exposed at the present time. In the vicinity of the mine, granite and pegmatite crop out locally. These are cross-cut by a diabase dike which strikes N. 30° E. Smith¹⁵ found the shaft open at the time of his visit, December 4, 1931. He states that the shaft did not reach water level. The vein strikes N. 30° E., is six feet thick, and dips 45° to 50° SE. According to L. P. Phinazee, the east, or hanging wall side of the vein is heavy vein-quartz. The part of the vein showing at the time of Smith's visit exposed three feet of vein-quartz, 2-3 feet of kaolin with mica in 4-inch books, some "burr-rock", and some intimate intergrowths of feldspar and quartz.

Mining is said to have been stopped here because of a disagreement with the owner. Head-size fragments of milky and smoky quartz occur at the site of the mine. Some small lumps of potash feldspar also occur. Leaves and books of "A" mica up to 3 by 4 inches may be picked up, some of which contain clear central portions of punch size; also some clear, flat leaves may be sheeted from between the "A" structures in the books. It is probable that some good pattern mica was obtained here, but the sheeting cost would be rather high.

WORSHAM AND GOODWIN PROSPECT

The prospect is located 3.5 miles (airline) and 5.1 miles by road N. 55° W. of Forsyth. It is 0.5 mile north of the Central of Georgia railroad and is accessible via a dirt road from Forsyth to the prospect. It lies between two large parallel ridges extending east-west. It is on the north slope of a ridge 20 feet east of a new underground Bell telephone line. The property is owned by J. R. Goodwin and H. S. Worsham of Forsyth.

A pegmatite is exposed by two pits about 6 feet deep located about 65 feet apart and connected by a shallow trench. This trench is in a N. 52° E. direction. The dike strikes N. 52° E., dipping 60° SE and is enclosed in biotite gneiss which strikes N. 65° E., dipping 80° SE. The pegmatite is from 4-6 feet thick and contains numerous xenoliths of biotite gneiss up to 6 inches in thickness. These inclusions are conformable to the strike and dip of the pegmatite.

Hard, coarse cleavable potash feldspar, a small amount of lenticular smoky quartz, muscovite, and a little biotite compose the dike. Most of the muscovite is small and rather badly cracked and ruled. It is hard, clear, flat, rum-colored and splits well; however, it contains numerous inclusions of smoky quartz. No mica larger than punch size could be found around the opening at the time of the writers' visit. There are no records of any sheet mica having been obtained here. The prospect has little promise for the production of sheet mica.

About 50 feet northwest of the above-described locality, pegmatite is exposed in a gully. The mica here is of better quality than at the other locality. No prospecting has been done here.

CHARLIE CALLAWAY PROSPECT

Some prospecting for mica was done three miles (airline) N. 15° W. of Forsyth in 1918 by Way and Lambert. The old filled pit lies a quarter of a mile west of the Forsyth-Jackson Highway and is in a pasture just

south of the dirt road. Very little work was done at this locality and the pegmatite is not exposed at present. Some "burr rock" and a little mica are scattered around the filled pit. The mica is hard, flat, rum-colored and splits well, but cracks are common and some of the mica contains quartz inclusions. The country rock here is augen gneiss. Some pieces of small mica are exposed in a cultivated field 150 feet S. 70° E. of the above locality.

THE OLD CALLAWAY PROPERTY

Mica has been dug in the past on the Old Callaway Property which is located 2.5 miles (airline) due north of Forsyth and 0.5 miles east of Highway 42 to Jackson. Digging has been done in the past 0.5 mile east of the old home place on a small ridge just east of a small branch. Work is said to have been done here shortly after World War I by Lambert and L. P. Phinazee. The workings here at present are badly caved and filled. They now consist of an elliptical-shaped open cut 40 feet long, 20 feet wide and 8 feet deep. To the southeast and about 20 feet from the open cut, there is one pit which is 8 feet deep at present. The workings trend N. 55° W. About 30 feet east of the open cut and off the general trend of the workings, there is another pit about 10 feet deep, indicating that the dike is dipping to the northeast.

The country rock is deeply weathered, and strikes N. 55° W., dipping about 70° NE. The pegmatite is not exposed, but the general trend and character of the works suggest that it is generally accordant in dip and strike with the country rock. Some quartz float and boulders of quartz occur just beyond the west end of the cut. A pit or trench at this locality might reveal the character of the pegmatite.

No records of production are available to the writers. The mica is light rum in color; books left on the dump are flat; some books are bent and frequently cracked; and occasionally the books contain holes from which inclusions have weathered. No books larger than punch were left around the mine.

WILLIE BOWDOIN PROPERTY

Some recent prospecting for mica has been done upon the Willie Bowdoin property located 4.5 miles (airline) and 6 miles by road N. 70° E. of Forsyth. The property is accessible via the Forsyth-Juliette Road and a dirt road south from the above road to Ebenezer Church. The property lies one mile due north of Ebenezer Church and an eighth of a mile south of Cooks Creek.

Three pits have been made recently in an open field northwest of the tenant house on Willie Bowdoin's farm. These openings expose pegmatite dikes generally parallel and up to three feet in thickness. The largest opening is a square pit about 6 feet deep. The dike here is from two to three feet thick, strikes N. 20° E. and dips about 30° SE. The dike is hard and is composed mostly of smoky quartz and small mica with a small amount of feldspar. Deeply weathered granitized biotite gneiss encloses the pegmatite. The mica here is hard, flat, light rum-colored and splits well, but cracking and ruling are common. Much of the mica is small, but some of the books taken from the opening will measure up to five inches in diameter along the cleavage surfaces.

NEW GROUND MINE

This mine lies two miles southwest of Juliette and is 200 yards S. 10° W. of the Old Walker Smith Mine. It is on the property of R. R. Driskell. Mica was mined first here in 1915 by Harris and later in 1931 by H. L. Driskell. The pit here was formerly 26 feet deep and 8 feet wide. It now contains water, is 65 feet long and from 10 to 30 feet wide. The vein is about 3 feet wide, strikes N. 15° E., dipping 74° SE. This dike appears to have the same strike as does the Goulsby pegmatite, but its mica is of a different quality, thus it may represent a parallel dike. The opening is in hard rock, the dumps consisting of a mixture of feldspar, quartz and mica. The pegmatite is locally garnetiferous. Many books of mica in the dumps are bent on the edge. Generally, the mica is light rum-colored, hard, and free of spots; but some of it shows "A" structure, contains quartz inclusions, is cracked, and some splits poorly.

About 20 feet above and 100 feet to the southwest towards the crest of the slope, several pits occur in line. There is also a trench 60 feet long and originally 26 feet deep slightly west of this line of pits but it did not reach hard rock. This trench was made by Harris about 1915. A Triassic diabase dike cuts the pegmatite at this place. Some large books are reported from the trench, one of which sheeted 12 by 20 inches. Some of the sheets are spotted to pattern and others are without spots. The mica is generally of the "A" type; some ruling occurs. Harris is reported to have removed about three barrels of unsheeted mica from both localities. Some mica, which sheeted up to 4 by 6 inches, is reported from the first locality.

A short distance west of the above locality, a small trench was made in a coarse, hard pegmatite dike from 8 to 10 feet thick which strikes about N-S. The dike contains some garnets. The mica books are rum-

colored, but small and bent. The feldspar is very coarsely crystalline and light gray to pink in color.

OWL HOLLOW PROSPECT

This prospect lies on the top of a flat ridge about a quarter of a mile south of the New Ground Mine. It is a quarter of a mile west of the Redding residence. Three small pits were dug at this locality in 1931 by the Driskell brothers. The country rock is hornblende gneiss injected with granite. The dike here strikes N. 10° E., dipping 70° SE. The pegmatite contains garnets; no mica of any value was obtained. Other similar pegmatites occur in the general locality.

A. T. REDDING PROPERTY

This property lies two miles S. 45° W. of Juliette and is accessible via a dirt road southwest from that town. A small prospect now 12 feet long, 8 feet wide and 10 feet deep lies in an open field one-eighth of a mile due north of the Redding home. The original prospect was opened by Harris in 1915, who is reported to have removed from 40 to 50 pounds of mica. It was leased recently by L. D. Gray who did a small amount of digging here. The pegmatite is not exposed but is said to be from 8 to 10 feet thick and to consist of a quartz lens on the eastern side, feldspar on the western side, and with most of the mica concentrated between the feldspar and quartz. Books of biotite, as large as 3 by 4 inches, are found near the pit. The muscovite is generally rum-colored, but some books are greenish. Fragments of mica picked up around the pit do not split very well and some of the mica is spotted. The dike has not been traced thus nothing is known of its extent.

On a knoll in the woods about half a mile N. 30° W. of the Redding home, there is a small pit in quartz which contains small mica and very little feldspar. The mica here is greenish and some of the books are spotted.

THE OLD WALKER SMITH MINE

This old mine is two miles southwest of Juliette and three-quarters of a mile northwest of the Redding property. The mine is in a woods 400 feet south of a small stream near the bottom of a hill and ten feet above the flood plain. The mineral rights here are owned by Dr. R. C. Goulsby of Forsyth and the land is owned by Charlie Cochran. Mica was first mined from this locality about 1904 by Dr. Goulsby.

The rock here is soft to the extent of mining and water will be encountered about 20 feet below the surface. A few outcrops of medium-grained pegmatite and granite are found on the slope of the hill above the mine, but the mica-bearing pegmatite is not exposed. Dr. Goulsby, in 1904, removed considerable mica from this mine and is said to have sold one barrel of mica in the rough for \$100.00. It is reported that he did not mine deeper than 16 feet. Some mica was obtained here in 1919 by Mr. Cleveland, and a little prospecting was done in 1942 by L. D. Gray. The mining operations here in the past consisted of five pits more or less lined up in a N. 10° E. direction which is probably the strike of the pegmatite. The line of pits is about 75 feet long and one was 22 feet deep. According to Mr. R. R. Driskell, the pegmatite dips about 45° E. and is three feet thick. Most of the mica is said to have come from the north end of the works. Some of the mica books are reported to be large. Dr. Goulsby is reported to have removed one book which was 11 inches thick and 11 inches in diameter. Most of the mica is reported to be associated with the quartz. There is some "A" mica but, for the most part, the specimens found in the dump are flat, light rum-colored, hard and split well.

E. J. GOGGINS PROSPECT

Prospecting for mica has been carried on in the past upon the old Goggins property which is now owned by J. W. Johnson of Cabaniss. It lies 10.5 miles by road northeast of Forsyth and an eighth of a mile north of Cabaniss on the east side of the dirt road.

A pit, 15 feet long, 8 feet wide and 10 feet deep, was dug here recently by E. J. Goggins. The wall rock is thoroughly decayed schist, but the pegmatite is only slightly weathered. The dike is very irregular in shape, generally conformable to the country rock, striking N. 25° W. and dipping 75° NE. It is about three feet thick, but stringers and offshoots from it cut the country rock. A lens of milky quartz one and one-half feet thick occurs in the dike near the northeastern side. Very little mica is exposed in the pegmatite. The mica in the dump is clear to light rum in color; many of the books are wavy and considerably ruled. Several pieces of flat mica, as large as 2 by 3 inches, were observed around the opening at the time of the writers' inspection.

GODDARD AND WATSON PROSPECT

This property, now owned by H. S. Worsham of Forsyth, is located 1.5 miles northeast of Cabaniss in the northeastern part of Monroe Coun-

ty. Some prospecting for mica is reported to have been done in the past upon this property, but the writers were unable to locate the old prospects.

MARIE VAUGHN PROPERTY

This property lies eight miles N. 16° W. of Forsyth on the dirt road to High Falls. It is half a mile southeast of Bloodworth School, between Towaliga and Little Towaliga rivers and 1.5 miles northwest of their junction. A narrow "burr-rock" pegmatite, said to strike N. 10° W., occurs back of the Vaughn house. The mica is hard and rum-colored, but it is small, badly cracked, and somewhat curved. Another pegmatite, striking N. 26° W., occurs 0.6 miles S. 10° E. of the dwelling. There is some clear mica here but considerable "A" mica is present and the books are bent and cracked. About 0.4 mile west of the house, a pegmatite corresponding to the type illustrated by Figure 8 occurs. The quartz lens is about 70 feet wide and 100 feet long. The feldspar of the pegmatite is semi-kaolinized and the mica consists of about one-third biotite and two-thirds muscovite. The muscovite is clear and flat and no "A" structure is observed. Ruling occurs. The larger muscovite books will measure 1½ by 2 and will trim 1 by 1 inch, and some 1½ by 2 inches. Some of the books are curved and cracked. A small knob-like hill a quarter of a mile S. 40° E. of the dwelling near an old rock chimney is mantled with quartz gravel. Some muscovite and biotite mostly smaller than punch occur with the gravel.

COLEMAN PROSPECT

This prospect is 8 miles (airline) and 10 miles by road N. 12° W. of Forsyth. It is accessible via the Forsyth-Jackson Highway and a dirt road to the west from the highway south of Sutton's store. The opening is one and one-half miles southwest of Sutton's store. M. J. H. Stuart of Forsyth owns the property.

An old pit, said to have been 40 feet deep with drifting along the vein at this locality is now filled. A recent pit made by Mr. English at the side of this pit is about 15 feet deep with a 25-foot drift from the bottom in a S. 17° W. direction. The biotite gneiss country rock strikes due N. to N. 30° E. and dips about 30° E. and SE. The pegmatite dips and strikes with the country rock and, where exposed in the new pit, may be described as biotite gneiss saturated with more or less pegmatite; quartz lenses occur. The rock is rather hard at the bottom of the pit. Mica books in the dump are bent and some exhibit "A" structure. Both green and rum-colored mica are present. No important production has been reported from this locality.

E. B. BUTLER PROPERTY

This property is located 9 miles north of Forsyth via the Forsyth-Jackson Highway. It is 0.5 miles southwest of Sutton's store and one mile northeast of Bloodworth School. This property lies just north and adjoining the Coleman property.

Smith¹⁵ reports that a small pit was dug for mica upon the property in 1917 in a field south of the road. The biotite gneiss country rock and the vein appear to strike N. 30° E., dipping 65° SE. Numerous fragments of quartz lies near the pit, some containing mica books one and one-half inches across. It was reported to Smith some good-sized pieces of mica were taken from the pit.

MRS. MATTIE SMITH MINE

This mine is eight miles north of Forsyth and half a mile east of the highway to Jackson. It is three miles south of Blount. The mine is a quarter of a mile N. 75° E. of the old Mattie Hamm Smith home. Mrs. Mary Martin is the owner of the property. This mine was first opened by Gus Weldon. Mica was mined at this place for 1½ years in about 1923. Some recent mining was done here by Clay Cheek, L. A. Rogers and J. K. d'Antignac.

Mica was mined from three pits with drifts along the dike between the pits. The present works consist of two shafts close together at the northern end of the mine. The total length of the works from the mouth of the incline to the northernmost shaft is about 125 feet. The openings are lined up in a N. 8° E. direction. The country rock is mica schist striking N. 16° E. and dipping 40° SE. The two pits at the northern end have been re-opened by the recent prospectors. These shafts, 40 and 30 feet respectively, expose a pegmatite which is four feet thick at the top and eight feet thick at the bottom, at which point the rocks harden rather abruptly. The dike is generally conformable to the country rock in strike, but dips 75°-80° SE. It consists of white, cleavable albite, some coarse, dark gray potash feldspar, considerable medium to fine-grained pegmatite, smoky quartz, muscovite, and some biotite. Lenses of smoky quartz 6-8 inches thick containing black tourmaline crystals occur in the dike.

The mica is clay- and iron-stained to the bottom of the shafts. Mica occurs throughout the pegmatite, but is especially abundant near a schist inclusion 1½ to 6 feet thick on the footwall side of the vein. The mica is rum-colored and plentiful, but the books are bent, wavy, and cracked so that very little commercial sheet mica could be produced. The mica is

clear and no "A" structures are observed. It is probable that a considerable amount of washer punch could be obtained from this mine.

The inclined drift at the south end exposes the pegmatite which is at least six feet thick at this place. The mica books exposed in the incline are small. A new shaft, 30 feet deep dug east of the strike of the dike and between the mouth of the incline and the shafts, contacts the hanging wall of the pegmatite at the bottom, and also the drift made to the south along the pegmatite from the northern shafts.

C. M. SUTTON PROPERTY

This property is located nine miles north of Forsyth on the west side of the highway to Jackson. Prospecting for mica has been done in an open field and in a young pine woods from one-quarter to one-half mile west of Sutton's home and store. The pit in the field was made to a depth of about eight feet shortly after the World War. Some biotite and a few small pieces of muscovite partly of the "A" type are found here. About a quarter of a mile west of the above-described pit in a pine woods are two pits made by Tom Stokes and others. The country rock is mica schist striking N. 40° E., dipping 51° SE. The northernmost pit is now 12 feet deep and was formerly 20 feet deep. The pegmatite is from two to four feet thick containing schist inclusions, is nearly vertical and strikes N. 21° W. Mica is plentiful but the books are bent, wavy and badly cracked. A pit about six feet deep, was made about 100 feet southwest of the one above. This pegmatite is at least five or six feet thick. Biotite mica occurs here. Books of muscovite three or four inches across may be obtained here, but they are cracked and curved.

MRS. W. H. WESTBROOKS PROSPECT

This prospect lies 10.25 miles north of Forsyth and one mile west of the highway to Jackson. It is one mile due west of Blount. An opening, located 300 feet S. 75° W. of Westbrooks' home, has been worked several times in the past. Mica was mined here in 1917-18 and again in 1923, where a shaft about 40 feet deep was sunk in the middle of the vein. In 1942, Mrs. Westbrooks' son removed seven or eight tons of mica from this locality. Recently, C. M. Wacaster stoped down the soft kaolinized feldspar filling the shaft and removing some scrap mica. The pegmatite appears to be from 15 to 20 feet thick, containing schist inclusions which dip southwest. The dike appears to strike N. 40° to 60° W. It consists of coarse cleavable, semi-kaolinized feldspar, some smoky quartz, muscovite, and biotite. Quartz lenses occur, but none are evident now in the dike.

The muscovite is abundant in the pegmatite, has a deep rum color, and books tend to cluster about the mica schist inclusions. The mica books are all bent and twisted, so that very little sheet could be obtained from the mine. A large amount of scrap and a considerable amount of washer punch could be obtained here. Commercial feldspar could be obtained here.

DR. T. D. THURMAN MINE

Mica has been mined on the old T. D. Thurman farm, which is located 3.4 miles (airline) and 4 miles by road S. 70° W. of Forsyth. The mine is west of a dirt road running north and south between the Barnesville-Forsyth Highway and the Culloden-Forsyth Road. It is half a mile north of the Culloden-Forsyth Road. The mine is now owned by H. S. Worsham of Forsyth.

Mica was mined here about 1917-18 and again in 1922. According to reports, it was mined first by Lambert and Way; later McKinney and Owens worked here. A small amount of work has been done since that time. The mine consists of a series of old shafts which strike generally in an east-west direction covering an area of about 100 by 300 feet which begins about 200 feet west of the above mentioned dirt road. A second set of pits occur about 100 yards west of the former, and extend over an area of similar size. Many of the pits are rather shallow and none of the shafts seem to have exceeded 40 feet in depth.

Only one of the eastern openings was accessible at the time of the inspection. This shaft exposed a 3-foot pegmatite dike whose strike could not be determined. This shaft is vertical down to the 25-foot level, from which point extends an inclined drift to the north. The drift extends below water level which is at about 30 feet. West and northwest of the above described shaft there are five pits which apparently, from the nature of their dumps, represent shafts which have caved completely. No record as to the depth of these shafts could be obtained but, from the size of each dump, it appears that their original depth was between 30-40 feet. All of these old works tend to line up in an east-west direction.

The country rock is deeply weathered in the vicinity of the mine, but in the road cuts near the mine it strikes N. 34° W., dipping 60° SW. It is a biotite gneiss completely saturated with granite.

Fragments of smoky quartz, kaolinized feldspar, and mica books occur in the old dumps. Books of biotite, which will measure 4 by 5 inches, occur locally. The early miners apparently discarded mica which would under present conditions be classified as commercial, because books

up to 3 by 5 inches across are in the dump at present. The mica is rum-colored, flat, hard, and splits well. A few books are curved; cracked and ruled books are not frequently encountered. Considerable mica of punch size and $1\frac{1}{2}$ by 2 inches appears to have been left in the dumps. Mica books, which will measure 2 by 3 inches, were dug from the dike at the one locality where it was observed.

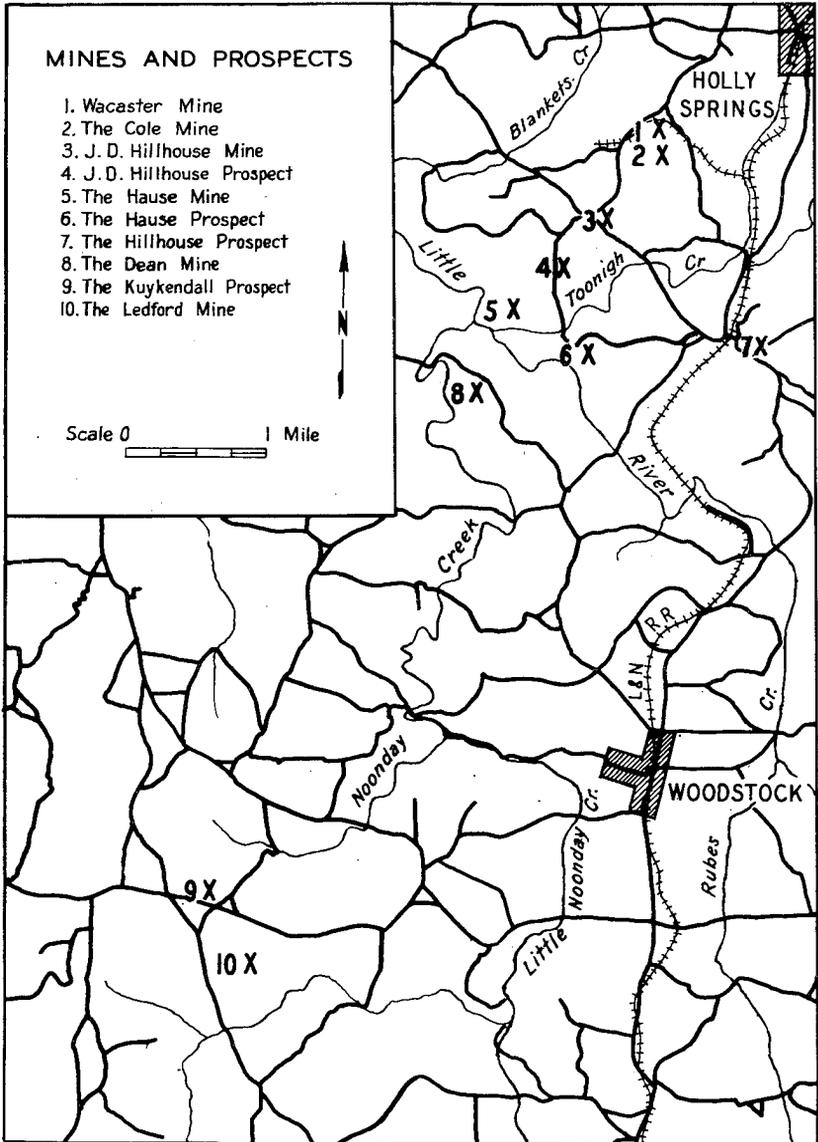
The other mines mentioned previously are west of the above described locality; there are six pits in an east-west line. The four easternmost pits expose the pegmatite and are from 10-15 feet deep and are about 30 feet apart. No definite width of pegmatite here could be determined. The two western pits are at present from 15-20 feet deep and are connected by a drift between the two. The pegmatite is exposed in both openings. In the two western pits the pegmatite is exposed across the strike for at least 30 feet. It contains feldspar crystals which are at least two feet across; schist bands up to six inches in thickness occur in the pegmatite. Although the pegmatite appears to be much thicker at this end, the mineralogy is similar to that of the eastern part except that the dike seems to be coarser-grained and biotite books are much more abundant. The dike is terminated at the western end by a large "blow-out" of milky quartz. This pegmatite probably corresponds to the type illustrated in Figure 9, but there has been insufficient prospecting to determine this fact. The mica is rum-colored, and where the pegmatite is exposed in the two westernmost pits, mica books as large as 4 by 5 inches occur in it. Where observed, however, they are usually bent and wavy and somewhat cracked; other flat, good rum-colored books occur that will trim $1\frac{1}{2}$ by 2 inches or larger.

The extent of the works and size and quality of the mica found around the mine and in the pegmatite suggest that a considerable amount of good sheet mica was taken from this property. It is unlikely that mining was carried to any great depth thus good mica should be obtained at and below water level.

CHEROKEE AND PICKENS COUNTIES

This area lies in Piedmont, Georgia, in the northern portion of the Atlanta plateau where the elevation generally ranges between 1,000 and 1,400 feet; the country is hilly and locally rough, but the mines and prospects are usually accessible by car. Most of the mines are only twenty-five to fifty miles north of Atlanta. The producing sections lie east and west of a line which extends through Toonigh, Holly Springs, Canton, and Tate, and includes an area of about 300 square miles. The

FIGURE 27 MICA MINES AND PROSPECTS SOUTHWEST OF HOLLY SPRINGS, CHEROKEE COUNTY GEORGIA.



two producing areas occur on opposite sides of the marble belt. A considerable amount of good mica has been produced from a pegmatite zone five or six miles in length southwest of Jasper; in eastern Cherokee and Pickens counties east of the marble belt, mines and prospects are scattered over considerable territory. Clear, strategic mica and spotted mica of the "electric" grade in many cases are taken from the same mine.

Cherokee County

WACASTER MINE

This mine is located 1.2 miles (airline) S. 40° W. of Holly Springs and 1.5 miles (airline) N. 20° W. of Toonigh. It is 1.6 miles by road from Holly Springs. The mine is on Lot 419, 15th District, 2nd Section of Cherokee County, and the present owner of the property is J. R. Barbour, Cincinnati, Ohio.

The mine was opened in 1920 and was worked at various intervals until 1926. No work has been done at this mine since then. The mining was done by C. M. Wacaster for the Tri-State Mica Company, Chicago, Illinois.

The pegmatite is very irregular in shape and in thickness, and is very variable in its mica content. A pit about one-eighth of a mile southwest of the Wacaster home exposes the pegmatite which strikes N. 35° E., dipping 67° SE. Sheets as large as 2 by 3 inches are said to have been trimmed from books removed from this pit. The mica is green and spotted. Most of the mining was done several hundred feet southwest of the above-described pit. The opening, considerably filled, is now 5-20 feet deep and about 50 feet in diameter.

According to Mr. Wacaster, the workings at this mine, now completely filled, consist of a vertical shaft 60 feet deep sunk in the country rock just southwest of the pegmatite. From the bottom of the shaft, a cross-cut 24 feet long to the northeast was made to the pegmatite. Where the cross-cut reached the pegmatite, drifts were made along the pegmatite in both directions. These drifts total 60 feet in length. Mr. Wacaster states that later a shallow 95-foot drift was made in the pegmatite from the pit to the northwest. Considerable timbering was left in the mine and water was encountered just below the opening as it now appears.

The mica at this locality is spotted and somewhat wavy, but it is hard and represents a good grade of "electric" mica. Wacaster states that a 36-pound block, which measured 7 by 14 inches, was obtained from one

place in the mine and that \$925.00 worth of mica was taken out in one afternoon. Most of the mica is said to have been obtained from near the surface. Mica taken from this locality was hauled to a mica cutting house near old Camp Gordon.

A pit was made in the pegmatite, a short distance southwest of the main workings near the southwest corner of the lot. The pegmatite here consists for the most part of primary kaolin. It contains some small books of ruled mica and some small lenses of milky and smoky quartz. The pegmatite at this locality dips about 60° SE. Southwest of this pit, the pegmatite appears to terminate in a quartz "blowout".

Northeast of the openings described above, on the northeast corner of the lot and just southeast of the Wacaster home, a kaolinized pegmatite has been prospected. This is probably the pegmatite described above. The pit is about 40 feet long, 15 feet wide, and 10 feet deep. According to Mr. Wacaster, about 35 per cent of the material washed from this deposit is kaolin.

N. M. COLE MINE

This mine is located 1.3 miles (airline) N. 25° W. and 1.5 miles by road from Toonigh on the old Cole property. The mine is about 200 yards west of the Toonigh-Cherokee Mills Road on a small branch of Toonigh Creek. The property is now owned by E. M. McCandless of Canton.

Several pits and shallow excavations were made in the vicinity of a branch on this property by Mr. Makepeace of Ball Ground. He stated that considerable mica was removed by him from this property, but that many of the blocks were weathered and clay-stained. He reported that he found some of the deposits to be but local pockets which pinched out not far from the surface. Some mining is said to have been done by others at a later date who dug a hole near the branch where they used a pump.

The pits are partly filled at the present time. The country rock is a biotite gneiss striking N. 31° E. and dipping 45° SE. The pegmatite appears to strike N. 34° E. and dip 82° SE. It is associated with a rather strong quartz lead.

There is very little mica to be found around the site of the old mine. Fragments of mica and weathered mica books probably from this mine are found on the branch below the mine at the site of an old burned dwelling. The mica is light rum in color, but the pieces are generally spotted. It is also badly cracked and ruled.

J. D. HILLHOUSE MINES

These openings are located 1.7 miles (airline) N. 45° W. of Toonigh near a crossroad of a road leading from Holly Springs and one from Toonigh. It is on Lot 599, District 15, Section 2 of Cherokee County. Two openings of long standing and several small pits have been made upon this property. An open cut about 75 feet long and 40 feet wide at its head exposes three parallel pegmatites 10-15 feet apart. These dikes are intruded parallel with the country rock, which is coarse-grained mica schist. They strike N. 36° E. and dip about 65° SE. The dikes are 2-3 feet wide and contain lenses of white sugary quartz which enclose mica books. The feldspar is semi-kaolinized, coarsely cleavable, and gray to slightly pink in color. Some parts of the pegmatite dikes contain some "burr rock" or "mica conglomerate". Some work was done here in 1941.

The mica is light rum in color, hard, but spotted. Books up to 4 by 6 inches were found around the workings, but those which were left behind do not split well and are generally curved and cracked.

About 250 feet northeast of the open cut is an old drift made near the branch level northeast into the hill. The drift appears to be about 65 feet long and is in a N. 40° E. direction. The drift follows the strike of the pegmatite, but it is now somewhat caved and filled. Showing in the dump are large fragments of white, massive quartz enclosing mica books up to 4 inches across. The mica is similar to that found in the open cut, with the drift appearing to be in the same pegmatite as the open cut.

A pit was made recently about 10 feet deep west of the open cut. The mica books here are small, cracked, spotted, and ruled. A small amount of biotite occurs. This locality has possibilities for the further production of scrap.

About half a mile southwest of the above-described open cut, is another open cut made in 1941. This opening is 25 feet wide and about 60 feet long. Two parallel pegmatites occur here striking N. 40° E. and dipping 65° SE. The pegmatites parallel the schistosity of the country rock which is a mica schist, and the dikes are about 6 feet apart. Lenticular masses of white quartz, some up to 4 feet across, occur in both pegmatites. The southeastern pegmatite is 6-7 feet thick and the other is about 4 feet thick. The mica books occur in the quartz lenses; some of the books will measure up to 4 inches across along the cleavage faces. The mica is light rum in color, cracked, somewhat curved, and contains some spots but not as many as the other openings on this property.

Two carloads of washed scrap mica are reported to have been taken from these various openings on the property in 1941, when a plant for the washing of scrap was built on Toonigh Creek near the old W. M. Roberts home-site. Since then, this plant has been dismantled.

HAUSE MINES

These mines and prospects were made on the old B. D. Hause property which lies just north of Little River and which is accessible from Toonigh by a soil road. The Old Alabama Road formerly passed through the property which is traversed by Toonigh Creek. The mines range between one mile and 1.75 miles west of Toonigh (see Acworth Quadrangle). The property is now owned by the Georgia Power Company.

Mica-bearing pegmatites are unusually abundant in this district, ranging from minute lit-par-lit injections to bodies 6 or 7 feet in thickness. They strike usually northeast in the general direction of the mica schists and gneisses, although cross-cutting apophyses and dikes occur. The general relation between the pegmatites and the country rocks may be seen around the site of the old smithy at the falls of Toonigh Creek. An excellent exposure of pegmatite and country rock may be found in an abandoned cross-cutting drift made above a small tributary to Little River about 100 yards from its junction midway between the old Dean Mine and Toonigh. The country rock as exposed in this drift is biotite gneiss, which strikes N. 27° E., dipping 77° SE. It is injected almost layer by layer by thin bands of pegmatite which locally expand to form knots and eyes of coarsely cleavable feldspar. Locally, pegmatite from 1-6 inches occurs containing small mica. This drift, in hard rock, was made at great expense, evidently to satisfy scientific curiosity since it serves no other useful purpose.

The history of mining in this area is obscure, although mining was done here by T. K. Flentke of Evansville, Indiana. Some work was done on the property by Mr. Makepeace of Ball Ground. The property offers considerable opportunity for the production of scrap mica and in several localities good sheet mica could be obtained along with the scrap.

A series of old pits and cross-cuts occur around and between the present tenant house and the site of an old burned dwelling. The pegmatite is exposed around the tenant house for a distance of at least 300 feet, striking N. 47° E. The dike is several feet wide and contains a high percentage of good scrap mica. The mica is rum-colored, hard, spotted, ruled, cracked and wavy. The books are small, and part of the pegmatite is

"mica conglomerate". A short distance from this locality southwest along the same strike, there are old abandoned cross-cuts and inclined drifts.

About a third of a mile S. 44° W. of the old Hause home-site on the edge of a hill overlooking Little River, there are two old open cuts in pegmatite. One of these cuts, 150-200 feet long, strikes N. 23° E. A 60-foot cut crosses the head of the one above-mentioned, striking N. 64° W. The miners are said to have been looking for "white dirt".

On the hillside above the terminus of the cross-cutting drift near Little River, a pit has been made in a pegmatite which strikes N. 15° E. The pegmatite has a total width of perhaps 3 feet and consists of two limbs separated by a band of schist. It contains scrap mica, yet apparently the cross-cutting drift was made to cut this dike at depth.

An old abandoned mine on the northwest side of Toonigh Creek and west of the old Hause home occurs in Lot 639. The pit, now considerably filled, is about 20 feet deep with a diameter of 20-40 feet. A large dump containing a good deal of scrap mica occurs just northeast of this opening, indicating that the work was more extensive than can be seen at present. This pit exposes two pegmatite dikes about 10 feet apart standing nearly vertical and striking N. 55° E. In the easternmost dike, very little mica is observed, but hooks at least 5 by 6 inches that sheet 2 by 3 inches were dug out with a prospector's pick from the westernmost dike when visited by the writers. Although the feldspar in the dikes is kaolinized, the mica is hard and not badly stained. Some of the sheets are spotted and some are clear. This property should be re-prospected.

An opening was made recently in a field half a mile north of the Hause tenant house on the north side of Toonigh Creek about one mile east from its junction with Little River. This work was done by C. M. Wacaster for E. M. Clapp. The pegmatite here strikes N. 50° E., dipping 40° NW. Prospecting has been insufficient to expose the dike completely. It consists of a 4-foot quartz lens with 3 feet of coarse, cleavable, gray potash feldspar and sheet mica on the foot wall, and a foot or more of coarse feldspar on the hanging wall. The quartz lens is milky in color and contains books of hydro-biotite. Some of these books are 3 or 4 inches in diameter, measured along the cleavage direction. Some of the muscovite books contain biotite in conjunction with them, the biotite being considerably altered to hydro-biotite. Some scattered feldspar crystals are imbedded in the exterior portions of the quartz lens. Small nodules of smoky quartz are associated with the sheet mica. Some of the best and flattest sheets are found at or near the contact between the quartz and

feldspar on the foot wall side. The mica observed is flat, light rum in color, and free of spots. When visited by the writers Dec. 1, 1942, a book was dug from the pegmatite which measured 6 by 8 inches and which trimmed good flat sheet up to 3 by 4 inches. Prospecting here should be continued.

This property was re-visited in March, 1943. Since the initial visit in December, 1942, Frank B. English has exposed the pegmatite by an inclined shaft to the southwest. This incline is about 30 feet deep at present. The dike, as exposed, ranges in thickness from 6 to 13 feet. It contains some schist bands and a persistent 4-foot quartz lens. The mica found in the dike occurs on either side of the quartz lens. It is reliably reported that more than \$2,000 worth of mica has been removed recently from this incline by English.

J. F. HILLHOUSE PROSPECTS

Several prospects upon the estate of J. F. Hillhouse, about one mile northeast of Toonigh, have produced recently a considerable amount of scrap and some sheet mica.

Most of the work has been done upon Lot 521, District 15, Section 2 of Cherokee County. Three pits were made along the strike of a pegmatite which runs N. 40°-50° E., dipping 60°-80° SE. The pegmatite, enclosed in mica schist, contains inclusions of country rock which dip and strike with the dike. The mica occurs near lenses of quartz. In the northeasternmost pit about a quarter of a mile northeast of the Hillhouse home, there is a shaft about 25 feet deep which is intersected by an inclined drift which is about 60 feet long. Most of the mica was taken from this place. At this locality, the pegmatite is from 6 to 8 feet wide; mica and small quartz lenses or nodules occur in bands which dip with the pegmatite and which are interlayered with coarsely crystalline, kaolinized feldspar bands. The quartz is heavily stained with iron rust probably produced by the oxidation of sulphides. An assay of this type of material shows gold to be absent. About seven tons of "A" mica were taken from this opening. Several tons of scrap mica were taken from the pits nearer the dwelling. Some books, which weighed as much as 50 pounds, were taken from the main opening, and these books are said to have measured 10 by 14 inches square. About 80 pounds of sheet mica, some of which will measure 4 by 6 inches, and several hundred pounds of punch were sheeted from the total amount mined. The mica is clear and free of spots. The mica was split in very thin sheets to avoid imperfections and stain. The amount of sheet is probably too small at this locality to pay for sheeting costs.

Another small prospect was made on Lot 521 near the railroad and between the railroad and the old Holly Springs-Toonigh Road. The pegmatite here seems conformable to the country rock which strikes N. 45° E. and dips 66° SE; it is about six feet thick. All of the mica is scrap mica. There are other unprospected pegmatites in this district which should produce scrap mica.

Excellent sheet, but in books of small dimensions, was removed by Mr. Hillhouse recently from a small prospect near the center of Lot 449. A pegmatite at this place is two or three feet wide, dipping 68° SE. The pegmatite and country rock strike N. 57° E. The pegmatite contains some narrow schist inclusions; it consists, however, of feldspar, small books of mica, and lenses or nodules of quartz which measure up to 1½ inches in diameter. Mr. Hillhouse states that he removed recently 3,000-4,000 pounds of scrap from this small opening. Seventy pounds of sheet were sold as punch although an appreciable amount measured 1½ by 2 inches. The mica is very hard, flat, free of spots and light rum in color. More prospecting should be done at this locality.

DEAN MINE

This old mine is located 1.7 miles (airline) S. 78° W. of Toonigh and 2.8 miles by road from Toonigh on Lot 711, District 15, Section 2 of Cherokee County. The mine is half a mile south of the junction of Toonigh Creek and Little River.

This mine was opened and worked in 1889 and some work has been done upon it recently. It was formerly owned by C. W. Flentke, Evansville, Indiana. It is said that mica obtained from the property was ground at a mill near the mine. Galpin³ writing about 1915 states: "The excavation consists of a T-shaped open cut about 50 feet up the north side of a ravine, which is perhaps 75 feet deep. The cross of the "T" follows the 'lead' and is about 75 feet long, 30 feet wide, and 25 feet deep. A short tunnel extends northeast from the bottom of the pit, and a cross-cut burrows into the foot wall a few feet..... Two dikes, striking N. 40° E. and dipping southeast, may be seen in the pit. One, 3 or 4 feet wide, lies along the northwest side of the working face and contains partly decomposed feldspar, a little quartz, and muscovite in crystals measuring as much as 3x4 inches on the cleavage. The mica is found mainly within one foot of the hanging wall, where it makes up possibly 20 to 25 per cent of the rock. The books examined were badly clay-stained and 'ruled'. The second dike lies 10 feet southeast of the first. It is from 10 to 15 feet (?) wide in the bottom of the cut, narrowing rapidly toward the

top, as if cut off by a diagonal fault. The dike is composed of kaolin, considerably mottled by black or dark splotches, and muscovite. The latter lies within two feet of the hanging wall. With the mica there is some quartz. The mica plates seldom exceed 3-inch diameters in this exposure."

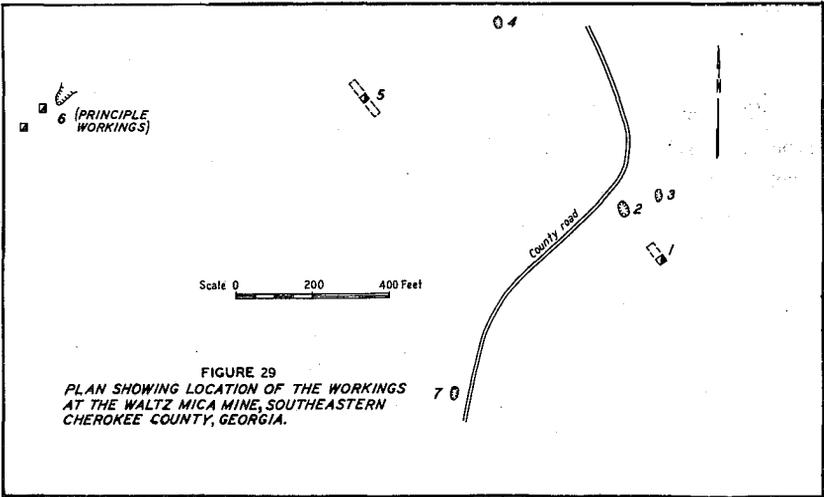
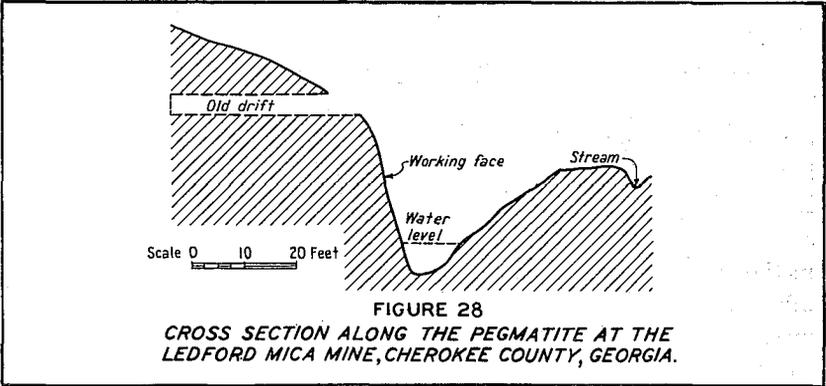
When visited Nov. 10, 1942, the open cut was considerably filled. The main opening is about 115 feet long striking N. 29° W., and the cross of the "T", about 50 feet long, strikes N. 44° E. The pegmatite obviously is irregular in shape varying much in composition from place to place. It extends due north from the mine to the break of the hill about half a mile from the junction of Toonigh Creek and Little River. The pegmatite can be traced throughout this distance by quartz float and small mica books. The pegmatite on the hill above the mine contains small muscovite books which do not appear to be large enough to commercialize as sheet. In 1942, J. L. Neil removed some scrap mixed with quartz and kaolin from the open cut and washed it at a small plant near the railroad about half a mile east of Toonigh.

The present character of the pegmatite in the mine is generally concealed by weathered pegmatite. The mica books in this material are generally small. The color is light rum; the books are frequently cracked and ruled. The mica is generally spotted.

KUYKENDALL PROSPECT

This prospect is located three miles (airline) S. 80° W. of Woodstock and 1.4 miles (airline) S. 77° W. of Damascus Church. The prospect is in a field just north of the old Alabama Road upon the farm of Mr. R. A. Kuykendall, Acworth, Route 1.

Several pegmatite dikes crop out upon this property. They appear to be generally conformable to the country rock and generally parallel with each other striking about N. 45° E. One small pit about a quarter of a mile N. 10° E. of the dwelling is said to have produced a small amount of sheet mica about twenty years ago. Samples seen around the pit are cracked, bent, and spotted. Some of them are of the "A" type. Mr. Kuykendall states that he obtained about one hundred pounds of mica from one pit and about fifteen hundred pounds from another pit nearby. When the property was visited November 11, 1942, very little mica which could be classified as sheet could be found. The present small openings have not proved very promising. The property was leased in 1942 by B. T. Tuggle who sank a 36-foot shaft on the hill near the house. The shaft did not intersect a pegmatite.



J. V. LEDFORD MINE

This mine is located on the property of J. V. Ledford, 3.2 miles (airline) S. 63° W. of Woodstock and 0.5 mile south of the Old Alabama Road. It is on a branch of Tate Creek, 100 yards south of an old sawmill. The mine is 3.7 miles by road southwest of Woodstock.

According to local reports, the mine was opened first by Bill Hunter and Walter Ray nearly 90 years ago. The 35-foot drift in the upper part of the mine was made by Mr. Wagster. The mine was leased by Frank B. English and E. M. Clapp, and was operated for a short time in 1942. It was leased recently by Fowler and Carbone of North Carolina. In spite of its long history, very little mining has been done upon this property.

The country rock at this mine is a chloritic garnetiferous schist saturated with pegmatite; when fresh, it contains pyrite. The pegmatite strikes N. 46° E., dipping 66° SE. At the present time, a large quartz lens occupies a considerable portion of the pegmatite between the upper drift and about midway of the open cut. This lens is from 3-5 feet thick and about 16 feet of it is exposed along the direction of the strike. Mica-bearing pegmatite occurs on both sides of the lens where the books show a tendency to be parallel to the dip and strike. The pegmatite is thickest where the quartz lens occurs on the hanging wall side. Where the quartz lens is absent, the dike is from 3-4 feet wide consisting mostly of feldspar, graphic granite and mica books. The pegmatite is hard and since present operations have reached water level, a compressor, jack-hammer and a satisfactory pump will be necessary to mine here.

Mica from this mine is hard and has a deep rum color. Some of the largest books are said to be wedged into the country rock. English obtained a 75-pound book at water level. One book 18 by 12 by 1 inches is said to have sold for \$27.00. There is some "A" mica. This mine as certain others in Pickens and Cherokee counties produces both clear sheet and spotted black or "electric" mica. There appears to be less spotted mica on the hanging wall side of the dike in this mine. The present workings are very close to a small branch so that continued work to the northeast will bring the stream into the mine. Additional prospecting should be done northeast of the branch and along the strike.

WALTZ MINE

This mine is located 7.4 miles (airline) S. 75° W. of Cumming, in the extreme southeastern corner of Cherokee County. It is one mile west of the Free Home-Alpharetta Road and a quarter of a mile north of the

old Milton County line. The property, formerly known as the old Holcomb Place and now owned by Carl Waltz of Cincinnati, Ohio, includes all of Lot 174, the east half of Lot 173, and 10 acres in the south-east corner of Lot 115 of District 2, Section 2 of Cherokee County.

Considerable mining was done here in 1926-27 by Wacaster and Goff. Smith¹⁵ visited and described the property June 29, 1933. at which time the openings were much more accessible than they are at present. The following description is related to the numbers upon Figure 29:

1.—This pit was originally 18-20 feet in depth with a short drift to the north. The pegmatite is at least five feet thick and appears to strike northwest with the enclosing schist. It appears to be generally conformable to the enclosing schist which dips 50° NE. A cross-cutting offshoot of the pegmatite, 1-1.5 feet wide, strikes N. 40° W. There is some heavy quartz associated with the pegmatite. The mica is distributed rather evenly through the pegmatite but not in large quantities. Some books, 6-10 inches across, were of the "A" type and would not sheet. Some clear sheets as large as 2 by 2 inches may still be found around the pit. The mica is green, ruled and cracked. Where books are flat, they split well.

2.—This pit is probably on the same pegmatite as the one described above. The pit is now 8 feet deep and very little can be seen. Some fragments of quartz and pieces of small mica occur around the opening. Smith says that the pegmatite here is one foot thick at the top of the pit and 6 feet thick at the bottom. He states that the mica is of the "A" type and is evenly distributed throughout the pegmatite.

3.—A small pit originally about 6 feet deep shows very little mica.

4.—This pit, now almost filled, is in the edge of a pine woods near a field. The small pit here was originally about 10 feet deep. Smith¹⁵ states: "The dike is a mixture of kaolin and quartz, with some mica. The mica is mostly of the "A" type, but is clear. Little or no sheet mica was found. The vein averages about three feet in width, strikes N. 15° W., and is almost vertical." Numerous books of mica occur in the field about half-way between Pits 4 and 2.

5.—Nothing may be seen at this locality except a small trench about 30 feet long, 10 feet wide, and 10 feet deep. Smith found a shaft at this locality 25 feet deep which contained 6 feet of water. The pegmatite is nearly vertical, striking N. 15° E. and about 4 feet wide at the bottom of the shaft. It contained very little quartz and is kaolinized to the bottom. At the bottom of the shaft, there was a 15-foot drift to the

north and a 30-foot drift to the south. About 5 feet south of the shaft, the vein is said to have narrowed to a few inches in width and then opened out to about 6 feet. This width continued to the end of the drift where it was cut off by a fault which was slicken-sided and showed country rock beyond. This part of the pegmatite is said to have been rich in mica, but most of the mica was found near the walls. Near the fault, the mica seems to continue down, but has been separated by slipping into thin sheets.

6.—Two shafts and an open cut about 50 feet long and 15 feet deep occur at this locality. These openings are about a quarter of a mile N. 70° W. of the dwelling near the corner of Milton and Cherokee counties. This is known as the Bates or Iza Clayton Mine. The country rock is hornblende gneiss and the pegmatite, where seen in the open cut, strikes N. 30° E., dipping northwest. Smith found the main shaft 61 feet deep and that the upper 51 feet of it was made in old workings. There are 10-12 feet of drifting north and south from the bottom of the shaft. The pegmatite is about 6 feet thick, almost vertical, and strikes northeast. It consists mostly of kaolinized feldspar with practically no quartz. Mica was scattered throughout the vein but was scarce at the bottom. The mica was in flat books as large as 3 by 5 inches. The old workings prior to 1900 are said to have yielded larger mica. Only small pieces of muscovite mica may be picked up around the mine at the present time. The fragments are green in color and usually spotted. Small biotite books occasionally occur.

7.—This was a small pit about 10 feet long and 5 feet deep. The pegmatite here dips eastward about 30 feet and appears to strike in the direction of Pit No. 5. Large blocks of mica were found here but all were of the "A" type and the sheets were tangled.

G. W. ANDERSON PROSPECT

This prospect is located one mile due north of Arnold, a quarter of a mile S. 24° W. of Big Spring Camp Ground in Hickory Flat District of Cherokee County. The prospect is on the farm of G. W. Anderson, Alpharetta, Ga. The original open cut upon this property was made several years ago. It was about 20 feet long heading due south into the hillside. W.P.A. workers recently have filled the original open cut and put down a shaft at the head of the cut. This shaft, about 20 feet deep, is very little deeper than the original cut. The shaft is timbered with small pine poles and when they rot about two years hence, the shaft will cave, thus concealing the pegmatite. The pegmatite strikes N. 70° E.

and dips 25° SE. It is enclosed in garnet-mica schist, containing some layers of hornblende schist, which strikes and dips approximately with the pegmatite. The mica is of the "A" type, but trimmed sheets 2 by 3 inches or larger have been obtained from this locality.

About 100 yards east of the above locality, there is a 15-foot shaft in country rock and pegmatite. The pegmatite here is associated with a thick lens of granular, milky to slightly smoky-colored quartz. Mica occurs in the quartz lens and in the pegmatite, but is generally concentrated near their contact. The mica at this locality is of "wedge-A" and "herringbone" type, ruled, cracked, and spotted.

COOK MINE

This mine is located on Lot 137, District 2, Section 2 of Cherokee County. It is 8 miles S. 80° E. of Canton, 2.8 miles by road south of Macedonia Church at Orange, and about 0.4 mile south of Mill Creek. The mine has been abandoned for 26 years. The dump and partly filled entrance lie about 150 yards N. 30° E. of the old home-site. The pegmatite underlies a ridge which extends from the locus of the old entries N. 36° E. for a distance of at least a half of a mile. The land is owned by Mrs. Elisha Bailey. The mine was worked in 1907 by the Pittsburgh Mica Mining Company. Mr. W. J. Cook of Orange, the Mine Superintendent, later obtained the mineral rights. The workings are in hard rock and are underground; they are now inaccessible. The mine had been abandoned 6 years prior to Galpin's³ visit in July, 1913, but the mining equipment was in good condition at that time. A 25-horsepower gasoline engine was used to drive an early type Westinghouse dynamo which generated current for operating the hoist and lighting the mine. The hoist was operated by a 7-horsepower electric motor. Home-made cutting tables were installed near the mine. Work was extensive; the underground shafts and drifts were described in detail by Sterrett:¹⁷ "The workings consist of an incline reported to be 150 feet deep, a drift extending from the incline 70 feet long in a N. 30° E. direction at about the 30-foot level, an interior shaft 30 feet deep on the southeast side of the drift, an incline 20 feet deep at the northeast end of the drift, an uprising connecting with a shaft from the surface and used as an air shaft, a shaft 22 feet deep connected with the 70-foot drift by a short incline, short drifts from the shaft at a depth of about 15 feet, and two surface pits. The interior shaft and incline below the 70-foot drift were filled with water at the time of examination. The mouth of the incline had caved in, and entrance to the workings was made through the 22-foot shaft." Those who

may be interested in re-opening this old mine would do well to study the plan of underground workings made by Sterrett and the plan given by Galpin.

The country rock is biotite-granite gneiss intruded by granite, but the pegmatite intrudes the older granite gneiss. The country rock strikes N. 35° E. and dips 66° SE. The pegmatite body is irregular in shape, many branches from the main body occur, some cross-cut the country rock. The pegmatite strikes with the country rock dipping about 45° SE. Numerous shallow cross-trenches were made recently along the ridge to the northeast for a distance of nearly a half of a mile by W.P.A. workers. They reveal numerous narrow bands of pegmatite interlayered with schist. These pegmatite bands are similar in composition to "burr-rock;" all the mica is smaller than punch. According to Sterrett:¹⁷ "The pegmatite is somewhat irregular in shape and branches out from the main mass. It varies in thickness from less than a foot in some of its branches to 8 or 10 feet where opened by the pits and the 22-foot shaft. The 'vein' was much thinner in the 70-foot drift than above and ranged from a few inches to 3 feet. The pegmatite was richest in mica in the upper workings and did not yield much at the 70-foot drift or lower. The deep incline yielded practically no mica but was sunk chiefly in the mica gneiss country rock. The feldspar of the pegmatite is kaolinized in the upper workings but was only slightly altered below the 70-foot drift."

The mica is smooth and flat and splits well. It is rum-colored but small black specks are common to many of the books. "A" mica occurs. According to Mr. Cook, about 4,500 pounds of mica, trimmed into sizes which ranged from punch to 5 by 7 inches, were shipped to Pittsburgh. Several tons of scrap could be obtained from the dump. A large amount of small mica could be obtained here by crushing and washing the "burr rock."

J. T. HALEY MINE

This mine is located on the property of Mrs. J. T. Haley, 6.5 miles east of Canton and one mile south of Old Fort Buffington. The mine is located near the crest of a hill south of the Haley homesite.

An old line of pits on a hill was opened on a pegmatite which strikes N. 70° E. The country rock is a coarse-grained biotite gneiss intruded by granite gneiss and pegmatite. The country rock strikes N. 38° E., dipping 66° SE. A new cross-cut was made in 1942 by W. T. Hippy. This opening was made at the southwest end of the hill in a direction of N. 40° E. It is about 160 feet long and intersects near its northeast terminus an old shaft made in the pegmatite.

Specimens of mica seen around the old mine exhibit "A" and "herringbone" structure. Some of the sheets are clear and some are spotted. Many of the books do not split well, are bent, wrinkled, cracked, and ruled.

R. M. REECE PROPERTY

This property is owned by R. M. Reece and is located one mile (airline) and 1.7 miles by road east of Holly Springs. A small pit was dug in the summer of 1942 in a pine woods a quarter of a mile S. 55° W. of the dwelling. The pegmatite strikes and dips with the enclosing mica schist which strikes N. 46° E. and dips 68° SE. The pegmatite consists of alternate bands of schist and pegmatite material. Where exposed in the pit, this zone is about 4 feet wide. The mica is much ruled; most of the books are small, bent and cracked. There is considerable "A" mica. Where flat sheets occur, the books contain a dark stain arranged in a pattern referred to locally by miners as "house roof." The prospect offers no promise for sheet mica.

On this property, as well as on adjacent properties east of Holly Springs, scrap mica could be produced from numerous pegmatite dikes.

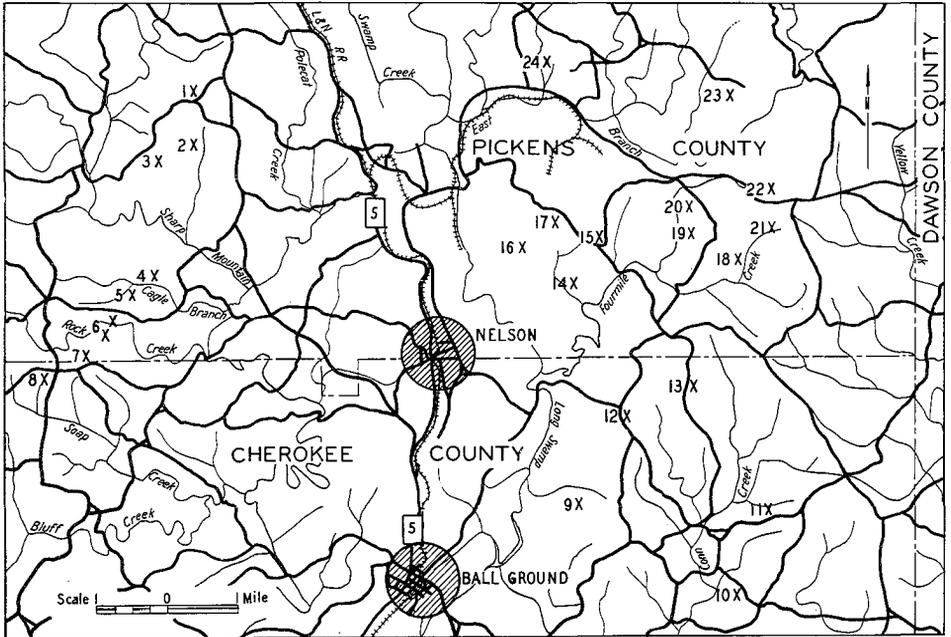
BENNETT MINE

This old mine is located 5.6 miles (airline) S. 85° W. of Nelson, 1.5 miles (airline) due south of Bethany Church, and 0.2 miles S. 70° W. of the crossroad with the Jasper-Sharp Mountain Road, south of the Pickens County line. The mine occurs on lot 229, 13th district, 2nd section of Cherokee County. Mica is said to have been worked here before the Civil War, and the place is still referred to locally as the "Mica Field."

Galpin³ found a number of small pits and trenches at this locality in 1913. He found sheets of mica which would trim 2 by 4 inches. The property was rediscovered and mined by Mr. Burleson of Spruce Pine, N. C. about 1918-19. The mining operations were carried on by Oliver Howell. At the close of this period of mining, Burleson retained the mineral rights which were retained by his estate for a considerable time.

The mine today consists of a series of pits and shafts and an inclined shaft which extends for a distance of about 100 yards along the strike of the pegmatite. The number of openings and the size of the dumps indicate that a considerable amount of mining was done at this locality during the Burleson period. Two more or less parallel groups of openings occur here arranged to suggest that the southeastern group of pits was planned to intersect the pegmatite farther down the dip.

MICA MINES AND PROSPECTS IN PICKENS
AND NORTHERN CHEROKEE COUNTIES GEORGIA



MINES AND PROSPECTS

- | | | |
|---------------------------|--------------------------|-----------------------------|
| 1-The Stencil Prospect | 9-The Cochran Mine | 17-The Howell Mine |
| 2-Jennie Burrell Prospect | 10-The Amphlett Prospect | 18-The Wilkie Prospects |
| 3-Allen Morton Prospect | 11-The Weaver Prospect | 19-C.H.Fouts Property |
| 4-The West Prospect | 12-Revis Prospect | 20-The Worley Prospect |
| 5-The Cagle Mine | 13-The Densmore Prospect | 21-The Poole Mine |
| 6-The Denson Mines | 14-The Jones Mines | 22-The Partain Prospect |
| 7-The Carney Prospect | 15-The Reynolds Mine | 23-The Scott Byees Property |
| 8-The Bennett Mine | 16-The Davis Prospect | 24-The Foster Prospect |

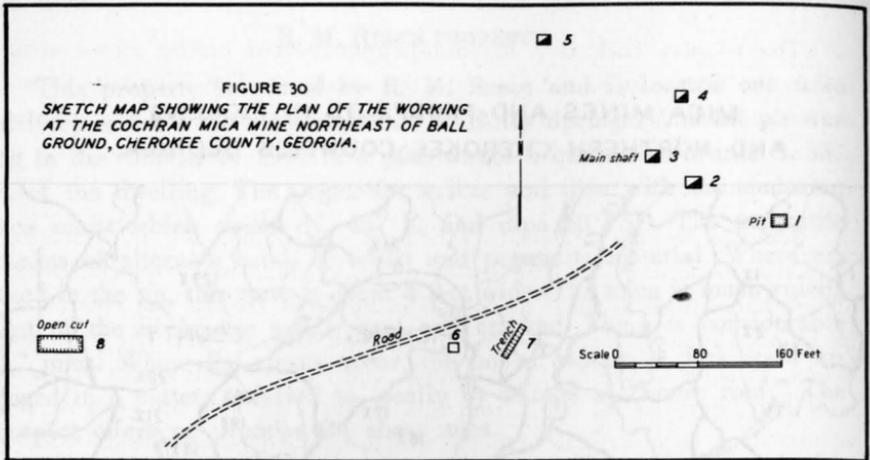


FIGURE 31, Mica books from the Howell mine. Pickens County.

Smith,¹⁵ who visited the property November 2, 1932, states that it is reported that the miners began to strike hard rock at the bottom of the pits about the time the work was abandoned. He says that water was struck in only the last pit at the south end of the works.

The country rock is a salt-and-pepper-colored biotite gneiss striking to the northeast and dipping to the southeast. The pegmatite is not well-exposed but is probably 3 to 5 feet wide. In one pit in the northwest side of the works it is at least 4 feet thick, dips 39° SE., and appears to strike about N. 15° E.

Judging by the materials found in the dump, the mica-bearing pegmatite is accompanied by lenses of milky and smoky quartz. Books of weathered mica as large as 6 by 6 inches, that are flat and clear, may be found. Practically no "A" mica or spotted mica is seen. The principal defects in some of the books are cracks and ruling; some books are bent and wavy. Beryl is reported from this locality, but was not seen by the writers. One large crystal of beryl which weighed 60 pounds is said to have been found.

Undoubtedly much good mica was obtained from this mine. According to reports, good mica was left here. Several carloads of good clear mica with little or no waste mica is reported to have been taken from this mine. The mine was left in poor condition thus re-opening it will involve some expense to expose the pegmatite. The pegmatite should be prospected toward the northeast.

COCHRAN MINE

This mine may be found in Lot 294, District 2, Section 4, and in the Conn's Creek District of Cherokee County. It is accessible by soil roads from Ball Ground; 2.5 miles (airline) N. 78° E. of Ball Ground and 5 miles by road northeast of Ball Ground; two miles west of Centerville. and seven-eighths of a mile N. 37° W. of Cherry Grove School and seven-eighths of a mile east of Long Swamp Creek. (See Tate Quadrangle).

This interesting mine was opened by J. Hines Wood of Canton, Ga. and the Georgia Mineral Products Company of Holly Springs, Ga. in 1933. The pegmatite is unusual in its thickness. An extensive quartz vein or "blow out," associated with coarsely crystallized feldspar and tourmaline, constitute the major portions of the intrusion. Some parts contain a large amount of scrap mica in completely kaolinized feldspar. Other sections where shafts have been made contain a large amount of scrap mica, sheet mica, and beryl. Prospecting has not been sufficient to develop the extent of these resources.

The pegmatite is associated with a pronounced quartz lens which strikes N. 80° E. It crops out boldly along the strike from the branch near the tenant house, becoming thicker and more conspicuous towards the west. The quartz sustains a distinct ridge or spur which extends for a distance of at least one-third of a mile southwest of the tenant house. The relation of the pegmatite to the quartz is somewhat obscure because of lack of prospecting, but the scrap mica zone, as such, lies principally upon the southeast side of the quartz dike, where it is widest and most conspicuous in Pit No. 8, Figure 30. The sheet mica and beryl-producing portions of the dike lie at the extreme southeastern side of the pegmatite body near the tenant house.

The total width of the dike which includes the quartz lens is 200 feet or less. The dip of the dike cannot be determined, but its great thickness and the steep dips of the country rock suggest that it has been intruded almost vertically into the enclosing rocks. The country rock is highly metamorphosed meta-sedimentary schists and gneisses which were injected by granite previous to the intrusion of the pegmatite. Coarsely crystallized quartz-muscovite schist and muscovite-biotite garnet schist prevail with a strike of N. 70° E. dipping steeply 65° or more to the southeast. On the southeast side of Pit No. 1, the country rock at the pegmatite contact is a highly altered and schistose conglomerate. The pebbles of the conglomerate (sometimes called "stretched pebbles") have been mashed into lens-like masses, locally several inches in length.

This mine is not an old one, thus has not been developed extensively. Smith,¹⁵ who visited the property in 1933, states that at that time a pit near the house 3 by 5 feet and 5 feet deep had been made by J. Hines Wood, and that 300 pounds of mica had been obtained from the pit. Books as large as 5 to 6 inches in diameter were obtained from this pit. The property was investigated by Lane Mitchell, October 24, 1934. Mitchell was much impressed by the display of mica, beryl, tourmaline, and quartz. He states that on top of the hill due west of the house, there are numerous pits from which mica has been mined and sold to Mr. Wood. Over 34 tons, he states, were sold in 1933, at \$1.00 per ton. Shaft No. 3 upon the diagram was 25 feet deep at that time. At present writing, it has the same depth, but about 10 feet of cross-cutting in both directions from the bottom of the shaft and normal to the strike of the pegmatite has been made recently by Chesley Vernon, the present tenant upon the farm. This shaft is untimbered but entirely accessible at present writing. Other shafts (Nos. 1, 2, 4, 5, 6 on fig. 30) were made by W.P.A. workers in 1941. They are timbered with pine slabs and all are sunk in the

pegmatite but inaccessible when visited by the writer. Mitchell states that the 25-foot shaft was abandoned by Wood after pits on the hill west of the house were dug, probably because scrap mica could be more easily obtained from the latter localities.

The open cut near the top of the hill about 600 feet due west of the house is about 60 feet long, 25 feet wide, and 10 feet deep with the longest dimension running east-west. This excavation is made in a thoroughly weathered part of the pegmatite which consists of coarsely crystalline, completely kaolinized feldspar, large crystals of black tourmaline, and books of scrap muscovite mica. The tourmaline crystals are large and numerous. Mitchell states that he saw a crystal at the time of his visit which measured one foot in diameter and three feet in length. Small crystals exhibit very good crystal form and many of them are hexagonal in cross-section showing a combination of two trigonal prisms. The crystals fracture easily at right angles to the *C* axis, and some of them contain quartz in the central portions. Fracture surfaces, parallel to the prism faces, are covered with muscovite and the crystals, although imbedded in kaolinized feldspar, are enclosed in a thick coating of muscovite, produced probably by hydrothermal alteration of feldspar. Should this mineral ever become economically valuable, a considerable tonnage could be obtained at this locality.

A large amount of scrap mica could be obtained from this locality where it could be mined with a power shovel. West of this pit, quartz composes the dominant part of the dike.

Some sheet mica was removed from the 25-foot shaft by Wood. Vernon removed recently about two tons of mica and about 200 pounds of beryl from the bottom of this shaft. Beryl produced by former operations was hauled away by Mr. Wood. The mica in the pegmatite at this locality is associated with nodules and small lenses of smoky quartz which exhibit a faint pink to amethyst color. The material is considerably stained by black manganese oxide. Beryl crystals, hexagonal in cross-section, are scattered abundantly through the pegmatite.

The mica is clear, free of spots and practically colorless. Some books are ruled, and "A" structures occur. Many of the books are curved or slightly bent and this feature is the principal defect of the mica. Occasionally black tourmaline occurs in the books parallel with the cleavage. The larger books will measure 6 by 8 inches and books of trimmed mica up to 4 by 4 inches could be cut to pattern from the pile mined recently by Vernon and, judging from the material available for inspec-

tion, a considerable amount of $1\frac{1}{2}$ by 2 inches and much scrap could be obtained here. Since the mica is considerably stained at this level, the shaft should be deepened to harder rock. Drifts or cross-cuts should be driven northwest and southeast from the bottom of the shaft towards the borders of the pegmatite, since prospecting thus far has developed the possibility of producing beryl, some sheet mica, and scrap mica in commercial quantities.

A. W. AMPHLETT PROSPECT

This prospect is located 4.6 miles (airline) S. 86° E. of Ball Ground and a half of a mile (airline) S. 50° E. of Conn's Creek Church. It is on the property of the Standard Pyrites Company in Lot 46 or 47 of Conn's Creek District. This property has been leased recently by Mr. A. W. Amphlett of Buford, Georgia.

A small pit was dug about four or five years ago on the side of a hill in the woods southwest of the soil road which leads southeast from Conn's Creek Church by Sam H. Freeman. Freeman removed a small amount of mica. Recently, J. L. Cornalison dug a small trench about 20 feet long which follows the strike of the pegmatite. The pegmatite is $2\frac{1}{2}$ -3 feet thick. It strikes N. 49° E. and dips 40° SE. It appears to be conformable to the country rock. The pegmatite is hard and unweathered; the mica schist which encloses it is moderately weathered, but will become hard a short distance below the surface. No strong quartz lead is noted here in association with the pegmatite, although small lenses of white granular quartz occur in the dike. The pegmatite is composed of coarse potash feldspar which contains in addition to quartz, tourmaline, and sheet mica.

About 100 pounds of mica books thrown out by Freeman lie around the opening. The mica is flat and clear and no spots or "A" structures were observed in the samples. The books average unusually large and pattern mica 3 by 4 inches could have been trimmed from some of them. Most of the books split well, but in some books there will be a small area where the cleavage is locked. A few books contain some small crystals of black tourmaline. Ruling occurs and some of the books are crossed by a small escarpment-like feature which represents the physical condition which immediately precedes ruling. More prospecting should be done at this locality.

Other pegmatites which have not been prospected occur in this vicinity. A pegmatite dike crosses the road about 250 yards north of the one described above. This dike is three or four feet wide; it strikes about N. 25° E. and dips 40° - 45° SE.

REVIS PROPERTY

This property is located on the Centerville-Fourmile Church Road 3.75 miles (airline) N. 52° E. of Ball Ground and 2.75 miles (airline) S. 72° E. of Nelson (see Tate Quadrangle). The pegmatite of this unprospected property is owned by J. T. Revis of Ball Ground, Route 1. It is at least 300 feet long and crops out about 250 feet southwest of the dwelling house. The dike strikes about N. 78° W. and dips to the southwest. At one place where the dike is exposed in the road, it is only about two feet thick and contains small flakes of mica. The dike also contains black tourmaline. At one locality in the pasture south of the house, flat, clear, hard sheets of mica which may be dug up with a prospector's pick are as large as 2 by 3 inches. The quality of the mica, and the thickness of the pegmatite appear to be variable, but the latter locality is worth some prospecting.

S. S. DENSMORE PROSPECT

This prospect is located on the farm of S. S. Densmore, Ball Ground, Route 1. It is 3.6 miles (airline) S. 82° E. of Nelson and 1.1 mile (airline) S. 25° E. of Fourmile Church.

A pegmatite on this property strikes S. 10° W. near the dwelling and dips 70° to the southeast. It was prospected about 1916 and again at about 1937. An old pit, now ten feet deep, may be seen about 200 feet southeast of the house where some small mica books may be seen on the dump. About 100 feet southwest of this pit in the edge of the woods, there is a small pit from which one-half bushel of mica is said to have been removed. All the mica left around the opening is scrap. The books exhibit "A" structure, are twisted, and the small flat areas between the ribs of the "A" structures are stained with numerous dark parallel lines.

The prospect is not promising.

Pickens County

W. P. STANCIL PROSPECT

This prospect is located upon the property of W. P. Stancil. It is 2.75 miles (airline) N. 60° W. of Tate and 2.5 miles (airline) due south of Jasper. It is in Lot 91, 13th District, 2d Section of Pickens County. There are several small outcrops of mica pegmatite upon this property. A small pit on the north side of the road near the dwelling was made in a pegmatite which contains pieces of mica about the size of a silver dollar. The pegmatite is not exposed. The amount of prospecting is extremely

limited, but it is doubtful if commercial sheet mica could be obtained from this spot.

JENNIE BURRELL PROPERTY

This property, now owned by Clifford Jones, is located 2.6 miles (airline) N. 70° W. of Tate, 3.4 miles (airline) due south of Jasper, and is on lot 125, 13th district, 2d section, of Pickens County. This property has not been prospected and was not seen by the writers.

A small amount of good sheet mica is said to have been found about fifty yards above the dwelling house.

ALLEN MORTON PROSPECT

This prospect is located on the property of M. H. Davis and Will Richards of Jasper, Route 3. It is 3.5 miles (airline) N. 80° W. of Tate and 3.5 miles (airline) S. 10° W. of Jasper on Lots 122 and 123, District 12, Section 2, of Pickens County. Mica was mined here on top of the ridge. The pit is now nearly filled up and is only six feet deep. About 15-18 feet of soft, stained kaolin with a little quartz and streaks of small mica flakes are exposed near the top of the pit. The pit is said to have been originally 15 feet deep. The largest piece of mica reported to have been taken from the pit was six inches in diameter, but only a little sheet was found. No mica fragments as large as punch were observed around the prospect when it was visited by the writers November 17, 1942. Small pieces found on the dumps are free of spots but do not split well; many of them are curved and cracked. The vein appears to strike N. 15° E. It is enclosed in a quartz-muscovite schist which strikes N. 35° E. and dips 70° SE.

Smith,¹⁵ who visited this property December 5, 1932 states: "About an eighth of a mile to the north in a branch there is an outcrop of feldspar of good quality. The feldspar shows some quartz intergrowths, but the amount of quartz is not excessive. Pieces of mica up to two inches across are showing on top of the ground. The outcrop in the bed of the branch is 15-18 feet wide.

About an eighth of a mile south of the Allen Morton prospect, on the slope above another branch, outcrops of a feldspar vein have been blasted off where about ten feet of the width of the vein is exposed. Further prospecting would be necessary to determine the quantity and quality of the feldspar. There is a massive quartz outcrop on the ridge east of the pegmatite dike."

C. C. WEST PROSPECTS

These prospects are on the old C. C. West property now owned by W. C. Sellers. These prospects are located 1.6 miles (airline) N. 75° W. of Cagle School, 1.6 miles (airline) N. 75° E. of Bethany Church, 3.5 miles (airline) S. 65° W. of Tate, and 4.7 miles by road southwest of Tate (see Tate Quadrangle). They are on Lot 13, District 13, Section 2, of Pickens County. Some prospecting was done upon this property years ago by Mr. West. A small pit was made recently in a pegmatite about 4 feet wide which strikes N. 29° E. and dips with the biotite gneiss country rock 56° SE. Some sheet mica is scattered through the pegmatite where it occurs in books which tend to be arranged parallel to the dip and strike of the dike. Small lenses of milky quartz occur in the pegmatite. The mica is clear and free of spots, green and of the "A" variety. This prospect is not even a good one for scrap mica.

Smith,¹⁵ who visited this property October 25, 1932, makes the following statement regarding it: "Several mica bearing veins cross this property on the slope north of Cagle Branch. One of these, prospected several years ago, appears to strike N. 15° E., dipping 50° SE. The dike is about five feet thick consisting mostly of kaolinized feldspar. The country rock is foliated mica schist which is sometimes garnetiferous. A small pit was made in another dike about 300 feet east of the former. This dike is three feet wide striking about N. 20° E. Fresh feldspar was struck a foot or so beneath the surface where prospecting was stopped. Mica taken from both places was in blocks from 3-5 inches across, but much of it was broken and shattered. All was clear with no spots and no "A" type mica seen. Some massive quartz occurs in both of the mines, mostly on the hanging wall side. The last mentioned vein is about 50 feet above the flat land of the creek valley and should be further prospected."

In the hollow, about mid-way between the two mines described above there is a poorly exposed dike of feldspar and quartz which contains only small pieces of mica and which seems to be nearly 20 feet wide. The outcrop exposes pink feldspar with some coarse intergrowths of quartz. The visible feldspar does not contain over 15 per cent quartz. Near by is a three foot vein of "burr rock."

F. M. CAGLE MINE

This property is 4.8 miles S. 65° W. of Tate (airline) and 5.0 miles by road southwest of Tate (see Tate Quadrangle). It is two miles by road east of Bethany Church and 2.4 miles by road southeast of Refuge

Church. The mine is on Lot 195, District 13, Section 2 of Pickens County. The mining area is located in a meadow, and about 200 yards west and northwest of the old homeplace.

Galpin³ found a square pit 10 feet deep at this place where some prospecting had been done in 1904. At that time Mr. Cagle stated that trimmed sheets 4 by 10 inches had been removed although the small pit was partly filled and covered with grass. The prospect was discovered shortly after this by Burleson, who is said to have purchased the property. He is reported to have mined mica here in 1918. Mr. O. C. Cagle now owns farm land around the mine. A series of pits made during Burleson's time follow the pegmatite for about a quarter of a mile below the house in a N. 10° E. direction.

The pegmatite averages five feet in width, dipping southeast with the country rock. The enclosing rocks are biotite gneiss and hornblende gneiss. These rocks strike N. 6° E. and dip 68° SE. Smith,¹⁵ who visited the mine November 25, 1932, found the pits relatively open and accessible. At the present writing, they have been partly filled so that only part of the pegmatite is exposed in two pits at the northeast end of the mining area, now upon the property of O. C. Cagle; they were accessible at the time of Smith's visit. He found two pegmatites at this northeast locality. He states: "Both of the veins are about five feet in width, striking about N. 15° E. and dipping 55° SE. One pit extends about 18 feet on an incline, which is lengthened into a vertical shaft which is about 25 feet deep on the vein. A cross-cut at the bottom of the shaft extends to the other pegmatite, but water was encountered at this level and a pump was used. Other openings went about 18 feet on the incline."

The feldspar of the pegmatite is partly kaolinized near the surface, but relatively hard and unaltered near water level. Judging from fragments left in the dumps, the good mica is associated with white cleavable feldspar and smoky quartz. Some thick, milky quartz lenses occur with the pegmatite, but the mica found in these is of the "wedge-A" type.

Smith¹⁵ states that mica books 12 by 18 inches are reported to have been taken from the mine. Books of mica free of spots that will measure 2 by 3 inches and several as large as 5 by 6 inches were discovered around the mine in November, 1942. The mica is clear, flat, and most of it splits well. Its principal defect consists of small specks and crystals of biotite which are included in some of the books. Almost no mining has taken place here since the days of Burleson. It is reported that two truck

loads of mica were dug from one of the holes about three years ago. Flat crystals of red garnet are found in some of the books of mica. The country rocks associated with the dike are of more than usual interest to mineralogists. Large garnets, two inches in diameter may be picked up in the soil near the pegmatite. Smith states that dornicks of massive kyanite containing considerable quartz occur in the hill on the west side of the mine. Numerous fragments of massive, coarsely, crystalline, blue kyanite are found by the farmers in fields east of the mine. Rutile crystals, an inch or more in diameter lie loose in the soil, and some clear quartz crystals as large as four inches in diameter have also been found. These minerals have not been prospected.

The local reports and size and quality of mica found around the mine show that good sheet mica was mined from this locality. The width of the pegmatite, its known extent, and the mineralogy of the deposit also are favorable. One of the pits contains water at a depth of about 12 feet below the surface. This pit is located at the lowest point along the strike of the pegmatite. It is possible that the pits were abandoned by the early miners as soon as they reached water level, thus good mica should be obtained here below water level.

DENSON MINES

These mines are located 4.75 miles (airline) due west of Nelson on the property of S. A. Denson, Jasper, Route 4. The farm is on the south side of Rock Creek just north of the Cherokee County line. It is one mile S. 60° E. of Bethany Church (see Tate Quadrangle). It is in the 12th District, 2d Section of Pickens County.

Five or six openings have been made upon this property near the dwelling and northeast of the dwelling for a distance of about half a mile. L. Green of North Carolina mined first on this property about 50 years ago. He disposed of his interests to Burleson who mined on Lot 203 in 1920-21. Green and Burleson mined in the field about 100 yards northwest of the house. The mining was done for Mr. Burleson by Oliver Howell. Very little can be seen at this locality at the present time where an oval-shaped open cut about six feet deep (originally 25 feet deep) is surrounded by several pits that were from 18-30 feet in depth. According to Mr. Denson, the open cut was made by Howell and the 30-foot, now mostly filled, pit on the southwest side of the open cut, was made by Green who used a pump. When visited by the writers November 17, 1942, the pits were found to be largely filled and there are no exposures. Smith,¹⁵ who visited the property November 25, 1932 states:

"The vein appears to strike E-W and dips about 45° S; it is about ten feet wide. The pit went to about 25 feet in depth where considerable water was struck which stopped mining. Massive quartz is showing, but the pit is said to have been in both kaolin and hard feldspar when mining stopped. Some large mica 12 by 18 inches is said to have come from here. It is reported that fifteen barrels of mica were removed by Mr. Green and eighteen barrels by Mr. Burleson. It was all of good amber color and flat."

Mr. Denson states that the mica rights on this property, involving an acre of land more or less were purchased by Burleson for the consideration of \$1,000. It is not possible to recommend or condemn a property where so little can be seen, and where the condition of the mine when abandoned is not known. Reports which came to Smith, statements regarding the mine collected by the writers, and Mr. Burleson's undoubted high opinion of the property justify the re-opening of the mine. As far as information can be collected, the workings were shallow, not having gone beyond 30 feet; considerable water may be expected beyond that depth.

Mica was mined from a pit in the garden northeast of the house. This pit is now completely filled. Smith¹⁵ states that mica was mined here "from another vein which strikes north or a little east of north, dipping west. This vein averages ten feet in thickness but locally attains a thickness of twenty feet. The pit is twenty feet deep, all in soft kaolin except a streak of quartz in the middle of the vein."

About a quarter of a mile N. 15° E. of the dwelling some work has been done recently in two small pits which were opened several years ago. The pegmatite strikes N. 20° E. and dips 45° SE.; it is generally conformable to the country rock. It is 3-6 feet in thickness. The mica from this place is hard, clear, and rum-colored but some "A" mica occurs. The largest sheets taken from this place are reported to have measured five inches across. Mr. Denson states that some pattern mica 2 by 3 inches was obtained. Some specimens of punch size can be found around the openings. More prospecting should be done here.

About 300 yards northeast of the above described locality on the same property, there are several small pits on the south side of the creek near the top of the valley wall, the largest of which is reported to have been 20 feet in depth. The vein appears to dip about 45° E., varying in thickness from 1 to 3 feet. This locality was mined by Mr. Denson, who states that he obtained two or three thousand pounds of mica which

he sold to Mr. Burleson. Some of the mica is of the "A" type and a considerable part of that mined was classified as scrap. Mr. Denson obtained one book of good mica not of the "A" type which weighed 60 pounds. Flat sheets of good mica which will measure 2 by 2 inches may be found at the present time around the pits. Loose fragments of massive kyanite are found in the fields upon the Denson property.

Numerous crystals of beryl have been picked up associated with quartz and pegmatite on the Denson property northeast of the above described localities. Very little work has been done at this end of the property. The pegmatite on this part of the farm and on adjoining land was described by Smith:¹⁵

"About three-eighths of a mile due east from the last pit described above, in the bend of Rock Creek on Austin Blan's property (Jasper Route 3), and adjoining the Denson place, there is an outcrop of massive quartz boulders and ledges 3-6 feet across. Mica has been mined at places between these ledges, the last time about five years ago. Some mica now showing in the quartz has a greenish tinge. One light green beryl crystal two inches in diameter was exposed in a large piece of quartz. The quartz ledges total about 100 feet in width. On their southeast side the surface of the ground is strewn with boulders of fine-grained biotite gneiss.

On the creek on the S. E. Cook property (Jasper, Route 3), and near the stream level, Mr. C. M. Wacaster of Holly Springs recently blasted out the vein to a small extent and is said to have recovered some good mica. Fragments of mica left behind are somewhat twisted. The massive quartz of the vein here is at least 50 feet across."

J. F. CARNEY PROSPECT

This prospect is one mile S. 30° E. of Bethany Church on the south side of Rock Creek just north of the Cherokee County line and about a quarter of a mile northeast of the Bennett mine. It is on Lot 229, District 12, Section 2, of Pickens County.

Smith,¹⁵ who visited this locality October 25, 1932, states: "Several small veins are said to cross this property; one was prospected about 10 years ago. Two sacks of mica were dug from the side of a little ditch beside the road at the corner of the barn lot by an old mica company that was mining on the adjoining property across the line in Cherokee County. No mica is showing now. More or less quartz and mica are showing on the slope to the south of this locality. The country rock is garnetiferous, and loose dornicks of kyanite occur in the soil."

JONES OR BOZEMAN MINE

This mine is located two miles (airline) S. 45° W. of Dug Gap and three miles (airline) S. 60° E. of Tate on the property of Mrs. Rozella Jones. The mine is three-quarters of a mile southwest of Federal School, and one mile west of Fourmile Creek. There has been mining at this locality at various times for the past fifty years on Lot 181, District 4, Section 2.

The pegmatite strikes N. 60° E. Toward the northeast, a 35-foot shaft was made upon the pegmatite by W. H. Bozeman and J. S. Wood. A 20-foot shaft with a short drift at the bottom toward the pegmatite was made by Pitman in 1941 near the southwestern end of the works. The mine was leased, and development work was done in the summer of 1942 by Frank English, Spruce Pine, North Carolina and Mr. E. M. Clapp, Atlanta, Georgia. English sunk a shaft to the pegmatite about half way between the two shafts mentioned above. At the bottom of this shaft, he made an inclined drift which follows the pegmatite along the dip for a distance of about 25 feet; another drift about 15 feet long extends northeast from the bottom of the shaft along the strike of the pegmatite. The pegmatite is at least five feet thick and may be as wide as 7-8 feet locally. It strikes N. 60° E., dipping 40° SE. It is accompanied by a persistent quartz lead in the form of lenses. The fragments of milky to smoky quartz, abundant on the dumps, contain books of mica and black tourmaline. Beryl is reported from this locality. The country rock is weathered biotite gneiss which strikes N. 30° E. and dips 20° SE. Biotite books as large as 2 by 2 inches occur in the pegmatite.

The mica is hard and of light rum color. Some of the books are clear and free of spots, but other books are sheeted and sold as "electric" mica. A twelve-pound book of the latter type was exhibited by Mr. English which would cut pattern mica 3 by 5 inches. At the present writing, November 18, 1942, the mine is not being worked, but Mr. English believes that there is sufficient mica and mica of suitable quality to justify the continuation of mining. English and Clapp sold recently at old prices 841 pounds of clear mica for \$308.00. Of this amount 745 pounds were punch; 58 pounds, 1½ by 2 inches; and 17 pounds, 2 by 3 inches. Sold also was 730 pounds of black or "electric" mica which brought \$111.71. Of this amount 627 pounds were punch; 78 pounds, 2 by 2 inches; 18 pounds, 2 by 3 inches; 3 pounds, 3 by 3 inches; and 4½ pounds, 3 by 5 inches. These figures represent about two weeks work.

About an eighth of a mile southwest of the above-described locality, work has been done in the past and also recently for mica. Some work

is said to have been done here by Mr. Burleson of Spruce Pine, North Carolina, who sank a pit upon the pegmatite about eight feet deep and drifted 20 feet along the vein to recover some good mica. At the present time, the work consists of an inclined trench in the direction of the dip which is terminated by a ten-foot drift. One or two shallow cross-cutting trenches are found on the hillside just above this spot. A small amount of work was done here recently by Mr. English. The pegmatite at this place is five feet or more thick containing some thick quartz lenses. It dips southeast 35° and is generally accordant with the country rock. The mica is light rum in color and no spotted mica was observed. There is some "A" mica and many of the books are bent and cracked. The flat books split well. Small books of biotite are common.

The rock is hard at this locality but the prospect does not appear to offer the promise of the mine to the northeast. It would seem that the amount of prospecting, however, has been insufficient to develop definitely the possibilities of this place. It is believed that this prospect is on the same pegmatite as the mine to the northeast, thus prospecting should be done along the strike of the dike between the two localities. Other openings are reported along the strike to the southwest.

REYNOLDS MINE

The mine is at the junction of Dug Road and the old Federal Road a quarter of a mile N. 20° W. of Federal School. It is at the top of a ridge on the north side of Dug Road on the property of Mrs. Emily Reynolds. The pegmatite is accompanied by a strong quartz lead. It has profoundly affected the mica gneiss which contains tourmaline and small books of sheet mica the size of a silver dolla. near the contact with the dike. The gneiss layers of the country rock are nearly vertical and strike N. 55° E.

When the mine was visited by the writers November 18, 1942, it was found to be almost completely filled up and practically nothing could be determined about the character of the pegmatite or the extent of the mine. Fragments of sheet mica clear, flat and as large as 2 by 2 inches may be picked up at this locality. Small pieces of biotite mica about the size of a half-dollar piece are found.

When Smith visited the mine, October 27, 1932, the property was leased by Mr. Boggs and Mr. C. M. Wacaster of Holly Springs. Smith¹⁵ states: "They were stripping two veins about 30 feet apart both striking N. 35° E. The westernmost dike has a six-foot streak of quartz with considerable kaolin and shattered mica on either side of it. The pegmatite

appears to be about 10 feet thick, and near the surface it is almost horizontal but pitches sharply to the southeast at depth. The width and dip of the eastern vein could not be determined because it was insufficiently uncovered. There is a three-foot layer of quartz on the foot wall. Crystals of tourmaline and a little black mica are exposed."

MRS. MAY DAVIS PROPERTY

This property lies 1.5 miles west of Federal School and half a mile due south of the J. D. Howell mine. According to reports, mica was mined here about forty years ago from a pit ten feet deep with an opening to the south for the removal of waste material. Smith,¹⁵ who visited the property in 1932 states: "The vein appears to be striking N. 45° E. and dipping about 40° SE. Part of the vein shows some four-inch quartz layers on the hanging wall. The remaining three feet of pegmatite is locally kaolin with a small amount of mica; at other places it is composed almost entirely of broken and shattered mica. The dumps show considerable mica of the "A" type, thus it appears that most of the mica is scrap rather than sheet. There is said to be a line of outcrops between this locality and the Howell place to the north."

Owens, of Dahlonega, is reported to have done a small amount of prospecting recently.

HOWELL MINE

This mine is located 1.5 miles (airline) south of Marble Hill, and 2.6 miles (airline) S. 75° E. of Tate. It is 3.75 miles east of Tate by way of the old Federal Road and is just in front of Harbor Hill Church on Lot 144, District 4, Section 2 of Pickens County. The property is owned by Dillard Howell and Frank Coggins.

Some mining was done on the south side of Federal Road at this place in 1930 by Mr. M. L. Baxter. Baxter made several pits and a short inclined shaft from which he is said to have removed about \$600.00 worth of mica. The mine was operated recently by Frank English, of North Carolina, and E. M. Clapp, of Atlanta, who began work here in October, 1942. With about three weeks of work, English cleared out the old sixty-foot inclined shaft made by Baxter and lengthened it to about eighty-five feet on the incline. In November, the men were removing from 500 to 1000 pounds of mica a day and 8 or 10 tons of mica were stored in a building about a mile from the mine.

The pegmatite appears to strike about N. 45° E. It rolls on the dip varying from 45°-60° to the southeast in dip. The 85-foot shaft is in-

clined in the direction of S. 50° E. It is intersected at about 25 feet south-east of the mouth of the drift by an old thirty-foot shaft through which muck and ore are removed. The pegmatite is from four to five feet thick and this thickness usually includes a persistent quartz lens which may be as much as three feet or more thick locally. The quartz, when unstained, is very white and finely granular, but it is frequently stained brown or reddish-brown by the oxidation of pyrite. A sample of this quartz was assayed and found to contain no gold. No sheet mica is observed to be in the quartz. Kaolinized feldspar and sheet mica occur on both sides of the quartz lens except where it comes to the hanging or foot wall. Bands and lenses of kaolinized pegmatite (referred to by the miners as "fluken") occur in the schist above and below the main portion of the dike. These "fluken," where observed from the incline, may be as much as eight feet or more from the pegmatite, but most of them undoubtedly merge with it in the direction of the dip. The pegmatite contains schist inclusions which maintain the general dip and strike of the country rock; also "horses" or bodies of country rock more or less surrounded by "fluken." The quartz lenses appear to be later in age than the pegmatite proper, and the books of sheet mica near the quartz tend to be cracked and bent more than at other places in the pegmatite.

The pegmatite is unusually rich in sheet mica. The mica is light rum-colored, and no spots or "A" structure are observed. Books are frequently curved, some books are badly cracked, and ruling is a common feature, but the greatest defect of the mica is clay-stain and waviness which makes it necessary to split the mica into rather thin sheets. Mr. English stated that the day before the mine was visited by the writers, one man had removed 800 pounds of mica. The largest book will measure in the rough 14 by 14 inches, (fig. 31) and one book observed at the mica house weighed at least 60 pounds.

The pegmatite of the Howell mine extends southwestward, but there has been very little prospecting on the adjoining property. Several pits have been made in another pegmatite on the Jordan property 100 feet or more to the southeast. Mica specimens exposed on the dump are smaller, but similar in other respects to the mica at the Howell mine.

A considerable amount of mica has been observed in the field northeast of the mine and on the north side of Federal Road. The mica may be derived from the same pegmatite as the Howell mica. Good clear sheets three inches or more in diameter may be picked up here from the soil. It is surprising that no prospecting has been done at this locality.

WILKIE PROSPECTS

The prospects are located on the property of I. R. Wilkie, 1.25 miles (airline) S. 40° E. of Dug Gap, 4.25 miles (airline) N. 70° E. of Nelson, and 5.2 miles (airline) S. 80° E. of Tate. (see Tate Quadrangle) Two openings were made on a mica-bearing intrusion in 1941 by a prospector named Pitman. About 300 pounds of scrap mica may be found around a small hole made beside the barn. Some small books here are hard, flat, and rum-colored, but contain spots. The pegmatite contains almost no feldspar, consisting of a quartz dike which contains sheet mica. The country rock here is a sillimanite gneiss and mica-garnet gneiss striking N. 70° W. and dipping 80°-90° NE. The mica-bearing quartz dike strikes N. 34° W. About an eighth of a mile S. 34° E. of the pit at the barn, a small trench which cross-cuts the dike was also made by Pitman. Quartz fragments which contain books up to 2 by 3 inches in dimension were removed, but no sheet was obtained. The mica here is clear and it does not exhibit "A" structure. Books are bent and ruled; some clear sheets of punch size may be found in the soil near the prospect. Black tourmaline occurs in the quartz. The mica is scattered through the quartz dike, but appears to occur in zones parallel to the dip.

The prospect is of scientific interest only.

C. H. FOUTS PROPERTY

This property is reported to lie one mile south of Dug Gap on Dug Gap-Fourmile Church Road and six miles east of Tate depot.

The property was not located by the writer, but Smith¹⁵ states that "an outcrop of mica in a field appears to be in line with those on the J. T. Worley property. Pieces of clear, flat, but clay-stained mica four inches across were showing, and larger pieces are said to have been found in the past."

G. W. WORLEY PROPERTY

This place is north of Federal School, a mile and a half south of Marble Hill and half a mile southwest of Old Amicalola, Lot 142, 4th District, 2d Section of Pickens County.

Several narrow pegmatite veins crop out on the hill above the house. Smith¹⁵ writes: "The veins strike N. 35° W. and dip northeast. A little prospecting at several places discovered only a small amount of mica, the largest piece probably three inches across."

C. H. FOUTS AND E. H. KENT PROPERTIES

These properties occur three-quarters of a mile south of Fourmile Creek on Lots 203, 215 and 216, District 4, Section 2, of Pickens County. Smith¹⁵ reports a pegmatite on the slope near Fourmile Creek on the Fouts property which strikes N. 40° W., and which in one place is 100-150 feet wide. He was unable to find any good sheet mica at this locality. On the southeast continuation of the vein on the E. H. Kent property, pieces of sheet mica are said to have been plowed up in the fields.

J. T. WORLEY PROPERTY

This property is located on the farm of J. T. Worley on Dug Road-Fourmile Church Road half a mile south of Dug Gap from the Tate-Dawsonville Highway. It is on Lots 140 and 141, District 4, Section 2, of Pickens County.

When visited by the writers, November 19, 1942, Mr. Worley stated that no prospecting had been done on the property and although he had found sheet mica, he had forgotten its location, but would look for it again.

Smith,¹⁵ who visited the property October 29, 1932, states: "On a slope west of the highway across the branch flowing north to Fourmile Creek mica frequently occurs in the soil where pieces as large as 3 inches across may be found. They are badly weathered and clay-stained, but the samples are clear and are not smoked or spotted. Some pieces are wavy and somewhat twisted. The vein or veins appear to follow the strike of the enclosing mica schist, that is, N. 60° W.

POOLE MINE

This mine is located 5.75 miles (airline) S. 85° E. of Tate, 0.6 mile (airline) S. 65° W. of the old Holcomb Post Office, 12 miles southwest of Dawsonville, and south of the Tate-Dawsonville Highway near Fourmile Creek on a ridge extending from the road about a quarter of a mile.

Mica was mined here on the old Lovelady place fifty or sixty years ago and again about 1918 by Mr. Burlison, Spruce Pine, North Carolina. At the present time very little pegmatite is exposed, and an examination of the works indicates that the last group of miners did a considerable amount of dead work in trying to discover the vein. In one locality the pegmatite dips in an eastward direction at about 35°. It appears to strike about N. 35° E., but present exposures are too poor to certainly de-

termine the direction of the strike. Several old pits and an inclined shaft occur toward the lower end of the ridge. The inclined shaft is about 60 feet long extending downward in the direction of N. 60° E., but only a few small pegmatite stringers are exposed in it. Smith,¹⁵ who visited the property October 27, 1932, examined a cross-cutting drift 75-100 feet long driven into the ridge just above branch level, and obviously intended to intersect the pegmatite on the dip. He found only small traces of kaolin in streaks not over three inches in width and no mica exposed in the drift. He found two pits across the branch both about 200 yards apart and having a trend of N. 15° E. These exposed considerable "burr rock" and broken and shattered mica.

Some weathered mica around the old pits was undoubtedly once of good quality. Some of the books are bent and warped, but the flat books split unusually well. Parts of books 5 by 6 inches may still be found. In some of the books the sheets are clear and free of spots; other books contain local areas of spots which are connected by dark lines.

PARTAIN PROSPECTS

This prospect is located 5.5 miles (airline) due east of Tate and 0.8 miles (airline) N. 75° W. of the old Holcomb Post Office on the north side of the Tate-Dawsonville Highway. It is on Lot 138, 4th District, 2d Section of Pickens County. Most of the property is said to have been purchased recently by George W. Duncan of Marble Hill.

Mica crops out at several places on this property. It has been prospected at various times in two or three localities just north of the highway. A small amount of digging is said to have been done by Mr. Burleson, of North Carolina, who stayed at Mr. Partain's home when prospecting in this vicinity. A small pit may be found on the southwest side of the steep slope in the woods a quarter of a mile N. 50° W. of the Partain home. The mica around the pit is clear and free of spots, but the books are small and some of them are curved. Smith¹⁵ discovered a pit south of the road and a quarter of a mile west of the house. It was reported to him that about 150 pounds of small sheet mica but of good quality was taken from here. The vein strikes N. 75° W. and dips 45° SW. Kyanite, staurolite and garnets are common in the mica schist in the vicinity of these prospects. On the north side of the road and on the nose of the ridge, a small open cut was made on a pegmatite in 1932. The pegmatite is not exposed but appears to have the same strike as the preceding ones. The mica here occurs in books up to three inches across. It is hard and rum-colored, but curved, cracked, and contains numerous spots. Very little sheet mica could be obtained from this pit.

SCOTT BYEES PROPERTY

This property is half a mile west of Weaver School and 2.25 miles (airline) east of Marble Hill (see Tate Quadrangle). The property is not known to have been prospected. It is reported that in the field above the house pieces of mica as large as 5 or 6 inches in diameter have been plowed up.

JAMES FOSTER PROSPECT

This property is located on top of a hill three-eighths of a mile west of Marble Hill School and three-quarters of a mile (airline) N. 30° W. of Marble Hill (see Tate Quadrangle), and about a third of a mile N. 20° W. of the Marble Hill or Mountain Quarry. It is on Lot 64, 4th District, 2d Section of Pickens County. This property is now owned by J. M. Pyyon.

A small amount of prospecting was done at the top of the hill some years ago by Mr. Foster, the former owner of the property. The trend of the pegmatite is difficult to ascertain, but sheet mica, fragments of quartz, and numerous crystals of black tourmaline are scattered over an oval-shaped area of about an acre, the longer axis of which strikes about N. 65° W. The country rock is garnetiferous mica schist which contains small lenses of amphibolite. It strikes N. 62° E. and dips 39° SE. The pegmatite here appears to be unusually thick, perhaps a 100 feet or more wide, and judging by loose fragments in the soil tourmaline-bearing quartz composes an important part of it, *i.e.* the body somewhat resembles the so-called "blow out" or a greatly enlarged portion of a pegmatite or quartz vein. There has been insufficient prospecting to develop the true shape and character of the body. Several scattered pits were dug here about 25 or 30 years ago and two small pits were made recently by Jim Dover. Clear, flat sheets of mica, some of which will sheet 2 by 3 inches are found in the soil and around the pits. Some of the books split well, but the cleavage in other books is locked in places. No true "A" structure was observed in the mica, but a few books contain a structure resembling a radial "A" effect. The limited amount of prospecting here makes it difficult to determine the depth of weathering which goes beyond the depth of the pits. An appreciable amount of scrap could be obtained and certainly considerable punch. The mica does not contain spots. The deposits should be prospected further as a possible source of sheet mica.

It is interesting to note that this pegmatite occurs only 0.2 mile north of the outcrop of Murphy marble.

A. V. REEVES PROSPECT

This property is 1.25 miles west of Cagle School on the road to Indian Pine School. It is north of Cagle Branch and five miles (airline) northwest of Nelson.

Mr. Elmer Bennett dug a shaft upon the property about 1920-22. Smith¹⁵ states that in 1934 the single shaft, originally 15-20 feet deep, had fallen in. Scrap mica showing on the dumps was clear but contained a few black specks. He found some "A" mica, and writes that according to reports the largest piece of mica found was 3-4 inches in diameter and that no good sheet was discovered.

J. L. MULLINAX PROSPECT

This prospect was made in a field about 1.5 miles (airline) S. 87° E. of Antioch Church and 1.25 miles (airline) N. 23° W. of Pleasant Hill Church. It is 1.0 mile (airline) and 1.6 miles by road S. 25° W. of Talking Rock. A small amount of work has been done at this spot at various times in the past 25 years. The country rock is a slightly graphitic quartz-muscovite schist which strikes N. 27° W., dipping 10°-20° NE.

The pegmatite, about 4 feet thick, consists of kaolinized feldspar, mica, and small lenses of white quartz. It weaves along the strike in the general direction of N. 19° W. A trench about 80 feet long follows the strike of the pegmatite. There is a small pit about 15 feet deep about midway of the length of the trench. Several hundred pounds of mica from this locality were taken to North Carolina where the miners are said to have been offered a price for it by the ton. The mica is clear, green, ruled, does not split well, and of the "A" type.

W. J. GARRISON PROPERTY

This property is 3.5 miles west of Jasper on the Fairmont Highway and on a small branch of Talking Rock Creek. Smith¹⁵ saw this property December 4, 1932, and states: "Quartz and small flakes of mica crop out at a number of places on both sides of the creek. One outcrop on the east side of the creek was prospected some years ago; it is said to have shown good flat pieces of mica up to 5 inches across. Now only small pieces 1½ by 2 inches, somewhat twisted and shattered, are showing. Partly kaolinized feldspar and a little mica in pieces up to 6 inches across are struck in plowing the field across the creek."

LUMPKIN, UNION, FANNIN AND TOWNS COUNTIES

A considerable amount of mica has been mined in these counties in the past, but at the present writing mining is inactive. Most of the mica taken from this district was mined along the Blue Ridge crest near the Lumpkin and Union county line, but the mining section extends into the northern part of Union County, and into the southern and eastern part of Fannin County. A total area of around 400 square miles is involved. It is possible to drive to the general vicinity of most mines and many mines in Union County are accessible by car. This area lies in the Highland, or Blue Ridge section of the State, thus many of the old mines are now in the Chattahoochee National Forest area.

Lumpkin County

TUCKER PROSPECT

This prospect occurs upon the property of W. R. Tucker, of Dawsonville, Ga. It is 7.6 miles by road southwest of Dahlonega, by way of the Atlanta Highway and the South Auraria Road. This prospect is located in Lot 394, Section 1, of Lumpkin County.

The workings consist of a hole about 10 feet in diameter and 8 feet deep made recently, and an inclined shaft about 15 feet deep made some years ago. The shaft is about 100 feet due south of the pit but both openings appear to have been made in the same pegmatite. In the pit, the pegmatite is five feet wide; it strikes N. 34° E. and dips 54° SE. with the country rock (mica schist). In the small drift, the pegmatite is three feet wide where it divides around included lenses of country rock.

About 400 pounds of mica were removed recently from the pit by T. J. Stevenson of Dahlonega. The mica is light rum in color, hard, and where free of spots and other imperfections, is of excellent quality. In general, the books are not large; they are frequently curved, and ruling and "A" structure are common. When the prospect was visited October, 1942, very little mica of strategic grade which would sheet larger than punch could be found in and around the pegmatite.

GARRETT PROSPECT

This prospect is located 7.5 miles southwest of Dahlonega. It is on the south side of the Ellijay Road 3.2 miles west of its junction with the Atlanta-Dahlonega Road. The property is owned by D. M. Garrett, Route 3, Dahlonega; the mineral rights have been purchased recently by L. R. Hetrick.

The pegmatite at this place has been prospected by means of three short, inclined shafts. Drifting along the dike and a certain amount of stoping have connected the operation essentially into an inclined open cut, which ranges from 10 to 35 feet deep. The cut has a total length of about 60 feet striking with the pegmatite N. 70° W. Not very much work has been done at this place. Some preliminary work was done about 1941 by W. G. Owens of Dahlonega, and recently at the east end of the drift an inclined shaft about 35 feet deep was made by Hetrick.

The dike consists of vein quartz and medium-grained granite pegmatite. It dips 54° NE. and is three to four feet in thickness. At the east end of the cut, the quartz dike composes almost the entire thickness, but thins to a relatively narrow band about 30 feet to the west where the pegmatite appears upon both sides of it. The quartz lens varies in thickness in the direction of the dip. The quartz is medium-fine granular, generally milky in color, but locally somewhat smoky-colored. The feldspar is kaolinized to the depth of the present works and is somewhat stained by iron and manganese oxides. The country rock is deeply-weathered biotite gneiss which dips northeastward at an angle slightly less than that of the dike.

Mica is closely associated with the quartz dike or lens and from the appearance of the works most of the mica has been taken from the borders of the quartz lens. Owens states that he trucked from 10-12 tons of scrap from this mine to North Carolina. About 200 pounds of the material received a better classification and was sold for \$1.00 a pound. Although the mica is clear and free of spots it appears to be mostly "A" and "wedge-A," which is considerably twisted and ruled. Some pattern mica can be sheeted from the central portion of the "A" blocks. According to reports, a considerable amount of scrap has been removed for an opening of this size, but there is nothing to indicate that an appreciable amount of sheet can be obtained from this prospect.

The prospect is very accessible and is favorably located upon high ground, a considerable distance above water level. If the mine is worked to a greater depth along the dip, the hanging wall should be timbered. The pegmatite could be further prospected or worked by trenching at the surface.

TIPTON AND CRANE MINES

Tipton Mine.—

This mine is located upon the property of Charlie Tipton, 10 miles west of Dahlonega and 1.7 miles southwest of the Ellijay Road. The mine is 0.8 miles southwest of the home of Cleveland Dobbs.

The mine was first opened about 1904-5 and was worked for about one year. The first workings consist of a shaft about 20 feet deep at the northwestern end, and a drift from the shaft about 70 feet long following the strike of the pegmatite. The old shaft and drift are now badly caved, thus the pegmatite cannot be seen. In 1941, the Garrett brothers of Canton, Georgia, removed two dump truck loads of scrap mica from this mine.

The country rock is quartz mica gneiss, striking N. 75° W. and dipping at about 45° to the northeast. The pegmatite appears to follow the strike of the country rock as indicated by the nature of the works. From the dump, it is possible to find pieces of quartz which will measure from 12 to 18 inches in diameter; large pieces of graphic granite can also be found in the dump. The quartz is granular and white.

The mica present around the dumps is clear and splits well. "A" structure and ruling are very common; however, it is possible to cut sheets of good mica 2 by 3 inches from the middle of some of the "A"s, and some ribbon mica 1.5 by 3 inches may yet be found.

Crane Mine.—

This mine is located 200 feet northwest of the Tipton Mine upon the same pegmatite dike. The mine consists of an inclined shaft about 45 feet long, which dips 31° to the northeast following the dip of the pegmatite. The incline is in good condition, although untimbered; the work is said to have been opened a number of years ago. The mica schist of the hanging wall is exposed along the roof of the incline; the footwall is not exposed. Very little mica may be seen in the medium-grained pegmatite which is at least six feet thick throughout the length of the incline. It is likely that most of the mica is associated with a quartz lens which dips northeastward with the dike and which occurs in the pegmatite about one to one and one-half feet below the hanging wall. This lens, 6 to 12 inches in thickness, is thickest near the mouth of the incline and thins out down the dip about 20 feet below the entrance. Some narrow xenoliths of mica schist dip northeastward where they are included in the pegmatite. The mica from this mine is similar to the mica from the Tipton Mine. It is reported that books of mica weighing 75 pounds or more were removed from the mine.

Since a considerable amount of scrap mica has been obtained from the two mines described above and an unknown amount of sheet mica, the line of outcrop between the two openings should be further prospected. This direction is N. 75° W. Large fragments of quartz may be found along

the surface 100 feet or more northwest of the Crane Mine, indicating that the dike has farther extension in that direction.

WILLIAMS MINE

This mine is 10 miles northwest of Dahlonega. It is accessible by way of U. S. Highway No. 19 and the Cooper Gap Road. The mine was first opened on the east side of the road, but the present entrance to the pegmatite is now about 100 feet east of the road. The mine was owned and operated by the Pitner Mica Mining Company of Chicago, Ill. The land is now owned by M. J. Gilreath, but the title to the mineral rights is in dispute. Williams is said to have worked the mine first about 1902 or 1903, the preliminary work having been done by the Gilreath brothers who drove a shaft into the pegmatite from a point on the road just east of the present open cut nearly to the present entrance almost 100 feet from the road. The open cut from the road to the present mouth of the mine was made by Pitner so that debris from this cut covers the site of the original entrance. Galpin³ states that "according to reports much good mica was taken from the mine in 1907-08." The mine was cleaned out in 1913, and at the time of his visit an iron hoisting drum operated by hand, a home-made skip, drills, etc., constituted the mechanical equipment.

The mica schist country rock at this locality strikes N. 14° E. dipping 55° SE. The pegmatite is very irregular in shape, and varies considerably in thickness. It is intruded approximately parallel to the schistosity of the enclosing rock, but numerous cross-cutting shoots and stringers from the main body occur. The pegmatite also includes numerous "horses" or xenoliths of country rock. At the head of the inclined shaft, the pegmatite including schist bands is about 12 feet thick. The feldspar is stained and kaolinized. No large lenses of quartz occur in the pegmatite in the present workings, but numerous small stringers and lens-like masses of quartz are distributed throughout the body. They show a decided tendency to dip and strike with the dike. Very little sheet mica may be seen in the mine at the present time, but a considerable amount of small books and "ribbon" scrap is scattered rather uniformly through the pegmatite. Galpin³ states: "The masses of mica are often large. One shows in the roof of the slope which is 2½ or 3 feet in diameter. The mica books contain more or less "A" and "wedge" growths. Some plates are more than a foot in diameter, but the sheet mica obtained from them is considerably smaller." The mica is colorless to light green, clear and free of spots. The books split well, but most of the small fragments left around the mine at the present writing are curved and cracked.

SAIN MINE

The old original opening at the Sain Mine is about 400 feet S. 10° W. of the Cooper Gap Road and the original opening at the Williams Mine. This mine was discovered years ago by William Sain who plowed up fragments of mica in the field. He sold the mineral rights to the Pitner Mica Mining Company of Chicago and they are now owned by Mrs. Pitner.

A 60-foot incline (see fig. 32) was made in the direction of the dip of the pegmatite when the mine was worked by the Pitner Company about 1906. Several tons of mica are said to have been found in pockets within a few feet of the surface. Sterrett¹⁷ says that some of the crystals of mica were 15-18 inches across, but were cut into smaller plates by ruling. The mine was leased and operated in 1942 by Dolby and Pifer of Cartersville, Georgia, who made an open cut and a horizontal cross-cutting drift S. 54° W. into the hill which intersected the pegmatite. This drift and open cut are about 165 feet long and intersect the pegmatite at a depth of about 45 feet a short distance below the end of the old incline.

The country rock is weathered biotite schist striking NE. and dipping SE. The pegmatite is variable in width and somewhat irregular in shape. It is 2-10 feet thick, the average width being about 4 feet. Quartz lenses, some of large sizes, occur in the pegmatite or near the walls. A lens of quartz, a foot or more thick, lies in the pegmatite where it is exposed along the north wall of the old incline extending downward into the new workings at the bottom.

The quality of the mica discovered at the head of the new workings was not good. The mica is rum-colored but badly spotted and stained. The books are bent, curved, cracked and ruled so that very little sheet larger than punch could be obtained from them. A small entrance was made later into the north side of the old inclined drift where books of mica associated with the quartz lens seemed to be of somewhat better quality. Large books of mica were found at the locality; most are unspotted, but they are of the "A" variety.

It is probable that the Sain Mine is opened on the same pegmatite as the Williams Mine, thus there is space for prospecting along the strike between the two mines. The pegmatite appears to strike N. 10° E. More prospecting could be done also along the strike south of the Sain Mine.

GADDIS MINE

This mine is three quarters of a mile east of the Williams mine and about 300 yards N. 40° E. of the house formerly owned by Captain F. G. Williams. Work was done here in 1907 for the Pitner Company. Accord-

ing to Galpin³: "The pegmatite dike, which is narrow at the surface, crops out along the side of a low but steep ridge. It was prospected by a 40-foot open cut following the strike in a northeasterly direction. A 40-foot shaft and a 20-foot incline extend from the open cut down the dike. A caved tunnel, run from lower on the hill, meets the shaft at its base. The shaft and incline remain open, but would not be safe without timbering. The dike dips steeply (80°) to the southeast and seems to lie along a fault plane in the biotite gneiss country rock. It is said to widen to 6 feet in the deeper workings. Reports credit this deposit with a greater production of sheet mica than that of either the Williams or Sain mines."

When visited October, 1942, the old workings were partly filled and not very much could be seen. The country rock is deeply-weathered biotite gneiss which strikes N. 5° E., dipping 40° - 60° southeast. The pegmatite, where exposed in the upper parts of the workings, thickens from six inches to three feet within a short distance; it strikes N. 55° E. and dips almost vertically to 76° southeast. Very little mica may be found around the openings at present. The mica is clear, smaller than punch; many of the books are wavy, ruled and show "A" structure.

CAMP WAHSEGA PROSPECT

This prospect is located on the ridge west of the creek about 3000 feet by trail, north of Camp Wahsega and about half a mile due north of the camp. A small prospect was made at this place around 1900 by McDougal, who owned the property. This location is now included in the Chattahoochee National Forest area. The old pit was enlarged by T. J. Stevenson in 1942. At the present writing, it is about 15 feet deep along the incline and about 12 feet in diameter.

The pegmatite is irregular in shape and where exposed, is three to six feet thick. It consists mostly of mica and kaolinized potash feldspar; no quartz band is observed in the opening. The pegmatite dips about 35° N. 15° E. Most of the mica came from near the foot wall on the west side of the pit, where the pegmatite is the thickest. Stevenson states that from 400 to 500 pounds of mica were removed. The mica is light rum-colored, clear, free of spots, hard, and of excellent quality; however, most of the books contain cracks which tend to break them into rather small pieces. Most of the books are wavy or bent and ruling is common. Stevenson states that some 2-3-inch mica was obtained at this locality.

JONES CREEK PROSPECT

This prospect is located near a branch at the headwaters of Jones Creek about 1000 feet below the top of the Springer Mountain ridge. A

small amount of work was done here years ago by Mr. Ashley. The pegmatite, poorly exposed, is several feet thick and is inclined to be lency. The mica contains a dark stain arranged in a pattern to produce the effect of grating locally referred to as "house roof." The sheets, although comparatively flat, are minutely crinkled in several directions. The prospect is unpromising.

GLASSY MINE TOP MINE

This mine is 12.5 miles from Dahlenega by way of the Woody Gap Road and is 0.5 miles northeast of Dockery Gap. The mine is located in the Chattahoochee National Forest area near the crest and on the west side of Glassy Mine Top. It is accessible by means of a foot trail from the Woody Gap road at Dockery Gap.

A pepper-and-salt-colored biotite gneiss has been intruded in the region of the mine by mica pegmatite and mica-bearing quartz. The biotite gneiss strikes N. 26° E. and dips 75° northwest. The quartz is white and carries some pyrite. Openings upon the quartz occur generally west of excavations made in the pegmatite, although quartz lenses are found also closely associated with pegmatite.

Extensive open cuts and pits have been made over an area of two acres. The mica rock has been prospected upon a large scale, by as much as 500 feet of open cuts and by several test pits. The pegmatite is best exposed in a long open cut at the easternmost edge of the area. This cut is 225 feet long, strikes N. 26° E. and is more recent than the other pits and cuts.

The pegmatite, as exposed in the above-described open cut, locally attains a thickness as great as 15 feet. It is composed largely of a "burr-rock," although coarsely crystalline pegmatite also occurs. The pegmatite body has no definite shape, and it exhibits no persistent hanging wall or foot-wall.

A large amount of mica may be seen around this mine, but most of it occurs in the "burr-rock" where the books are smaller than punch; they could not be utilized as scrap without crushing and separation. A pile of mica books gathered from the coarsely crystalline pegmatite shows sizes up to 4 by 5 inches, although few books attain that dimension. This mica is light rum color, hard, clear, and free of spots; however, the books are so badly cracked that very little punch and almost no sheet mica larger than punch can be obtained from them.

Books, 3 by 5 inches or larger occur in the quartz. This mica is clear or pale green in color; specimens from quartz around the mine are mostly of the "A" variety.

Southwest of Dockery Gap and about 0.5 mile from the Woody Gap Road, mica prospectors have made several open cuts and pits on Chestnut Knob.

WASH WALKER OR "BIG" MINE

This old mine, now in the Chattahoochee National Forest area, is in Lot 776, District 11, Section 1, of Lumpkin County. It is on a wooded hillside about 250 yards N. 27° E. of the old Wash Walker home site. The mine was worked for the Pitner Mining Company. According to Galpin³: "The excavations consist of two nearly parallel drifts at slightly different levels and separated by only a few feet. These drifts appear to follow two pegmatite dikes which join a short distance to the southwest. The "leads" strike about N. 30° to 60° E. and dip to the southeast. A fair amount of mica is visible in the decomposed dikes. It is light-colored and of good quality. Some books show "A" structure, but it is not so noticeable as in most mines of the district. The observed sizes range from 1 by 2 up to 3 by 5 inches. The mine was worked in 1907 and is said to have produced more sheet mica than any other in the district."

When visited October 27, 1942, the upper drift was completely caved and had become an open trench; the lower drift is open from the entrance but is completely caved about 20 feet from it. No pegmatite or country rock is exposed. Fragments of granular, milky quartz, some graphic granite, and some massive white feldspar occur about the mine. Not much mica could be found. That which was found, is clear but some pieces are spotted; some of the books are curved and do not split well. Ruling and "A" structures are common. It is not possible to appraise adequately the value of the property, because the mine has been abandoned for a long time, thus its history is obscure.

WINN OR WINNIE MINE

This mine, now in the Chattahoochee National Forest area, was opened and worked in 1907-8 for the Pitner Mica Company, upon the property of Winnie Caldwell, said to have been one of the best known mid-wives and herb doctors in the country. The old mine, long abandoned, is on a wooded hillside about one hundred yards east of Yahoola Creek and N. 38° E. of Lon Caldwell's home. It is about 0.5 miles southwest of the Wash Walker Mine.

The country rock is granitized biotite gneiss dipping approximately 35° to the northwest. The mine consists of an old open cut in hard rock about 60 feet long, driven into the hill in the direction of N. 17° E. The cut at present writing is about 14 feet deep at the head, with an average width of six feet, and is terminated at the northeastern end by an inclined partly-filled drift which suggests that the pegmatite plunges here steeply. The open cut probably follows the strike of the unexposed pegmatite. At the northernmost end of the open cut, the pegmatite consists of a narrow stringer of quartz and feldspar which strikes N. 17° E., dipping nearly vertically but slightly to the west.

The mica is clear, free of spots, and splits well. Books of punch size or larger are frequent around the dump. Some of the books are wavy and these books tend to show cracks and ruling. Some "A" mica can be found. Massive quartz associated with the pegmatite is white and granular.

Galpin³ visited this property between 1912-14. He states: "The dike averages approximately 18 inches in width and carries a rather low percentage of exceptionally good mica. Two or three tons of rough sheet mica were taken from this mine according to reports."

J. W. (SHOTGUN) WALKER PROSPECTS

Two prospects have been worked near the northeast fork of Yahoola Creek near the old home of J. W. Walker, 2.5 miles northwest of Porter Springs.

The most prominent prospect is on lot 747, 11th district, 1st section of Lumpkin County, 0.5 miles N. 20° E. of the J. W. Walker home. The works are on a wooded slope in the Chattahoochee National Forest area along a steep "leading" divide or spur of the Blue Ridge to the north.

The pegmatite dike where exposed at the present writing, is 3-3.5 feet thick; it strikes about N. 77° W., dipping 44° to the northeast. Galpin³ states that "a large 'horse' of massive gray quartz lies in the widest part of the dike, and much of the mica which has been removed came from about this obstruction. The material in sight is of good quality but not in large sizes. The excavation was made in 1908. Two men working two weeks removed several tons of mica. Four thousand pounds of mainly sheet mica in medium and small sizes is said to have been the result of the best day's work."

The mine was worked by an inclined shaft which is about 20 feet deep, dipping at an angle of 44° N. 28° E. The pegmatite in the shaft is

medium-grained, and very little sheet mica can be seen. This shaft was made by the Walkers who mined here for the Pitner Mining Company. Some mica, found on the dumps, is clear to rum-colored, splits well, and is free of spots. Books that are bent or wavy exhibit ruling. Fragments of milky quartz on the dump show the impressions of books of mica. The quartz lens with which the mica is associated was removed from the shaft. According to reports the mine was abandoned because the mica "ran out" at depth.

About a quarter of a mile east of the J. W. Walker house a prospect is reported from Lot 863, 11th District, 1st Section of Lumpkin County. A pegmatite less than three feet wide was mined years ago at this point by a drift about 35 feet long. According to Galpin³, "the dike strikes N. 20° E. across the foliation of the enclosing biotite gneiss, and seems to have filled an open fissure. The deposit's structure is quite similar to that of a true vein, with bands of feldspar along the walls and quartz with mica in the middle; open cavities or vugs are frequent in the quartz. The product is in part sheet and in part "A" mica in sizes under 3 by 4 inches."

W. M. GOOCH MINE

The two openings which constitute this mine were made half a mile south of the Scott mine. Mica is said to have been discovered here by J. W. (Shotgun) Walker, and these works are now on his estate.

Sheet mica of excellent quality is found on the dump and around a horseshoe-shaped excavation. Work here was done by Major Graham C. Dugas shortly after the first World War. Carper worked at this place about 1924 at which time he is said to have shipped sheet mica to North Carolina by Parcel Post.

According to reports, the original workings consisted of a drift into the south side of the horseshoe, but the dump to the west now covers the point where mining began. A shaft 16-18 feet deep (now entirely filled) was made at the head of this drift.

The country rock is deeply weathered biotite gneiss striking N. 57° E. and dipping to the northwest. The only pegmatite exposed occurs on the northeast side of the horseshoe-shaped opening. At this place, it is rather fine-grained and contains no sheet mica; it appears to be an unproductive off-shoot from the pegmatite dike.

It is unfortunate that so little can be determined concerning the position and character of the pegmatite, for some considerable work will be necessary by experienced mica miners to disclose the "vein." The mica

is hard, clear, free of spots and rum-colored. Bill Walker reports that books of mica 6 by 8 inches trimmed for shipment were gotten from this mine. Very little "A" mica is observed at the mine, but some books are cracked. Numerous specimens of white, sugary quartz, some as large as two feet in diameter, occur in the dump and around the mine. They are marked frequently with the impression of mica books. Books, which will measure 2 by 3 inches, may be found around the dump. The muscovite from this mine is associated with a considerable amount of biotite. The biotite is found both in the crystals of muscovite and free in the dump.

Some 450 yards south of the opening described above, there is an open cut 35 feet deep at the head, about 100 feet long, and seven feet wide driven into the hill in the direction of N. 67° E. along the strike of the pegmatite. The main body of the pegmatite which appears to cross-cut the country rock is not exposed. This mine, also on the J. W. Walker estate, is said to be one of the first mica mines of the Yahoola District. It was worked by the Pitner Mining Company about 1908-9, and by Graham C. and Ernest Dugas shortly after the World War.

The mica is clear, flat, hard, and splits well; some books of "wedge-A" are found. Books of punch size and larger occur around the waste pile. The largest clear, flat book found will sheet 2 by 4 inches. It is obvious that good sheet mica was obtained from both localities described above, but reports on both mines are confused, thus history of production is obscure.

OLD SCOTT MINE

This mine, now in the Chattahoochee National Forest area, is 10.5 miles north of Dahlonega and about 30 yards west of the road leading to Grassy Gap. It is just south of the spring in front of the home of Noah Lance. The mine was first opened by Scott, and later owned and operated for the Pitner Mica Mining Company.

When visited October 27, 1942, the works had been long abandoned, thus were partly filled and no exposures of bed rock could be seen at the mine. The enclosing garnet-mica gneiss a short distance east of the mine, strikes N. 30° W. and dips 34° NE. Galpin states³: "The decomposed pegmatite dike, 6 feet wide and containing irregular, lenticular masses of quartz, carries considerable mica which is largely marked by "A" structures. The mine is reported to have produced several tons of clear, sheet mica."

The workings consist of an open cut about 150 feet long, made in the hillside in the direction of S. 3° W. Several short and irregular inclines

which follow the dip of the dike were made, thus the trench is not of uniform depth and is deeper at these localities.

After separating the clear, sheet mica, Pitner shipped away a considerable amount of scrap from this mine. The mica was mined by the Walkers, who received \$1.00 per 100 pounds for mining it. According to Bill Walker, "it took 8 to 10 two-horse teams two weeks to haul the scrap mica to Cleveland, Ga., for shipment." About 1919, some scrap was hauled away again from this locality. The mica is definitely associated with a strong lead of white, finely-granular quartz. Much of the mica is said to have been contained in the quartz.

Most of the mica taken from the mine has been removed, but books of punch size and even larger are still to be found around the mine. The mica is clear and free of spots; the pegmatite was not mined to any considerable depth, thus those who can afford to re-open the mine, should obtain considerable sheet at this locality.

CAPTAIN WALKER PROSPECT

A small prospect was made on the northwest side of the Black Mountain Road in August, 1942, by L. R. Hetrick and W. G. Owens. The prospect is on the property of Captain Walker about eight miles northeast from Dahlonega. The pegmatite is 2.5 to 4 feet thick and strikes N. 27° E. with a near vertical dip. The country rock, a sericitized kyanite gneiss containing garnets, strikes N. 30° E. dipping 0°-15° northwest. The pegmatite contains a rather large amount of mica which is hard, clear, and of a light rum color. The books, however, are badly curved and cracked, so that practically no sheet and very little punch can be obtained from them.

SOL WALDEN PROSPECT

This prospect is located on a leading ridge a quarter of a mile west of the junction of Horseshoe Ridge Road and the Cooper Gap-Woody Gap roads. The mine is located upon a wooded hillside in the Chattahoochee National Forest area. This prospect is known as a mine to "old timers," but the work done here in the past years was of limited extent.

The prospect, at present writing, consists of a shallow trench about 50 feet in length and about 3 feet wide, striking N. 50° E., and the exposed country rock strikes N. 36° E. and dips 69° NW. It consists of muscovite-kyanite garnet gneiss, a common rock in this vicinity. The pegmatite is not exposed and the trench is partly filled with soil and woods mold. Several small pits in minor pegmatite leads still remain on

the slope below the above-mentioned trench. The mica is associated with a band or lens of milky quartz, fragments of which contain the impressions of mica books. "Shot Gun" Walker is said to have removed the scrap mica after the cessation of mining operations. The few fragments of mica left in the vicinity are clear and free of spots.

T. H. McDONALD PROSPECT

This opening was made on the west side of the Cooper Gap-Woody Gap Road on a steep wooded slope about 300 feet above the road and 5.1 miles east of Cooper Gap. It is 0.6 mile east of Cane Creek Gap by road and 4 miles measured in this manner southwest of Woody Gap.

The country rock is biotite gneiss and kyanite-garnet gneiss which strikes about N. 80° E. and dips 30° SE. A band of low-grade vermiculite occurs between the pegmatite and the wall rock. The pegmatite has no definite foot and hanging walls; its thickness exposed in the small opening ranges from a few inches to five feet. Narrow off-shoots of the main vein cross-cut the country rock or inject it *lit-par-lit*. The feldspar is coarsely crystalline, semi-kaolinized near the surface, but hard near the bottom of the pit. Continued work here would call for mechanical equipment. The pegmatite is accompanied by persistent lenses of milky, finely granular vein quartz. Mica occurs throughout the pegmatite, but more of it is concentrated near the quartz. A considerable amount of mica, mostly scrap, was obtained from this opening about 15 feet deep which was made in 1942. All of the books contain a dark stain arranged in a pattern to produce the effect of grating when examined by transmitted light. No clear sheet was observed from books taken at this locality. The pattern produced in this mica is described from some other mines in Fannin, Cherokee, etc., counties where it is termed "house roof" by the miners (See White Mine, Fannin County).

PROSPECTS NEAR WARD GAP

Several prospects near Ward Gap were described by Galpin³. The farms near the Gap are now forested. The properties are accessible by way of the Cooper Gap-Woody Gap Road but the prospects, long abandoned, may be found only with the assistance of "old timers." The country rock is granitized biotite gneiss injected by numerous pegmatites. Strikes range from due north to N. 25° E. and dips from 65° SE. to near vertical. The pegmatites cross-cut the country rock, but some dikes conform generally to the schistosity. The mines have been long abandoned and do not appear to have been extensive. The rocks near the top of the

Blue Ridge in this locality are hard, and since these openings were made about 1906, the work was abandoned in some cases because hand labor without mechanized equipment in hard rock is slow and relatively unprofitable.

Ward Gap Mine.—

This old mine or prospect is located 75 feet, N. 70° E. of Ward Gap. The Cooper Gap-Woody Gap Road passes over the upper end of the workings. This prospect is near the old Ingram homesite which occupies the only flat place in the Gap. The workings consist of a pit over 10 feet in diameter and five feet wide and 4 feet deep. From the size of the dump, it seems that there were once more extensive workings than at present because some of them were covered by the road which is just south of the mine. The pegmatite is exposed and strikes N. 60° E. There are conspicuous quartz lenses in the dike; the mica seems to be associated with the quartz. Very little mica can be seen around this prospect. Pieces of sheet mica that may be found are clear and free of spots; books may be curved and cracked; "A" mica which exhibits ruling occurs. Since all of the sheet and most of the scrap have been removed from these old mines, it is probably unfair to judge the quality of the mica by the samples which remain on the dump.

Galpin³, who visited the property in 1912-14, states that the mine "was worked in 1907 and 1908 by J. L. Ingram for the Pitner Mica Company. The mine is mainly an irregular open pit with a crooked incline extending a few feet into the south wall. The pegmatite exposed is about 6 feet wide and is composed of partly kaolinized feldspar, some granular quartz, a greater amount of massive quartz, and muscovite in plates and books up to 5- or 6-inch dimensions. The mica, as elsewhere in this district, is distinctly associated with "horses" of vein quartz. It is inclined to be dark and smoky, and runs high in "A" structure. Mr. Ingram states that he removed about 3 tons of trimming mica together with some scrap, some of which was ground at the company's mill near Gaddistown. The mica was mined at the rate of 50 cents per 100 pounds of scrap, and 75 cents per 100 pounds of trimming material . . . A day's work by one man produced from 100 to 600 pounds of mica. Men received one dollar per day at other mines in the vicinity."

Henry Lee Mine.—

This mine was purchased by the Rowland Lumber Company shortly after it was opened in 1903-1906. It is upon a leading spur which extends south from the main ridge about half-way between Ward and Cooper

gaps. Galpin³ reports a production of several tons of sheet mica from the mine and states that "ribbon" mica, measuring 4 by 10 inches and of the highest quality is said to represent the best of the output.

Long Mountain Mine.—

This old prospect was opened for the Pitner Mica Mining Company slightly west of the crest of Long Mountain at a point one-half to three-quarter mile northeast of Ward Gap. The workings had fallen into decay at the time of Galpin's visit.³ He states "the excavation may have been 6 or 8 feet deep originally but is now less, due to the caving of the sides. The dike is poorly exposed, strikes N. 20° E. and dips southeast, and where seen is composed of rotten feldspar, quartz and a little mica. Much "A" mica has been thrown about the edges of the trench. From 5 to 6 tons of rough sheet mica is the reported production resulting from a few days work. The material is given up to be the best in quality of any mica mined near Ward Gap."

Prospects southeast of Ward Gap.—

Two parallel trenches 30 feet apart are located southwest of Locust Gap about 100 yards south of the Cooper Gap-Woody Gap Road and 150 yards southwest of T. V. A. Bench Mark AKW 94; it is a short distance south of the Appalachian Trail. Work was not extensive and no large amount of mica was obtained from the prospects. In the pit to the southeast which is 10 feet long, 8 feet deep and 6 feet wide, the pegmatite is exposed and is about five feet wide. It is a medium-grained pegmatite with graphic intergrowth of quartz and feldspar. The mica occurs in books in and against small lenses of quartz; the mica books are up to four inches in diameter. In the northwest pit, the pegmatite is not exposed. This opening is 40 feet long, six feet deep and five feet wide. Pieces of mica from the dump will measure up to five inches in diameter. The country rock and the pegmatite seem to be conformable and have a strike of N. 16° E. and dip 65° SE. The mica from the two pits is similar. It is clear, splits well, and is rum colored. Some of the mica is "A" type and is badly cracked.

Green Vein.—

This pegmatite was worked on the south side of the Blue Ridge, three-eighths of a mile southeast of Ward Gap by three hillside pits made into a vertical dike which varies from one to five feet in thickness. The distribution of mica in the pegmatite suggests that the entrances to the pits

followed shoots which pitch into the dike at an angle of about 45° to the north. The pegmatite thickens and thins along the vertical direction. The pegmatite strikes N.-S. and dips very near vertically. About 150 feet of the pegmatite are exposed at this locality. The dike cross-cuts the country rock which strikes N. 8° W. and dips 28° NE. Although worked long ago, this dike may be re-prospectied at small expense since the work here upon the mica shoots is limited in extent along the exposed portion of the dike.

The dike ranges in texture from medium to coarse-grained. Light pink feldspar and quartz are the principal minerals; little mica is to be seen. Quartz occurs as irregular lenses, narrow lenticular bands, and as graphic intergrowth with feldspar. Some biotite may be found in the books of muscovite. The mica books which are associated with quartz range up to six inches in diameter. The mica is colorless in thin sheets but greenish in thicker books. The following description of the mica applies to specimens picked up around the mine: Some of the mica is badly ruled and cracked; some "A" mica and "ribbon" mica is present; and all of the mica shows a small amount of curvature. It was reported to Galpin³ that four tons of thumb-trimmed mica and a large amount of scrap were hauled to the mill from this mine.

Union County

EPH LEE MINE

This mine is located on a spur of the Blue Ridge about 210 yards N. 25° E. from Eph Lee Gap, which is between Ward and Justice gaps on the Cooper Gap-Woody Gap Road. The old fields at the Gap have long since grown to briars and pines. Galpin³ found this mine to be older than most of the ones in this district. He states: "The workings consist of an irregular pit from which a 40-foot tunnel extends along the lead's strike to the northeast. The dike, which seems to fill a "fault fissure," shows a width varying from 6 inches to 4 or 5 feet. It is of unusual mineralogic composition. Mica is rather abundant and usually found along or near quartz stringers. The books average about 2½ or 3 inches in diameter on the cleavage and seldom exceed 5-inch sizes. "A" structures are frequent and many of the books are badly bent. Two or three tons of such material have been collected in a small log cabin near the mine. Considerable sheet mica, some speckled and some smoky, is said to have been shipped from the mine."

When visited November 4, 1942, the writers found the mine to be in better condition than most of the old mines in this section. The pegma-

tite injects biotite-granite gneiss which strikes N. 57° E. and dips 60° SE. The gneiss contains lenses and layers of hornblende gneiss. The works consist of a partly filled conical-shaped hole about 20 feet in diameter and about 10 feet deep. There are two outlet trenches, one, 20 feet long and striking N. 73° E.; another, 15 feet long strikes southwest. The pegmatite is exposed in the southwest trench where it strikes N. 17° E., dipping 65° SE. The quartz and feldspar are both white in color. Numerous books of mica still occur around the mine. Most of the specimens are clear and free of spots and there are some books as large as 2 by 3 inches. Many of the books are curved. Ruling and "A" mica are rather common.

It is not possible to make a satisfactory appraisal of a mine so long abandoned. The mine could be opened up without much labor by means of a drift made in the hillside along the strike of and under the southwest trench. There should be no water problems, the rocks will be hard from the beginning of operation and the mine, although in the National Forest, is very accessible.

WARD GAP PROSPECT

This prospect is about 17 miles by road north of Dahlenega. It occurs on the west side of the highway 1.3 miles southeast of Ward's Gap. Work here was done by T. J. Stevenson in September, 1942, who lives at Dahlenega. The prospect consists of an "L-shaped" open cut or open cross-cut driven S. 38° W. through the pegmatite and of a 15-foot drift at the head of the cross-cut which strikes with the pegmatite S. 20° E. The open cut is from 8 to 10 feet wide but narrows to about 6 feet at the head of the drift.

The pegmatite at this point is about 20 feet thick. The strike measured along the foot wall is variable but will average N. 32° E. It dips to the southeast 35° to 45°, showing a tendency to roll in the direction of the dip. The easternmost 12 feet of the hanging wall side of the dike consist of granitic pegmatite with small mica; the remaining eight feet consist of coarse pegmatite and sheet mica including a prominent quartz lens up to three feet in thickness, which tends to occur at or near the contact of the two types of pegmatite. The quartz is massive, stained, and milky. The feldspar is all kaolinized and considerably stained. The foot wall consists of oxidized and weathered mica schist which strikes about N. 10° E. and dips about 76° SE.

Most mica observed occurs between the quartz lens and the foot wall. The mica, as well as thin quartz lenses, tends to occur in thin lens-

like bodies which parallel more or less the dip of the pegmatite. The mica is pale rum in color, clear, and free of spots. It is mostly "wedge-A", and books are usually wavy or twisted. Ruling and cracks are common; the books are considerably stained. Stevenson states that 8 or 9 tons of mica, mostly scrap, have been removed and that very little of this is suitable for sheeting. The development thus far is small, but more work should produce a considerable amount of scrap if the pegmatite maintains its present character. Good potash feldspar should be obtained below the zone of weathering.

THOMASON MINE

This old mine, now badly filled, is located 0.7 mile east of the Cooper Gap Road and 50 yards east of the road leading to Gooch's Mill from the Cooper Gap Road. When visited by the writers, the pegmatite was not exposed and very little mica could be seen in the dump.

Mr. G. W. Gooch reports that this mine was operated between 1907-1908 by James Gooch for the Pitner Mica Mining Company. The mica around the mine is curved, cracked, and badly ruled. Most of it is "A" mica with a small amount of "ribbon." The mica is clear and light rum in color.

Galpin states³: "This mine consists of an open pit and one short incline on a narrow pegmatite dike, which lies one mile east of Gaddistown (Union County). The dike, which is not more than 2 feet wide, strikes N. 20° W. and dips 45° NE. All mica found here is of the "A" variety and was used for grinding."

MATT GOOCH MINE

This mine is located a third of a mile N. 36° W. of the Thomason Mine and is very similar to it. It was opened and worked in 1907 for the Pitner Mica Mining Company. The pegmatite is not exposed; the mica in the dump is light green in color, contains some spots, is cracked, ruled, and most of it has "A" structure. Milky quartz fragments in the dump will measure 24 by 18 by 12 inches and contain impressions of mica books. Galpin³ states: "One half mile north by northwest from the Thomason mine, a trench and tunnel have been driven 50 feet on the strike of a 3- to 5-foot pegmatite which has a low dip in a direction N. 70° W. The lead contains a high percentage of massive quartz, with which there is associated a little mica. Dark and partly specked mica is reported from this mine by Sterrett¹⁷."

JAMES GOOCH MINE

This mine is located two miles by road west of Cooper Gap and 0.6 miles south of Gooch's Mill in Lot 437, District 11, Section 1 of Union

County. The mine is in the Chattahoochee National Forest area 400 yards S. 48° E. of A. B. Todd's home.

Work was done at this mine between 1907-09 by James Gooch for the Pitner Mica Mining Company. The workings consist of an open cut 35 feet long in the direction of S. 20° W. into the side of the hill. The mine is now badly caved and covered with vegetation and the pegmatite is not exposed; however, Mr. G. W. Gooch reports the pegmatite to be from 4-5 feet thick.

Fragments of pegmatite observed in the dump are medium-grained graphic granite containing lenticular bodies of massive white quartz which range in thickness up to 12 inches. The mica books are in the quartz as well as at the contact between the quartz and pegmatite. The country rock is fine-grained biotite gneiss.

The mica found in the dump when visited November, 1942, is all scrap mica. There is both flat and wavy mica present, all of which is badly ruled, cracked, spotted, and has "A" structure. The mica is green in color. Mr. G. W. Gooch reports that when the mine was in operation, sheet mica which could be cut up to 4 by 6 inches was removed from the mine.

LOT 301, DIST. 11 PROSPECT

This prospect is in the Chattahoochee National Forest area about half a mile south of Suches Creek and about a third of a mile up a branch (south) from the home of Burt Gooch. Work was done here in 1941-42 by W. E. Johnson who discovered the mica when he dragged a log across the pegmatite.

The country rock is a biotite gneiss which contains hornblende layers. The pegmatite is generally conformable to the enclosing rock, striking about N. 35° E. and dipping 33° SE. It is from 2-5 feet thick, and tends to roll on the dip and weave in the direction of the strike. It is composed of coarsely, cleavable feldspar which is accompanied by persistent lenses of white quartz. The muscovite books generally occur in the quartz. Books of biotite as large as 3 by 4 inches occur occasionally in the quartz. Mica books from the quartz tend to be colorless to light green; whereas, mica books from the white feldspar tend to be light rum in color. There is some ribbon and some "A" mica; some of the books are wavy. Books up to 4 by 6 inches may be seen in the mine. Most of the books are somewhat spotted and this is the outstanding defect in the mica at this place. The present opening is about 30 feet long, 15 feet deep and from 8 to 10 feet wide on the northeast slope of a hill. This

opening represents 10 days' work by two men without machinery. Four hundred and fourteen pounds of mica were removed. Sheet mica (mostly 2 by 2 and 2 by 3 inches) was obtained, and sold for \$58.64 from which \$11.38 sheeting cost was deducted. Since mica was discovered at this locality by chance, the pegmatite should be prospected at other points along the strike where the mica may be of better quality.

JOE BLUE MINE

The Asheville Mica Company of North Carolina did some prospecting for mica on the farm of J. R. Blue, Route 2, Blairsville, in 1914. This prospect lies 11.5 miles by road south of Blairsville. It is accessible via the Blairsville-Dahlonega Highway and the dirt road running east from the highway to old Ponder's post office. This mine is on the western slope of Noah Mountain one mile southeast of Union Church, and 0.3 mile N. 65° E. of the Blue home.

A four- to six-foot pegmatite is exposed by an open cut 40 feet long with a drift 30 feet long at the head of the open cut. The open cut and drift are made along the strike of the dike which is conformable to the enclosing biotite gneiss. The dike strikes N. 25° E., dipping 56° SE. It is composed of semi-kaolinized microcline, lenses of milky quartz up to 18 inches thick, and mica.

The mica occurs associated with the quartz lens. It is hard, splits well, free of spots, and is rum-colored. No "A" mica was observed here. Much of the mica is cracked and bent; ruling is common. The mine owner reports that some good mica was removed from this mine by the Asheville Mica Company. However, it appears that the percentage of scrap mica would be very high.

T. H. SAXON MINE

Mica was first mined on the T. H. Saxon property some 70 years ago by Noah Elliott. This mine lies 11 miles by road due south of Blairsville on Noah Branch, one mile north of Tesnatee Gap Road, about two miles northeast of Ponder's post office and due south of Frozen Top Mountain. The mine is now in the Chattahoochee National Forest area.

This mine, now largely fallen in, shows an open cut on the side of the mountain about 100 feet above the old house site. The cut, which strikes N. 50° E. (undoubtedly the strike of the pegmatite), is about 30 feet long, 10 feet wide, and now 6 feet deep. The pegmatite is not exposed. The biotite gneiss wall rock strikes N. 60° W., dipping 50° NE. The pegmatite material, showing in the dumps and as float on the hill-

side consists of large milky quartz, a mixture of quartz and microcline, and mica associated with the quartz. The mica is hard, clear, and light rum-colored; ruling is common and many books are wavy.

Smith¹⁵, who visited the property in 1932, states: "Old inhabitants of this section, noted for their truthfulness, state that mica taken from here was 12 to 18 inches across, and that the girls cut it into fans that were used in this part of the country."

B. F. SCHULER MINE

Mica has been mined in the past upon B. F. Schuler's farm located 11 miles by road south of Blairsville and on the west side of the old Tesnatee Gap Road. The mine is near old Ponder's post office and above the mouth of Hilton Creek on Lot 36, District 1 of Union County.

On a slope in a hollow east of the headwaters of Chestatee Creek, a 3-foot pegmatite was prospected in 1930 by Luce England. The dike strikes N. 60° E., almost parallel to the hollow, dipping 65° SE. with the slope of the hill. The three prospect pits here were made along the pegmatite for a distance of about 50 feet in the direction of the strike. All three pits were originally about 20 feet in depth, but at present they are nearly filled by cave-ins. An old cross-cutting drift was started about 30 feet below the outcrop but it was stopped before it intersected the dike.

The dike is enclosed in hard biotite gneiss which strikes and dips with it. The pegmatite consists of a milky quartz lens from 6 to 12 inches thick near its middle, with mica and semi-kaolinized feldspar on each side of the quartz. Most of the mica is reported to occur near or against the quartz lens.

The dump shows pieces of mica up to four inches across which are somewhat curved and ruled. The mica is free of spots, hard, and light rum-colored. According to Smith¹⁵, about 100 pounds of the best mica is said to have been shipped from here, including a few blocks from 8 to 10 inches across.

ROGERS AND RECTOR PROPERTY

In 1932, the property here-mentioned was owned by F. R. Rogers and Mrs. O. M. Rector of Blairsville. The property is two miles southeast of Hampton Gap on the new highway to Blairsville; and is located on Lot 19, District 7, Section 1. Smith¹⁵ found a kaolinized dike about 13 feet wide exposed on the old road. The dike dips 70° to the north, striking approximately E.-W. A quartz lens, about one foot thick, occurs on the hanging wall side. This is a kaolinized feldspar dike, and thus very little mica is reported.

J. M. SILVEY PROPERTY

This prospect is on Pea Vine Ridge, west of Brasstown Bald and east of Buzzard Roost; it is about 1500 feet above Brasstown Valley and from four to five miles south of Young Harris. The mineral rights were owned by J. M. Silvey and the land was owned by the Vogel Land Company, but it now lies within the Chattahoochee National Forest. The first work done on the Silvey property was about 30 years ago. It was worked again by Harvey Caldwell in 1932.

Smith¹⁵ examined this property in 1932 where he found two openings in a vein striking about N. 25° E. and at least 20 feet wide. Heavy lenses of quartz occur in the middle of the vein. Mica occurs on each side of the quartz, most of the remaining portion of the vein being kaolinized feldspar. He reports a considerable amount of mica here but a poor quality.

On Locust Ridge, the next ridge to the west, there is said to be another large vein which was prospected 40 years or more ago by Judge John England. It is said that England found some good sheet mica.

DYER MINE

An old mine, considerably removed from the mica mining sections, occurs on Lot 150, southwest of Towns Creek upon the property of Mrs. W. E. Dyer near Choestoe. It is 12 miles southeast of Blairsville by way of the Blairsville-Dahlonega, C. C. C. camp, and W. P. A. roads. The mine is located near the bottom of a hill on the west side of the country road, about 500 feet N. 60° W. of Mrs. Dyer's home.

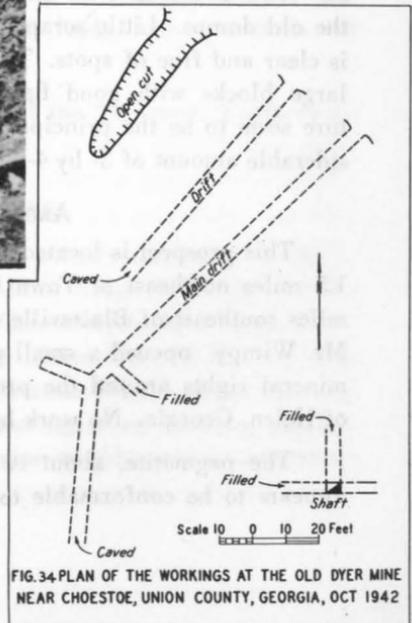
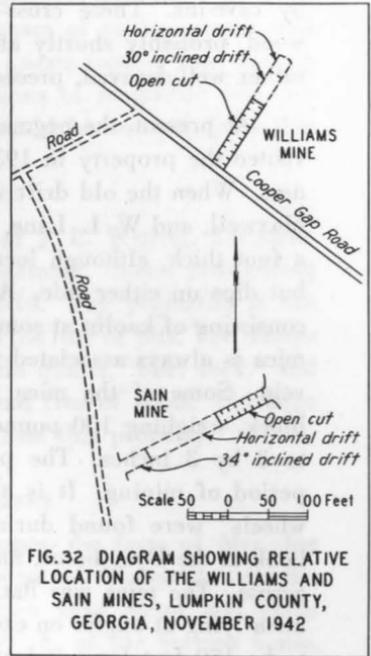
It is reported that mica was mined here first in 1890. About 1900, or a few years later, Joe Davenport and J. C. Collins ran a drift into the vein and are said to have removed considerable mica. B. E. Dyer prospected here during 1908 removing some promising-looking mica. Mrs. Dyer reports that about 1914 or 1915, a North Carolina miner opened the mine removing a considerable amount of mica, and did not pay for it. Mining was done in 1918 by Luce England, who cleaned out the old drift, and extended it 20 feet farther. A shaft on the hill which intersects some of the old workings was made recently by operators from Gainesville, Georgia.

Numerous drifts and cross-cuts have been made into the hill, thus the search for mica has been rather thorough at this place. When the property was inspected by the writers, November 5, 1942, the entrances to the main workings were accessible, but some cross-cuts and drifts were filled



FIGURE 33, Mouth of Dyer mica mine, Union County April, 1933.

Photo by R. W. Smith



by cave-ins. These cross-cuts and drifts were timbered with chestnut wood, probably shortly after the first World War. Oak timbering, now rather well-decayed, preceded this stage of mining.

At present, the pegmatite is not exposed. According to Smith¹⁵, who visited the property in 1932, the vein averages nearly two feet in thickness. When the old drift was cleaned out in 1933 by E. G. Elrod, W. S. Maxwell, and W. L. Lane, the vein at the head was found to be less than a foot thick, although locally widening to 22 inches. It lies nearly flat but dips on either side. At this place, its composition is very irregular, consisting of kaolin at some places and of mica and quartz at others. The mica is always associated with the quartz but not on any one side of the vein. Some of the mica removed was badly bent and shattered. One block, weighing 100 pounds and of good, clear color, trimmed sheet up to 3 by 3 inches. The photograph by Smith¹⁵ was taken during this period of mining. It is also said that books of mica as large as "cart wheels" were found during the early mining operation. Smith saw a book at the Dyer home, mined by Mr. England, that was about 12 inches across. The mica was flat, ruled part way down on the edges and with mica lying at angles on each side of the stripe. The original drift is said to be 150 feet long and at that time, good mica was exposed there, but mining ceased because the vein dipped a little and water became too abundant. The present condition of the mine is shown in Figure 34.

The country rock consists of mica schist which contains lens-like intercalations of hornblende gneiss. These rocks strike N. 77° E., dipping 36° NW. Practically no quartz or feldspar may be seen at present upon the old dumps. Little scrap mica is present, but the mica which remains is clear and free of spots. The mica is generally of the "A" type, but in large blocks with good flat sheets between the "A" structure; curvature seem to be the principal defect of the mica. It is stated that a considerable amount of 3- by 4-inch mica was trimmed from the blocks.

ARCHIE WIMPY PROSPECT

This prospect is located 1.25 miles due north of Old Liberty Church, 1.5 miles northeast of Town Creek School north of Town Creek, and 9 miles southeast of Blairsville. The property is owned by Archie Wimpy. Mr. Wimpy opened a small pit on this property in 1939. Recently, the mineral rights around the prospect were leased by Miss Frances Lance, of Helen, Georgia. No work has been done on this property since 1939.

The pegmatite, about two feet thick and very lenticular in shape, appears to be conformable to the biotite gneiss country rock. The dike

strikes N. 50° E., dipping 30° SE. It is a medium-textured dike composed of weathered potash feldspar, small lenses of milky quartz, and books of small "A" mica associated with the quartz lenses. The mica is colorless, soft, and "wedge-A." Small inclusions of magnetite also are present in the mica. Very little sheet mica could be secured from this pegmatite.

J. L. WEAVER PROSPECT

This prospect is located upon the farm of J. L. Weaver, 1.5 miles north of Blairsville near the dirt road to Rockmont. Some prospecting for mica was done on this property in 1912-14. The pegmatite is not exposed but strikes probably northwest as does the line of pits. The dumps around the pits show some hard microcline, vein quartz, "burr rock," and a little mica. The mica splits well, is hard, and free of spots. No large mica books are reported to have been taken from this property.

MRS. JOE STEVENS PROSPECT

Some mica has been mined in the past upon the farm of Mrs. Joe Stevens. The prospect lies 3.5 miles northwest of Blairsville via the Blairsville-Murphy Highway. It is in an open field about 200 yards northeast of the highway and 150 yards S. 30° E. of the Stevens home. The work at this prospect has been done by Mr. Adams who worked it in 1940, and Mr. Daniels who worked it last in 1942. The opening is 20 feet long, 8 feet wide, and 5 feet deep. The pegmatite is exposed in the cut striking N. 30° E., and dipping to the southeast. It is four feet thick and composed of hard potash feldspar, milky quartz, and mica. The dike is conformable to the country rock which is a muscovite schist. The muscovite schist contains numerous chevron folds, and kyanite is not uncommon in the schist.

The mica is clear and hard, but it is all the "A" type. Little or no sheet mica could be obtained here.

W. A. SULLIVAN MINE

This mine is located 12 miles by road a little southwest of Blairsville. It is accessible via the Blairsville-Blue Ridge Highway and the Young Cane-Murphy Road. The Young Cane-Murphy Road runs north from the highway 10.5 miles southwest of Blairsville. On the east side of the road, 0.7 miles N. 64° E. of Confidence School is an old mica mine first opened about 1912, and worked again in 1917-18. Adolph Pritchard, of North Carolina, worked the mine in 1936, and is reported to have removed some good mica.

A circular open pit, 30 feet in diameter and 15 feet deep at present, exposes a pegmatite which is at least 25 feet thick. The dike strikes N. 60° W., dipping 70° SW. It is enclosed in a deeply-weathered biotite gneiss which is generally conformable to the strike and dip of the dike. Inclusions of wall rock in the pegmatite several feet thick are common. The pegmatite consists of semi-kaolinized microcline, milky quartz, graphic intergrowths of quartz and feldspar, and mica.

Very little mica is showing in the pegmatite at present. That which is found is hard and rum-colored, but it is badly bent and cracked; ruling is very common and most of the mica contains "A" structure. Biotite is present in the pegmatite in sheets and as inclusions in the muscovite. Some of the sheet biotite is altered to vermiculite. Very little commercial mica could be obtained from this mine.

DAVENPORT AND HEDGECOCK PROPERTIES

These properties, owned by J. D. Davenport and J. P. Hedgecock of Culberson, Route 1, are 14 miles northwest of Blairsville and six miles from Culberson, N. C. on Camp Creek in the Dooley District, Lot 160, District 8, Section 1.

A summary of R. W. Smith's¹⁵ report of 1932 follows: A pit on a slope about a quarter of a mile southeast of the Davenport home is 20 feet long, 6 feet wide, and 10 feet deep. It strikes N. 60° W., which is probably the strike of the vein. The mica is of the "wedge-A" and "fish-bone" type, and some is badly ruled. Mica books are exposed in the pegmatite up to four and six inches across. Most of this mica would be classified as scrap. Several old pits said to have been dug 50 years ago are now filled.

It is reported that another similar opening, made in mica of the same type, occurs about a quarter of a mile southwest of the one described above and on the south side of the ridge.

THOMAS PROPERTY

This property, owned by G. S. Thomas, Bright Thomas and P. H. Thomas, is about fourteen miles by road from Blairsville, and about six miles from Culberson, N. C. It is at the head of one of the branches of Camp Creek in Dooley District, Lot 157, District 8, Section 1.

Smith¹⁵ visited the property of C. S. Thomas in 1932. He found a pit on the side of a hill about 15 feet long and 8 feet wide. The pegmatite appears to strike about N-S. Mica in books up to four or five inches

across occur in it, but all of the mica visible at that time was of the "A" type and much ruled and fractured. Smith concludes that as far as may be seen, there is considerable scrap mica at this locality.

Fannin County

SPRINGER MOUNTAIN MINE

This mine, now in the Chattahoochee National Forest area and the State Game Reserve, is in Lot 121, 6th District, 1st Section of Fannin County about 3 miles west of Winding Stair Gap. J. T. Anderson, of Blue Ridge, mined at this locality in 1932-33 on a permit from the National Forest Superintendent.

Smith,¹⁵ who visited the property Nov. 15, 1932, states: "The pegmatite, which is about 15-20 feet wide, strikes N. 35° W. with the enclosing biotite gneiss and dips about 40° SW. It is composed approximately of one-third quartz and two-thirds hard, white feldspar. Some of the feldspar shows graphic intergrowths of quartz. The mica is in large irregular books and blocks, but is principally of the "wedge-A" type; although some flat blocks and some "ribbon" mica up to 2 inches across are seen. It appears as if the proportion of scrap mica is too high to pay for mining it at this inaccessible place. Mining was done in an open pit, with an opening or cross-cut made to remove the waste at right angles to the trend of the dike. The pit is about 15 feet long and 20 feet wide and the mining face at its middle portions is 15 feet high. The mica was carried down the trail on the miners' backs to a camp to which the road had been graded. Some of the mica was sheeted at the camp but, when visited, the mine was not in operation and no good sheet mica had been left. Considerable feldspar free of quartz could be obtained from this locality."

A small amount of scrap was removed from the mine after Smith's visit, but the mine remains at present as he described it. It is said that some mica was taken from the property and sold as washer punch in 1942 by Mr. Wacaster.

WHITE MINE

This mine, now in the Chattahoochee National Forest area, is located on the west side of Rock Creek, 462 feet west of the Federal Fish Hatchery. The mine is on the property formerly owned by J. H. White of Cheyenne, Wyoming. It is said to have been opened about 40 years ago by the owner of the property. C. M. Wacaster used a drag-line to collect some scrap mica from the property in 1942.

The workings at present consist of three openings. The main opening is at the northernmost end of the zone of workings and is an inverted cone-shaped open cut 60 feet in diameter and 25 feet deep at the center. It is reported by Mr. Arthur Woody that an old drift is also present but has been covered by the dump. About 100 yards south of the main opening is an open cut which is in the pegmatite, and exposes the pegmatite at the head of the cut (the northern end). This opening is 50 feet long, 25 feet deep and 20 feet wide. About 100 feet south of the above-described works, there is another small pit about 15 feet in diameter which also exposes the pegmatite. Recent work has been done in only the northernmost and southernmost openings.

The pegmatite intrudes biotite gneiss which contains interlayered hornblende gneiss. The dike is well-exposed in the north pit where it is between 6-10 feet in thickness. It dips 26° E. and appears to strike N-S generally parallel with the line of openings. It is composed of light gray potash feldspar, mica, and lenses of milky quartz, which are 1-24 inches thick and dip with the pegmatite. The feldspar is not kaolinized to any considerable depth. "A" mica and ruling are rather common features. Books tend to exhibit crystal outline and contain minute spots, connected with dark lines to give the effect of a grating. Some of the mica is finely wrinkled. The quality of mica from this mine seems not to justify the extent of the works.

On Rock Creek two miles north of the Fish Hatchery, there is an old prospect on the Harley Belle Isle property. Mica also is said to have been mined near the head of Little Rock Creek. Other prospects are reported from Frozen Mountain near the head of Frozen Branch.

Towns County

SPANISH MOUNTAIN MINE

This mine is located nine miles by road south of Hiawassee. It is three miles west of the Hiawassee-Cleveland Road and one mile south of the Owl Creek Road in Glassy Mine Gap, 0.75 miles S. 25° W. of the home of Pat Garrett. The mine is now in the Chattahoochee National Forest area.

The mine was first opened and worked for a short time by Alfred Taylor about 1900. Since that time, no work has been done at the mine which is now caved and covered with vegetation. The workings consist of two open pits, one directly in the gap and one about 50 feet below the gap on the north side of the ridge. All of the mica removed came from

the pit on the northern side of the ridge where the opening is about 25 feet long, 12 feet wide and 8 feet deep. The pit in the gap is much smaller.

The country rock, mica gneiss, and the pegmatite are conformable and have a strike of about N. 30° E.; they dip very steeply to the northwest. The small opening in the gap exposes a quartz vein which is about three feet thick. It contains very little mica. In the dump from the other opening, massive, white quartz fragments up to 12 by 18 inches containing mica books are exposed. Small fragments of potash feldspar, partly kaolinized and containing small lenses of quartz, also are in the dump.

The mica found in the dump is clear, flat, splits well, and is colorless. Small amounts of "ribbon" and "A" mica are present. It is reported that nearly 1000 pounds of sheet mica were taken from this mine and sold at Gainesville, Ga. The sheet sizes are reported to range from 2 by 2 to 10 by 10 inches; however, only scrap and a small amount of sheet which would sheet out 1 by 2 inches were found in the dumps when visited in October, 1942.

O. L. BURCH MINE

This property is 2½ miles S. 65° W. of Hiawasee and 2½ miles south of the mouth of Hog Creek on the east side of Long Ridge. The principal opening upon this property is an eighth of a mile northwest of the dwelling and 150 feet up the slope of Long Ridge.

The first work was done here about 60 years ago. The mine was later operated by Norman Poole of Chicago, and several tons of mica are reported to have been removed. The mine is a linear open cut not quite parallel with the vein. The vein apparently strikes about N. 80° E., is nearly vertical, and is about 7 feet wide. The vein is not now exposed. It is said that it consisted of lenses of milky quartz in the central portion with mica and kaolin on the side. The mica is light green in color and many books are spotted, although some are clear. Some of the books are curved, and there is some ruling. It occurs in massive hornblende gneiss and basic rocks which tend to be altered near the pegmatite to garnet chlorite schist.

Other workings occur on the strike of the vein above and below this opening. Several are accessible along the strike and down the slope of the Ridge. Smith¹⁵ states that an old pit occurs in the vein where quartz occupies nearly the entire width of the vein. Mica books at this place are up to 4 inches across, and the mica is flatter at this locality. The total distance from the lower pit to the top pit is about a quarter of a mile. About 40 to 50 yards below the above-mentioned pit, there is a filled

pit upon the property of Victor Burch. Smith states that the mica here is of better quality than at the first described locality.

W. A. HENSON MINE

This mine is located eight miles east of Hiawassee on Scataway Creek, one mile north of the Hiawassee-Clayton Road. The mine is on the farm of a Mr. Bowen and 100 yards northeast of his home. Mr. Bowen owns three-quarters of the mineral rights and Mrs. W. A. Henson, of Hiawassee, owns one-quarter of the mineral rights.

Work was first done at this mine by Fowler Ledford, Haysville, N. C. in 1929. In 1931, Charlie Lee, of Hiawassee, worked for about a week at this mine. Lee dug a drift about 30 feet long into the west side of the hill, but no mica is showing in the drift. Eight open pits have been made on the western side and on top of the hill. The largest of the open pits is on the west side of the hill and is fifteen feet deep and twelve feet in diameter. It is reported that most of the mica removed came from this largest pit.

The pegmatite, conformable to the country rock, strikes about N. 45° E. and dips very near vertical to the northwest. There is only one pegmatite showing at the northern end of the workings; however, along the strike to the south the pegmatite seems to split. At the southernmost parts of the workings, the two branches of the pegmatite are about 75 feet apart. The eastern branch of the pegmatite, which is about eight feet thick, is composed mostly of kaolinized potash feldspar with small lenses of milky quartz and a small amount of mica; the western branch, as well as the main pegmatite, is composed of a lenticular vein of quartz ranging up to two feet in thickness near the middle of the dike. The branch and main pegmatite have a thickness of from 4-6 feet. The mica books are in the quartz, and near the contact of the quartz and potash feldspar.

The mica is smoky to rum in color and is spotted to pattern. It is flat, hard, and splits well. It is reported that sheets up to 8 by 8 inches have been gotten out of this mine. The average sheet size is reported to be about 3 by 4 inches. From 3,000 to 4,000 pounds of sheet and 6,000 pounds of scrap mica were reported by Mr. Bowen to have been sold from this mine.

RABUN COUNTY

Considerable mica has been produced from the pegmatite belt which occupies a northeast-southwest zone about 10 miles east of Clayton. A

prospect on Rabun Bald and others near Scaly, North Carolina may have other connections. The mines produce clear, strategic mica and mica of the "electric" grade. They are in the Highland area, but are generally accessible by roads up mountain valleys and hollows.

NORTON MINE

This mine is located 8.4 miles east of the railroad at Clayton. The natural approach is by way of Warwoman or Pine Mountain Road. The mine is on the southwest side of Earl's Ford Road, 0.4 miles south of its junction with Warwoman Road. The mine is on the Norton place, Lot 20, District 3, Rabun County.

Mica has been known from the property and worked spasmodically for about 60 years. The prospect was opened by John Norton and later leased several times to North Carolina miners. It is said that Irvin Rice of Highlands, N. C., removed about \$1400 worth of mica in 1928. Recent work has been done by J. M. Norton, who states that he has sold about \$1300 worth since 1941. The mica was prospected by WPA workers of the State Mineral Survey Project in 1941. These workers sank a shaft near the southeast end of the present works and recently Mr. Norton removed mica from this shaft. The mine was leased in 1942 to R. H. Cameron of the Georgia Mica Company.

The pegmatite examined by the writers, October 12, 1942 is traceable from the hillside on the southwest side of Earl's Ford Road southward for at least 500 feet. No prospecting has been done on the northeast end where vein quartz is especially pronounced.

The mine is located on the southeastern wall of Warwoman Creek where a small tributary has cut across the pegmatite. The principal development is a drift made by Mr. Norton. This drift has been driven for about 100 feet in a direction S. 50° E. through schist and into the pegmatite at a point about 70 feet above creek level. Near the head of this drift, there has been made four short cross-cuts, each of which encountered some mica but the largest and best is in the head of the drift.

The pegmatite is well-defined and is 15-20 feet wide at the mine. The most reliable strike as taken along the west wall is N. 48° E. The pegmatite rolls slightly but the average dip ranges between 60° SE. to vertical. The pegmatite is unusually coarsely crystalline, and contains a large amount of high-grade potash feldspar. The feldspar is coarse, cleavable microcline, locally exhibiting well-developed crystal faces and coarse graphic granite or "corduroy" spar. The feldspar is generally

light gray in color but some pink feldspar occurs, a feature common to the pegmatites in Rabun County. In the upper part of the mine, the joint surfaces of the feldspar are stained by black manganese oxide.

Quartz lenses 2-3 feet wide and up to 20 feet in length occur near the central portion of the pegmatite. Clear, but green "A" mica occurs along the borders of the quartz lenses. The mica is irregularly distributed in the pegmatite because locally the pegmatite consists almost entirely of feldspar.

Mica from around the quartz lens near the head of the drift is hard, clear, and flat. Norton reports the occurrence of some books at this point 6 by 8 inches in the rough. Mica is plentiful near the foot-wall side of the pegmatite and near its contact with the biotite-granite gneiss. The mica from the foot-wall area is mainly "electric" grade; however, some "A" mica occurs with it. The spotted mica has a faint greenish color. Some of the mica is considerably spotted and the spots are generally concentrated near the center of the books; where books exhibit crystal outline the spots conform to a pattern.

The drift mentioned above has not been driven to the hanging wall of the pegmatite. This pegmatite justifies additional development work carried out in a systematic manner. The dike strikes southwest from the head of the drift, thus mining should progress in this direction into and under the steep hill which rises towards the southwest.

BLECKLEY PROSPECT

This pegmatite, mentioned by Galpin,³ page 171, crosses the Pine Mountain or Warwoman Road, 6.3 miles east of the railroad at Clayton; it occurs in Land Lots 15 and 16, District 39, Rabun County. The property has been owned by Euber Nicholson, Clayton, Route 1, since 1935.

The dike strikes N. 45° W. where it crosses the highway; it was prospected years ago on the south side of the road where the remains of an old trench made along the line of strike may be seen. The pegmatite is well-exposed on the north side of the highway, where it cuts the schist nearly vertically. The dike at the highway attains a maximum thickness of 12 feet but includes much country rock. The enclosing mica schists dip 10-40° N. 30° E., but the dike there is intruded almost vertically into the axis of a local syncline of mica schist. A test pit on the south side put down recently by WPA workers appears to have missed the vein, and another pit on the north side of the road about 20 feet deep was made too near the road and was dug into country rock east

of the vein. The exposure is not especially favorable, but later prospecting might develop possibilities along a probable extension of the dike to the northeast.

Mica is rather evenly distributed throughout the pegmatite. The mica is hard and splits well but is mostly of the "A" type, and books are rather small. The mica is ruled, green in color, and spotted. No books were found that split larger than punch.

PROSPECTS NEAR HAMBY SCHOOL

Several prospects were examined in the vicinity of Hamby School which is located about half a mile southwest of the intersection of Flats Road with Warwoman Road.

A pegmatite has been prospected recently by Jeff Speed upon a steeply wooded slope, several hundred yards south of Warwoman Road. A considerable amount of scrap mica was obtained from a hole about 9 feet deep, where a flat-lying pegmatite four feet or less in width is intruded into granite. The pegmatite is accompanied by a definite quartz vein which attains a thickness of about four feet. Mica is scattered throughout the pegmatite but books are large and more abundant against the quartz. The mica is all of the "wedge A" type, white and free of spots.

About one mile north of Jeff Speed's house on a road to Apple Valley, a small pegmatite is exposed on the northeast side of the road. This pegmatite is associated with small quartz lenses and is of the pocket type. The mica is curved, full of cracks, and much of it is of the "A" type. Several other narrow pegmatite dikes cross this road but very little mica larger than punch may be obtained from any one of them.

On the Flats Road, 0.8 mile north of its junction with Warwoman Road, small books of mica are scattered uniformly through a pegmatite which is about 2½ feet wide. The pegmatite is exposed on the northwest bank of the road, strikes N. 50° E. and dips 55° SE. The mica is hard and of a light rum color but most of it is smaller than punch.

Numerous narrow pegmatites which attain a thickness of three or four feet intrude biotite gneiss in a stone quarry near Holcomb Creek on the Flats Road. Similar pegmatites occur in the vicinity but no mica of commercial quality has been discovered in this locality. Some of the small books of muscovite contain intergrowths of biotite.

KELL MINE

This old mine is one of the best known mines in the state. The mine is located in the northeastern part of the county upon Walnut Fork, a

tributary to Warwoman Creek which drains a part of the southeastern slope of Rabun Bald. The only approach to the mine is a mountain road which leads northward from Warwoman Road to a point 8.3 miles east of the railroad at Clayton. This road follows the western side of a spur of Rabun Bald, and the mine is located at its crossing of Walnut Fork Creek, a rather large mountain stream. The mine is located on Lot 39 of the 3d District of Rabun County. The mine is owned by H. E. and Gus Edwards, and Wm. H. Berry, Jr.

The history of this mine is incompletely known. The mine was first worked by Dan Kell, deceased, of Clayton, who reported that a large amount of stove mica was shipped. Several blocks were encountered which produced trimmed sheets measuring 10 by 12 inches; considerable punch was also shipped. The mine was worked for mica and feldspar in 1917 by H. E. Edwards. Mr. Edwards states that he removed a block of mica which weighed 439 pounds, and sold it in the rough for \$1.00 per pound.

The mine was visited by Galpin³ in 1912. He found an open quarry-like cut 16 by 16 feet at the southwest base of the steep valley wall of Walnut Fork Creek, and only a few feet above stream level. He states that the pegmatite dike attains a maximum width of 24 feet and dips 70° in a direction about N. 70° W. He states that a thickness of 8 to 12 feet along the hanging wall is coarsely crystalline pegmatite.

When visited, October, 1942, the principal drift into the pegmatite was inaccessible and under water. Three main branches of the pegmatite, five to ten feet wide, may be observed above water level. These dike-like extensions cut the country rock at various angles. There is a drift about 15 feet above water level which follows one of the branches of the pegmatite. In this drift, the pegmatite was observed to roll and change dip frequently within short distances. The country rock is generally a pepper and salt-colored biotite gneiss; near the mica pegmatite it strikes about N. 60° E., and dips 35-55 degrees southeast. The gneiss is thoroughly decomposed above water level but retains its original structure. The feldspar of the pegmatite, however, is hard and only slightly kaolinized. All the rocks are fresh at water level.

On the hill above the creek northeast of the entrance to the tunnel, the remains of an old partly-filled pit may be seen. A trench, 6 or 8 feet deep in this field, has been dug recently by WPA workers. Numerous fragments of hard, flat mica occur in the soil but all of the books are smaller than punch size. It is doubtful if this old pit intersected the main pegmatite vein. Since the original drift was driven at near creek

level, those who wish to re-open the old drift will be faced with a serious water problem. If the mica-bearing shoots plunge downward as they do in many mines, the water problem might become insurmountable. There has been insufficient prospecting in the ridge to the northeast of the drift where it is possible that a shaft might intersect the mica-bearing pegmatite.

The dumps near the entrance to the drift consist mostly of quartz since the feldspar has been shipped. Large pieces of opalescent rose quartz, milky quartz, and some smoky quartz occur. Mica books were not found in the quartz thus it is assumed that most of the sheet mica was associated with coarse feldspar. Based upon the probable extent of the operations, the mine produced considerable potash feldspar. A microscopic description and chemical analysis of the feldspar is given by Galpin.³

Fragments of mica observed around the mine are flat, firm and unusually hard. This mica is almost colorless yet small books are dark and opaque. The mica splits exceptionally well and no spots or inclusions were observed. A ton or more of scrap remains at the site of the old trimming shed. A part of this scrap is "A" mica and part of it consists of fragments trimmed from the better grade. Rib-like fragments suggest that some of the "A" books were at least 15 inches in diameter. The "A" mica is green in color and a few small red garnets occasionally occur near the point of the "A." Much of the "A" is of the wedge type, thus it splits very poorly.

The two types of mica described above probably came from different parts of the pegmatite, and probably represent two different periods of mica formation.

TUNNELL OR CREIGHTON MINE

This mine is located 7.7 miles by road east of Clayton. It is 1.7 miles southeast of Antioch School, and one mile southeast of Warwoman Creek and Beck's Mill via Chechero Road. It is in Lot 2, District 3 of Rabun County on property which formerly belonged to the Blue Ridge Railroad Company. This property was later sold to the Southern Railroad Company, and is now owned by George Garrett.

According to reports, the dike was discovered about 1882, at which time it was worked by the Bleckleys. According to Galpin,³ the workings consisted in 1915 of an open cut, 20 by 100 feet and 30 feet deep. Two drifts along the strike of the vein from both ends of the old open cut and four shafts, in the cut and beyond its south end, were made

recently of Cameron. Joe Porterfield, who is in charge of the mine, states that they have removed altogether 20 to 40 tons of mica within the last year.

The pegmatite cross-cuts biotite gneiss, which dips from 0° - 40° southeast and strikes N. 10° E. The dike is well-exposed in the drift at the northeast end of the old cut where it is 12 to 20 feet in width, nearly vertical or dipping steeply to the southeast. It consists of massive feldspar, some quartz lenses and mica. Locally, the dike is nearly all massive, faintly pink potash feldspar. Feldspar is coarser on the northwest contact and local lens-like bodies of medium fine-grained pegmatite occur near the hanging wall. It is stained by black manganese oxide near the surface. Small smoky quartz lenses which occur with the feldspar and mica dip southeast from nearly 0 to 18 degrees. The best mica lies near the foot wall.

The drift to the south follows the pegmatite dike from a point near the old cut S. 15° W. for a distance of about 100 feet, where it intersects the base of a 20-foot shaft. The pegmatite is generally narrower in this direction, where it is 2 to 3 feet thick locally. Mica is plentiful in many places near the hanging wall and foot wall. The pegmatite takes a definite roll to the southeast and widens near the terminus of the drift near the shaft.

The mine is reported to have produced several tons of fine mica prior to recent operations. Porterfield states that a large book found recently cut sheets 8 to 10 inches in size. The mica is clear and specimens range in color between light rum and pale green, the latter may contain spots. "A" mica occurs locally; mica in place in the south drift is occasionally curved; some is spotted, and ribbon structure is especially noticeable. Light rum-colored ribbons 7 by 1 inches occur.

All the present works appear to be rather shallow. The mine should produce a considerable amount of feldspar as well as mica. Present workings extend for a distance of about 250 feet but the dike is probably longer, and it should be further prospected along the strike to the northeast and southwest of the present workings. All attempts at deeper working in this locality should consider ground water problems.

A pegmatite, which strikes nearly east and west, crops out a short distance west of the one described above. This dike should intersect the main pegmatite at a point north of the head of the northeastern drift. It was exposed by a WPA crew at a point north of the mine where it may be seen in a small pit about 60 yards west of the old open cut at the mine.

It is about 6 feet wide and is composed of very pink feldspar, smoky quartz and green mica of the "A" type; there is also some ribbon present.

A coarse granite intrudes biotite gneiss west of this dike. It is composed of potash feldspar and smoky quartz; small garnets are common. This granite is associated with the pegmatites, thus it may be the parent rock from which they were derived.

SPEED - ARRENDALE PROSPECT

This prospect is located on a branch of Dick's Creek about 1.5 miles southeast of Beck's Mill and Warwoman Creek. It is on the east side of a hill about 50 feet above the branch and about three-quarters of a mile S. 40° E. of the old Mark Beck homeplace. The mine is not accessible by road; it is half a mile west of the home of J. F. Speed. The property is located about 9 miles east of Clayton, in Lot 3, District 3, Rabun County.

A small open cut was made on a hillside in 1937 across the strike of the pegmatite by J. M. Speed and J. V. Arrendale. In 1941, WPA workers of the State Mineral Survey Project made three or four parallel trenches on either side of the original prospect.

The country rock is a granitized biotite gneiss which strikes N. 14° E. and dips 81° SE. The pegmatite is about 10 feet thick, striking about N. 37° E.; it dips steeply southeast with the country rock but cuts it at a slight angle. Several feet west of this pegmatite a similar pegmatite about six feet wide is exposed in some of the trenches.

The pegmatite is medium-grained, but coarser where sheet mica occurs. It is reported that 500-600 pounds of mica were removed from the prospect. Some of the mica is flat but a considerable amount is wavy and ruled; "A" mica occurs. The larger books of mica will measure 3 by 4 inches, but they are badly cracked. The mica is green and spotted; in many cases the central portions of the books are black.

About three-quarters of a mile south of this prospect on the trail leading to Joe Hopkins' branch and about half-way between this prospect and the Mark Beck mine, WPA workers have done a small amount of work on another pegmatite. The dike is about three feet wide, strikes N. 40° E., dipping steeply to the southeast. The mica exhibits features similar to the mica described above.

MARK BECK MINE

This old mine is located 7.5 miles (airline) southeast of Clayton on Lot 74, District 4, of Rabun County. The approach from Clayton is via

Warwoman and Dick's Creek roads, but the mine is accessible only by trail. It is located about two miles south of Dick's Creek Road which is the nearest highway approach. The mine is on the west valley wall and about 50 feet above Joe Hopkin's Branch.

This mine was opened in the first years of the present century by Mark Beck upon land then owned by his father, Captain Sam Beck. It was reworked for a short period by J. V. Arrendale around 1920. A small amount of prospecting around the mine was done recently by WPA workers of the State Mineral Survey Project. The mine is now on the land owned by the Federal Government.

The country rocks consist of biotite gneiss with thin lenses of interbedded hornblende gneiss. These rocks dip variably in the vicinity of the mine from 10-30 degrees north and northwest. The strike of the country rock ranges generally between northeast and east. The pegmatite was not well-exposed when examined by the writers. The dike is about 12 feet thick at the north end of the open cut. Sterrett¹⁷ found the dike to range between 6 and 12 feet in thickness.

According to Sterrett, who examined the property in 1907, the mine was developed by means of an open cut about 100 feet long and 10-15 feet deep, with three cross-cutting entries from the down-hill side. At the present writing, the open cut which follows the strike of the dike is about 140 feet long, but it is partly filled.

A dike of milky quartz between one and four feet in thickness, occupies the central part of the pegmatite. According to Watts,¹⁸ about five feet of the dike on either side of the quartz is a good grade of feldspar, the rest of the dike being low grade pegmatite. Coarsely crystallized masses of partly kaolinized feldspar a foot or more in diameter are common in the waste pile. Although a considerable amount of commercial feldspar could be produced at this mine, it could not be removed at the present time. A considerable amount of bluish, bluish-green, and yellowish-green beryl crystals have been found at this locality.

Most of the mica is of the "A" type, and almost all of the samples to be seen in the dump at the present time are "wedge-A". Some of the books are as large as 8 by 10 inches; punch and clear sheets as large as 2 by 3 inches can be obtained from some of the "A" books. The angle of the "A" books is truncated frequently by ruling near the base. The mica is clear, green and free of spots.

PROSPECT ON WESTMINISTER ROAD

A small prospect occurs in the northeast bank of U. S. Highway 76, 3 miles west of the bridge over the Savannah River. The pegmatite is 28 feet wide, is nearly vertical and strikes northeast. It cuts the enclosing biotite gneiss which dips 15° - 35° SE.

The dike consists of massive pink feldspar and milky quartz. A single crystal of microcline, which exhibits crystal faces, was observed to be $2\frac{1}{2}$ feet long and 2 feet thick. Scrap mica is abundant throughout the pegmatite. The mica is green in color but without spots. It is all of the "wedge-A" type; some of the books are at least a foot thick.

PORTER MCCRACKEN MINE

This old mine is 9.7 miles by road southeast of Clayton, and about three-quarters of a mile east of the road between Beck's Mill and Westminister Road, three miles south of Beck's Mill and Warwoman Creek. The mine is about a quarter of a mile southwest of Licklog Creek near a small tributary stream. It is in Lot 67, District 4 of Rabun County.

The mine was first worked by Porter McCracken who later leased it to a company in Lima, Ohio, operations extending until 1906. This organization cut and trimmed mica for shipment on the lease; some of their abandoned equipment was sold as junk in 1941. It is said that they also sold the scrap.

When visited October 14, 1942, an old open cut was found. This cut is about 15-20 feet deep but partly filled with debris, so that the pegmatite is not exposed. The cut is about 150 feet long and strikes about N. 15° W. and probably follows the pegmatite dike. Galpin⁸ states that the pegmatite dips 80° to the east and is composed of rather coarse pinkish feldspar, quartz and muscovite. Large masses of gray to light pink potash feldspar and milky quartz occur at present on the slope below the mine. Galpin writes that the mica occurs in rather thin books which seldom exceed 4 inches in diameter. Mica dug from the old dumps is clear, flat and free of spots, splits well, and sheets as large as 2 by 4 inches occur. Some ruling is present, a few books of flat "A" mica which contain some spots are to be found. It is probable that the best mica came from this trench.

An open cut and a pit were made in a pegmatite dike which strikes generally parallel with the one described above and which lies about 300 feet to the southwest.

The open cut, about 50 feet long and 20 feet wide, was made near the small tributary branch. It does not cut entirely through the pegmatite which may be seen to plunge under the nearly horizontal beds of gneiss at the head of the trench. The pegmatite is at least 15-20 feet wide and consists largely of massive gray to light pink potash feldspar. Loose blocks of massive feldspar several feet in dimensions are numerous as well as some fragments of graphic granite. Lenses of milky quartz are associated with other minerals of the pegmatite. Some prisms of black tourmaline occur in feldspar and quartz. "Burr-rock," several inches to a foot in thickness, tends to lie between the main pegmatite mass and country rock. Very little mica is found but numerous clear to light green books of "wedge-A" remain around the opening.

A small pit, now about 10 feet deep and 20 feet in diameter, was made about 40 yards from the cut described above, and in the same pegmatite. The pit is partly filled but large fragments of coarsely-crystallized gray to light pink feldspar, graphic granite and milky quartz lie in and around the sides of the pit. Large books of wedge or heart-shaped green "A" mica, which are formed about small wedge-shaped lenses of quartz, are abundant. Black prisms of tourmaline occur in feldspar and in the books of mica.

The head of an old, partly filled open cut is crossed by the Beck Mill-Westminister Road about one-fifth mile south of Licklog Creek and 2.8 miles south of Beck's Mill. This cut also was made upon the McCracken property.

The trench runs N. 40° W. and follows the strike of the pegmatite. The pegmatite is exposed in the north bank of the road at the head of the trench where it is rather fine-grained and is about 3 feet wide. A narrow band of feldspar in the center of the dike is coarse-grained. The dike stands nearly vertical, cutting the axis of an anticline of biotite gneiss. This dike is exposed again along the strike in an old road about 250 feet north of this locality where it has not been prospected.

The dump has not been re-worked for mica. The mica is clear, green, containing some spots; some ruling occurs, and some books do not split well. Books 3 by 3 inches in the rough are found in the dump; a small amount of "A" mica occurs. Fragments of light pink feldspar and milky quartz are scattered about around the trench.

The mine on Lot 67 has been made accessible recently by a very good logging road. According to reports, considerable sheet mica was removed from the linear open cut, but a prospect shaft should be made

first in it to determine the present character of the vein. The pegmatite to the southwest should produce considerable feldspar and some scrap. The history of the open cut on the Beck Mill-Westminster Road is not known, although it was made probably around 1906.

L. W. CURTIS PROPERTY

The L. W. Curtis property, southwest of Clayton, is typical of many pegmatites in that area. The pegmatite occurs on Lot 179, several hundred feet above the first spring, on the east side of a spring branch about 400 yards from Betty's Creek road. Narrow pegmatite dikes containing some sheet mica were prospected in this locality by WPA workers of the State Mineral Survey in 1941. Pegmatite dikes, 6-8 feet thick in this locality contain some "A" mica but no sheet mica.

HICK'S MINE

This mine is located about three miles northeast of Pine Mountain on Lot 80, District 3 of Rabun County. When visited by Galpin,³ 1912-14, the mine had been long deserted. He stated:

"A caved drift about 60 feet long follows a pegmatite which varies in width from one to six feet and strikes N. 50° E. with a 60° dip to the southeast. Roan gneiss is the country rock. The mica, slightly brownish in thick plates, is unusually elastic and tough, but the plates found are rather small and no large amount is to be seen in the exposed portions of the dike. Work in this mine was stopped by an unfortunate cave-in which killed the two operators."

RABUN BALD MINE

This mine is located 11 miles by road, and is accessible from Clayton via the highway to Highlands and the dirt road to Rabun Bald south from Scaly, North Carolina. The mine lies on the east side of the Bald about half a mile south of the road's end. It is 250 yards N. 23° E. of the Tower on Rabun Bald and about 100 feet below the crest of the mountain. The mine lies in Lot 90, District 3 of Rabun County.

Most of the work at this mine was done in 1928-29 by J. V. Arrendale, who is reported to have removed about five tons of mica from the mine. No records as to the amount of the production of sheet mica could be obtained by the writers. In 1941, the WPA State Mineral Survey re-prospectied this mine, but most of their work was confined to exposing the pegmatite.

The workings here consist of two open pits about 30 feet apart. The pits are 25 feet wide and 5 feet deep. These openings expose a very lenticular-shaped pegmatite with a maximum thickness of five feet. The dike strikes N. 25° E., dipping 30° SE., which is also about the slope of the ridge. Inclusions of biotite gneiss in the pegmatite are common. The dike and wall rock (biotite gneiss) are hard. The pegmatite is composed of coarsely cleavable microcline feldspar, milky quartz and mica.

The mica is hard, splits well and is clear to greenish-rum in color. Most of it is flat, but wavy books are not uncommon. Some of the mica contains black spots. The greatest defect of the mica from this mine is the abundance of cracks in it.

HART AND ELBERT COUNTIES

Mica-bearing pegmatites occur in Carolina gneiss between Elberton and Hartwell. The known mica producing district here includes about 250 square miles. Most of the mining centered around the old Chapman Mine in Elbert County. There are numerous prospects in various parts of the area worthy of investigation.

Hart County

R. L. SHIFLETT PROSPECT

Eighteen years ago a small prospect was opened about one mile northwest of Montevideo upon the property of R. L. Shiflett, Elberton, Route 3. The site of this prospect is about 650 feet northwest of Little Cedar Creek and two-thirds of a mile due north of the Shiflett home, which house is one mile west of Montevideo on the Flat Rock School-Montevideo Road. The prospect is about 20 feet south of the line between R. L. Shiflett and E. L. Adams. When visited October 1, 1942, the small prospect pit could not be found but a drainage ditch nearby exposed a quartz vein and pegmatite which strikes N. 15° W. The pegmatite is four feet or more in width. Sheet mica was observed on the east side of a quartz lens. About 40 pounds of clay-stained mica was exposed. This exposure consisted of a single book, the larger sheets from this book measured at least 14 by 14 inches, but at least half of the mica was of the "A" type.

MACK CARTER PROSPECT

Prospecting was done upon the property of Mack Carter, Elberton, Route 3, a short distance north of the Montevideo-Flat Rock School road, 1.75 miles west of Montevideo.

According to Mr. Carter, a hole was dug about 600 feet N. 20° E. from the Carter house; this work was done about 18 years ago. There are two parallel pegmatites about 150 feet apart northeast of the house. The easternmost one strikes N. 25° E. and appears to extend from the vicinity of his house to the banks of Little Cedar Creek, a distance of about 900 feet. Its course is marked by rather persistent smoky quartz float associated with fragments of sheet mica. The small prospect made in this lead has been filled up. Mica taken from this pit was found in the field about 300 feet from the road and east of the Carter house where sheets are abundant at the present time in the soil. The mica is clear, flat and free of spots. Many fragments 2 by 3 inches in size occur here. When mica was mined here, this property was owned by John Craft. This prospect is probably that of the J. W. Craft farm mentioned by Galpin³. According to the above-mentioned report, the prospectors are said to have sacked ready for shipment about 2 tons of thumb-trimmed mica.

MINES BETWEEN AIRLINE AND MACEDONIA CHURCH

Most of the openings are close to and on the northeast side of the Airline-Vanna Road about 1.5 miles by road southwest of Airline. The pegmatite belt extends from the clay road about half a mile to the northeast, and across Lightwood Log Creek. The openings lie along the trend of the pegmatite zone which strikes approximately N. 50° E. through the properties of Truett Garner, Howard Banister (the old Moss place), and to the property on the northeast side of Lightwood Log Creek.

Mining was done in this area in the fall of 1942 by W. G. Miltenberger in partnership with Phil Stovall of Sylva, North Carolina. At this time, a considerable amount of mica had been mined although the property was in the prospecting stage. Prospecting was confined to the Banister and Garner properties. At that time, five openings had been made along the strike of the pegmatite southwest of Lightwood Log Creek. Also, two other openings were made on the Garner property on the southeast side of the belt.

The pegmatites are intruded into a coarse-grained granitized mica schist. These pegmatites (fig. 5) can be traced by mica and fragments of quartz. Black tourmaline is a common accessory mineral but is especially abundant towards the northeastern portion of the belt. A pit in the field of the Banister property exposed a pegmatite about 12 feet thick which dips 50° SE. A quartz lens, 3 feet thick, occurs in the pegmatite about 1 foot below the hanging wall. Narrow schist inclusions, dipping southeast, occur throughout the pegmatite. The largest and best mica is

found on the side of the quartz lens. Miltenberger stated that he removed about 5 tons of mica from around this quartz lens, which is exposed in a pit 15 feet deep and 30 feet long. The pit is located on the slope of the hill about 350 feet southwest of the creek.

It is said that two other pits in a cultivated field on the Banister property produced about 6 tons of mica. Also, it is reported that 2 tons of mica were taken from other small pits on the Garner property where mica books up to 4 by 6 inches can be picked up in the field along the strike for a short distance to the northeast of the pits.

Several pits, made in the vicinity of a quartz "blow-out" on the Banister property in the woods, on the hill southwest of the creek, expose sheets of mica in a pegmatite which strikes N. 45° E. and dips 45° SE. It is about 3 feet wide and contains stringers of schist. The mica is considerably ruled. Most of the mining has been done from this locality northeastward to the creek. Just above creek level, Miltenberger drifted into the vein and downward to water level. At this place, the pegmatite dips about 25° SE., is about 5 feet wide, contains some schist bands, and quartz lenses that are 1 to 2 feet in thickness. Most of the best mica may have been gotten at this locality. The mica is light rum-colored, and no "A" structures are observed; there are some marginal quartz inclusions. Many of the books left behind are cracked. Mica books, 8 inches or more in diameter, were obtained here where mining ceased shortly after a workman was seriously injured by a cave-in. In the field southwest of this drift, there is a small pit which appears to be in a pegmatite to the west of this lead. Good, flat mica, some of which will trim 2 by 3 inches, had been left around the pit.

More prospecting should be done here as well as at other localities upon this property. The Colonial Mica Corporation reports that 3056 pounds of mica were sold to them from the Moss property in the fall of 1942 with a total value of \$726.27.

HARPER - PIERMAN PROSPECT

This prospect occurs 1.5 miles due south of Hartwell and one-half mile east of the Hartwell-Bio School road. It is in a cultivated field about 250 feet southwest of Cedar Creek, on the property of A. B. C. Harper and Howard Pierman of Hartwell.

A small pit about 5 feet deep and 10 feet in diameter was dug recently by O. E. Thomas. The pit passes through a pegmatite which lies nearly horizontal and which is two or three feet thick. A foot or

more of granite grading into soil immediately overlies the pegmatite, which is underlayered by granitized Carolina gneiss. It is reported that about 200 pounds of sheet was obtained from this pit. The prospect has been leased recently by W. G. Miltenberger.

The mica observed here is clear in color and generally flat; some sheets contain a few very small black spots and some "A" structure; some of the sheets are curved. Some books contain small flat crystals of brown tourmaline. The prisms occur without orientation and their "c" axes lie parallel to mica cleavage. A few sheets of mica were observed to contain thin interlayered films of quartz.

Fragments of mica 2 by 3 inches or larger were observed in the soil at unprospected points in the vicinity of the property when it was examined October 1, 1942.

MICA IN WESTERN HART COUNTY

More prospecting should be done east of Bowersville and Canon in western Hart County.

Good rum-colored mica is reported from the property of Enman Martin, Route 1, Canon, one mile west of Crossroads Church. A pit there, taken recently to water level, was abandoned for lack of a pump. The adjoining property to the north, owned by Joe Wood, contains a similar type of mica. A pit here 25 feet deep is now filled.

At present, mica is mined about 1.5 miles east of Canon upon the property of Fred Ridgeway. The mine, known as the Horsehead Mine, is leased by Ralph Payne, and mining is done by the Payne brothers. The pegmatite was prospected first about two years ago, when it was exposed in a gully on a hillside. About \$1000 worth of mica was sold in 1942-43 to North Carolina mica buyers. Most of the mica was taken from a shallow drift about 30 feet long on the east side of the gully. Recently, the boys, upon advice of Mr. Lynn W. Thomas of the Colonial Mica Corporation, made a pit now 10 feet deep on the west side of the gully where they have re-contacted the pegmatite on its strike. They now have in stock 20 pounds worked up of light, rum-colored mica, and about 100 pounds of block mica. The books are clay-stained, thus are split thin. The prospect has promise, thus mining should be continued.

The pegmatite is about 4 feet thick, strikes about E-W, dips 45° S., and according to the rule rolls in direction of the dip. The dike is conformable generally to the enclosing mica schist, and contains numerous

weathered schist "horses." It consists mostly of mica and quartz on the hanging wall side, with disconnected quartz lenses in the middle (fig. 6). The mica is clear, free of spots and of good quality. Books, which will measure 10 inches or more along the cleavage, occur. The mica is flat; there is some ruling, but cracks are its principal defect. The boys have obtained some trimmed sheets as large as 5 by 5 inches from the pit.

Elbert County

CHAPMAN MINE

The most extensive mica mining in Elbert County has taken place on the J. E. Chapman estate (fig. 35) located 10 miles by road north of Elberton, and a quarter of a mile due south of Rock Branch settlement. The mines lie between Rock Branch and the Elberton-Iva Highway, with all the workings on the northeast side of Coldwater Creek. The mines are accessible by clay road from Rock Branch settlement or by clay road leading off the Elberton-Iva Highway at the bridge over Coldwater Creek. The Chapman estate is now administered by Mr. M. E. Chapman of Anderson, South Carolina. The pegmatite corresponds to the type illustrated by figure 5.

There have been numerous periods of mica mining in this locality and according to reports, the earlier workings were made 40 or more years ago. Galpin³ states that operations are reported to have been most extensive in 1907 and that considerable work was done in 1910. When visited by Galpin in 1913, the principal workings consisted of a long drift driven into the hillside above Coldwater Creek and a cross-cut driven towards the drift from a tributary of Coldwater Creek.

C. M. Wacaster is said to have taken over these works and to have extended the drift toward the northeast about 1924. He is reported to have operated here for about two years, and to have removed a considerable amount of good sheet mica. During Wacaster's operation, all the work was in kaolinized material which made it necessary to heavily timber the mine works.

When visited by the writer, October 5, 1942, the old drift mentioned above was observed to follow the pegmatite in a direction N. 20° E. from a point above the water level of Coldwater Creek into the hill on the north side of the creek. Several old, caved shafts occur along the line of the drift which probably intersected the drift. A shaft near the northeast end of the drift (3, fig. 35) strikes the floor of the drift at a point about 25 feet from the surface, thus the floor of the drift rises to the

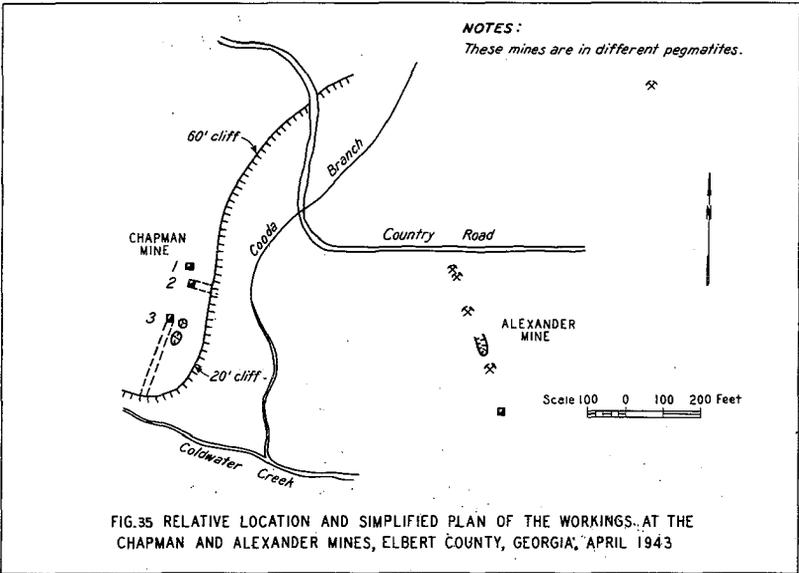


FIG.35 RELATIVE LOCATION AND SIMPLIFIED PLAN OF THE WORKINGS AT THE CHAPMAN AND ALEXANDER MINES, ELBERT COUNTY, GEORGIA, APRIL 1943

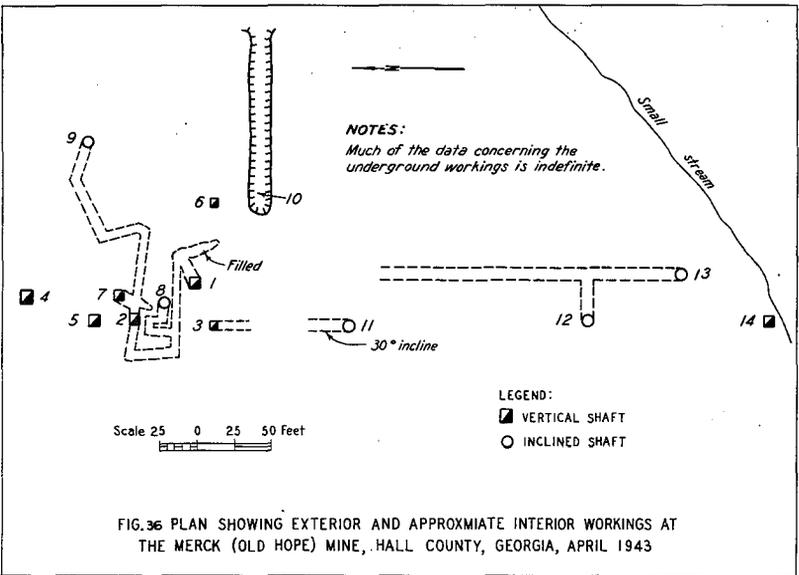


FIG.36 PLAN SHOWING EXTERIOR AND APPROXIMATE INTERIOR WORKINGS AT THE MERCK (OLD HOPE) MINE, HALL COUNTY, GEORGIA, APRIL 1943

northeast. The drift averages about four feet in width. The main dike in this shaft is generally conformable to the schist which strikes N. 20° E., dipping 20°-45° SE. The dike is very irregular in shape, containing many "horses" and stringers of schist. It cross-cuts the enclosing rock in many places. The mica from the shaft is green and of the "A" type. Some of it is spotted. The pegmatite is coarse-grained with smoky quartz, mica, and coarse, cleavable feldspar. The feldspar should be hard and but slightly kaolinized at water level.

Shaft No. 2 is filled and now 5 feet deep. This shaft seems to be in the eastern "vein." Pegmatite exposed in its sides contains mica of the "A" type, clear or rum-colored, the latter containing inclusions of biotite. Samples do not split well. Shaft No. 1 is partly filled but now about 40 feet deep with drifting east and west near the bottom.

A better type of mica came from the caved drift in the southwest part of the mine. Specimens of mica in the dump are clear, flat and lack spots. Most of the good mica comes from this part of the pegmatite; some is said to have trimmed up to 5 by 6 inches. The soft material over the drift has settled into the old workings. The mine could be reopened by converting the old drift into an open cut or by sinking a shaft into hard rock below its level. Mr. Wacaster states that the pegmatite has been mined to water level along the drift. According to Galpin,³ the pegmatite dike followed by the drift averages about 7 feet in width and strikes with the micaceous gneisses, dipping nearly vertically. The pegmatite in the old drift was not accessible to the writers.

Pegmatite occurs near the end of the cross-cut tunnel mentioned by Galpin driven N. 75° W. from the northwest side of the valley wall of "Cooda" Branch, a small tributary to Coldwater Creek. Pegmatite was intersected at a point 50 feet from the entrance. The dike at this point is from 3 to 4 feet wide; it strikes N. 65° E. and dips 45° NW. Since the pegmatite at this place contains very little sheet mica and since the dip differs from that recorded by Galpin, it probably represents an off-shooting dike east of the main lead. Other openings upon this eastern "lead" are represented in Figure 35. The pegmatite, as observed near the head of the cross-cutting tunnel, is medium-coarse in texture with rather small books of mica evenly distributed through the vein. The enclosing schist and gneisses in the immediate vicinity of the mine dip 45°-60° SE. and strike N. 35°-50° E. Biotite in the country rocks near the pegmatite has been altered to vermiculite.

Several unprospected outcrops of pegmatite occur in the field 50-75 feet northwest of a shaft which was driven into the head of the above-described cross-cutting tunnel. This lead may be traced northeastward to the clay road by the presence of mica sheets up to $1\frac{1}{2}$ to 2 inches in size, and fragments of white vein quartz.

The mica-bearing pegmatite dikes of this section intrude included areas of mica schist which extend from the north into the granite, thus are separated by tongues of granite. Northwest of the Elberton-Iva Highway, which is on granite, a body of schist extends southward into the granite area. This body of schist includes the pegmatite described above, and it also includes the pegmatite on the Alexander property east of the old Chapman mines. A tongue of granite fingering northward into schist occurs between the old Chapman mines and a 30-foot shaft on the south side of the clay road. Just west of this shaft, another extension of schist extends southwestward into granite and granitized schist. Another pegmatite occurs in this schist zone. This pegmatite extends from the Ward property southwestward into the Chapman where it terminates near Coldwater Creek at the granite contact. The rocks to the northwest of the zone that includes the pegmatite are well-exposed in the rapids of Coldwater Creek. This rock is a primary granite gneiss which has assimilated and included a large amount of the original biotite gneiss; thus this rock may be regarded as a granite.

The northwestern pegmatite lead on the Chapman property has been extensively prospected from the granite contact south of the clay road, northeastward east of the house of Pomp High Smith (colored) to "Cooda" Branch, a distance of slightly more than one-half mile. This pegmatite strikes N. 45° E. and is characterized by a strong quartz lead. The quartz is smoky or milky in color, but not coarsely crystalline. Southwest of the clay road, loose fragments of quartz contain small mica books and flat, smooth surfaces against which mica books were formed. Prospecting along the lead southwest of the road apparently did not produce very much mica.

Northwest of the road the pegmatite appears to be at least 12 feet wide in places, and the workings are more extensive. The mica is clear and white, but most of the mica remaining around the openings is wedge and "A" mica or of the "herringbone" type. Present indications suggest that a considerable amount of scrap was obtained from this locality.

The square shaft 30 feet deep mentioned above beside the clay road occurs in the middle of the mining section, S. 5° E. of Pomp High Smith's

house. This shaft was sunk in the northwestern edge of the granite tongue at a point where a coarse medium-textured pegmatite intrudes the coarse granite. Mica fragments are numerous on the dump but practically all of them are smaller than punch. In general, where irregular bodies of mica pegmatite without definite foot wall or hanging wall intrude granite, the mica is small. The small books are clear, free of spots, and of a very light rum color.

ALEXANDER MINE

This mine occurs between the Elberton-Iva Road and the Chapman Mine. A series of pits are located between Coldwater Creek and the clay road which passes through the Chapman Mines. These openings are on the old Alexander place which is now owned by Mrs. Ethel Galaway of Tampa, Florida. The pegmatite has been worked by a series of six pits and a shaft at the southwest end. These openings extend from the clay road mentioned above to a point about 500 feet to the southeast. The pegmatite strikes about N. 20° W. and is associated with a moderately strong quartz lead. The pits were made at various times by Brown and Bailey, and Bailey is reported to have obtained some good mica.

Fragments of mica 3 by 8 inches that would cut punch or better were observed when the property was visited. The mica is clear in color. Very little mica above punch size was left at the mine but no authentic reports regarding shipments could be obtained. "A" mica with considerable ruling, and some mica with imperfect cleavage, are common features of specimens remaining on the dump. A noticeable amount of biotite flakes between the sizes of a dime and quarter occurs.

Northeast of the above-mentioned clay road, and between 650-800 feet N. 30° E. of the tenant house, several pits were dug for mica. Hornblende gneiss is a common wall rock. The pegmatite consists of kaolinized feldspar and quartz fragments striking N. 10° E. The mica is white to light rum in color. Mica sheets which remain at the pits are small and badly fractured. Some of the sheets are curved and do not split well. This prospect is not particularly promising.

WARD PROSPECT

The Ward prospect occurs in the northeast part of the county in the Rock Branch section. The prospect is on the farm of Mr. R. M. Ward, one mile southwest of Rock Branch High School, and three-fourths of a mile northwest of the intersection of Rock Branch with Coldwater Creek.

The prospect consists of two showings of mica. At each, a small amount of work has been done. These slightly prospected points are located southwest of the Ward home; one in a field about 1000 feet from the house and the other along the strike to the southwest in the edge of a pine grove.

The history of the prospect in the pines is not well-known; however, the first work was done prior to 1917. This work consisted of trenching along the pegmatite outcrop for about 100 feet. The trench appears to have averaged about four feet in depth. At this same early date several shallow pits were made; later, probably during 1917-18, a shallow shaft about 25 feet deep was sunk 18 feet northwest of the pegmatite outcrop. The vein was encountered near the base of the shaft. From the bottom a small amount of drifting was done along the vein. The report and dumps indicate that the drifts encountered kaolin. About 1940, some North Carolina miners cleaned out the shaft and took out a small amount of mica.

This prospect in the pines is on a pegmatite striking about N. 35° E. and dipping about 45° to the northwest. Exposures show the vein to be at least six feet wide. Quartz veins in the pegmatite were observed up to one foot in width. The feldspar is of the potash type with crystals up to eight inches in diameter. It is probably kaolinized to a depth of 50 feet.

Only mica in the dump was available for inspection. This mica was found to be very slightly stained by a few long, narrow, rectangular black spots. However, clear areas of 2 by 3 inches were noted between these rectangles. The color is medium rum. Some ruled and flat "A" books also occur. The largest fragments observed on the small dumps are about 3 by 4 inches. In the dumps at the small circular shaft are some small, clear, flat sheets of mica.

The mica prospect in the field was opened by Mr. Ward in 1925. At that time, he mined and sold to the Asheville Mica Company \$75.00 worth of sheet. Mr. Ward reports finding flat rum books up to 5 by 6 inches. The mica observed in the dump is mainly sound, and of the flat rum type. A small amount of flat "A" mica occurs.

The prospect in the field consists of a cut about 30 feet long, which was 25 feet deep at the west end before caving. The pegmatite is reported by Ward to be about four feet wide; it dips 55° to the northwest. The largest mica was found along the contacts on the hanging wall side.

ROCK BRANCH CHURCH PROPERTY (COLORED)

Rock Branch Church (colored) is located about half a mile north of the Ward home. A mica-bearing pegmatite walls the church well at a depth of about 30 feet.

The pegmatite can be seen in the well where it dips to the northwest; in the dump from the well, there are fragments of 2- by 1-inch flat, clean rum-colored sheets; also, a small amount of "A" mica.

Beyond the church property, and in an adjacent field to the northeast, there is a showing of quartz and mica fragments. This is in line with the strike of the vein in the well. The property in the field should be prospected.

NEW BETHEL M. E. CHURCH PROSPECT

This prospect is located on the north side of the Elberton-Iva Highway at a point two miles northeast of New Bethel M. E. Church in the Rock Branch section. The prospecting was done in 1942 by Mr. Frank Daniel. The work consists of a pit six feet deep. The contacts of the pegmatite are not exposed but it is at least 12 feet wide.

Mica fragments up to 2 by 3 inches occur in the dump. Most of the mica seen is cracked and curved. The prospect is of little value.

C. U. GAINES PROSPECT

Mica occurs in cultivated fields on the property of C. U. Gaines, Elberton, Route 3, about 1500 to 2000 feet southwest of the school at Montevideo. Sheets of mica are found in a field at a point 150 yards N. 45° E. of Mrs. Sally Partain's house and about 200 yards east of the Montevideo-Elberton Road. The mica is flat and splits well; some sheets contain black spots. Loose fragments are abundant in the soil where sheets up to 2 by 3 inches occur. No prospecting has been done at this point.

On the west side of the above-mentioned road, Mr. Gaines states that some mica was mined by parties unknown about 25 years ago. He also reports that much mica was hauled away from a pit 20 feet deep. This operation was stopped by Mr. Gaines who filled the hole. Small pieces of sheet mica occur in the soil at this spot which is about 75 yards northwest of Mrs. Sally Partain's house. Some of this mica contains a pattern spot.

COOLEY MINE

The Cooley Mine is on the N. M. Cooley farm, 1.5 mile west of the Savannah River and on a clay road three-fourths of a mile northwest of the Elberton-Iva Highway, two miles east of the Rock Branch section. The mine was in production, September, 1942, operated by Mr. O. E. Thomas. The chief miner is Luther Willis. The deposit was discovered and opened this year. The development work to date consists

of two inclined, irregular, shallow shafts down the dip of the vein to a depth of about 20 feet; also drifting along the vein for about 45 feet. The waste and mica is pulled out of the shafts by rope and windlass. Three men work the mine. About eight thousand pounds of mica, both sheet and scrap, have been taken out of the mine.

Most of the mica produced is block "A," usually wavy; the color is pale green to light rum. All cut pattern is wavy. Much of the mica is greatly shattered; many of the "A" books are 6 by 8 inches in size.

The pegmatite is from $2\frac{1}{2}$ to 3 feet thick, strikes N. 30° E., dipping 53° NW. It contains "burr-rock." The feldspar is of the potash type partly kaolinized to present depth of mining; the wall rock is coarse-grained granite. Numerous fragments of beryl were found on the dumps and several crystals six inches in diameter were observed.

It is doubtful if this mine can be worked at a profit for sheet mica.

CRAFT PROSPECT

A small amount of prospecting has been done on the farm of J. H. Craft in the extreme northeast corner of Elbert County. The Craft farm borders the Savannah River, and is 3.5 miles due east of Montevideo.

A few years ago, two small pits were dug on mica pegmatites at a point about halfway between the Craft house and the river. These pits are near and on the northeast side of the farm road. The pits are on separate pegmatites which are about 800 feet apart, but sufficient work had not been done to determine the strike of the pegmatites.

The pit nearest the river has exposed enough good mica to justify additional work. This pit is visible from the farm road.

DEWY ROSE PROSPECT

A small prospect was opened recently by J. H. Tate of Dewy Rose in a field about 500 feet N. 15° E. from his dwelling. A small amount of sheet mica was obtained in an opening from which he removed about one cubit yard of soil. Some of the sheets trimmed to 2 by 3 inches; much of the mica is ruled. The pegmatite is probably narrow; it strikes about N. 30° E. associated with a quartz lead.

OTHER MINES AND PROSPECTS

Strategic mica has been mined near Gainesville in Hall County, in Henry County, and from several other localities. A considerable amount of mica of the "electric" grade has been taken collectively from Pauld-

ing, Troup, Jasper, Morgan, Cobb, southern Cherokee County, and the northern part of Fulton County. Later prospecting may discover good mica in other counties.

Carroll County

B. W. TREADWAY PROSPECT

This prospect is located one mile northwest of Temple between the country road to Draketown and the Atlanta and Greenville Line of the Southern Railroad. This property was formerly owned by J. A. Potate of Temple, but it is now owned by B. W. Treadway of Temple. History of the work at this prospect is obscure; however, Mr. Treadway states that someone mined mica at this locality in 1917-18. The old workings are badly caved and filled. Apparently, they originally consisted of a shaft and an open cut about 50 feet apart both made in the same pegmatite. The shaft was in a field and has since been filled.

Exposure of the pegmatite is poor, but it appears to be 4-6 feet wide and very lenticular in shape. The pegmatite appears to be conformable to the enclosing garnetiferous mica schist country rock, which strikes N. 43° E. and dips 72° SE. The pegmatite is composed of kaolinized feldspar, small lenticular bodies of quartz, and mica. The mica is green in color, curved, cracked, very badly spotted, splits poorly, and contains "A" structure. Ruling is very pronounced in all of the mica.

Some small sheets of electric grade could be obtained here, but the amount of waste and scrap would be large. It is very doubtful that with even the present high prices of mica, any profit could be made in mining mica at this locality.

Paralleling and northwest of the above-described pegmatite, there are numerous small, lenticular pegmatite dikes exposed in the road cuts. All of these small dikes contain small books of mica, but the books are not large enough to produce sheet. It is very doubtful if good sheet mica can be produced from this area.

Cobb County

MABRY PROSPECT

Mica is found on this place in Lots 176, 177 and 184, 2d District of Cobb County. These openings are at and near Wesley Chapel on or near the Upper Roswell Road. Prospects are on the farm of V. N. Mabry, Route 2, Marietta.

A small trench was dug on Lot 184 about half a mile S. 50° W. of the home site in 1942. About 400 pounds of sheet were removed by the operator although the owner received no payment. Later, 640 pounds of scrap and sheet were removed by others. Sheet which squared 5 by 6 inches was removed. The pegmatite is 4-5 feet wide where it cross-cuts the mica schist almost vertically. Some "burr-rock" may be found on the dump. The country rock dips 47° SE. and strikes N. 10° E. The pegmatite, where exposed, is conformable to it. The mica is clear but small spots generally occur. No "A" mica was observed but "ribbon" is common. Some of the mica is clear and of strategic quality. The pegmatite should be further prospected.

Nearby, on the southeast corner of Lot 176, a pit 20 feet in diameter and 8 feet deep was dug in 1942 with a power shovel. This pit is a fifth of a mile S. 60° W. of the house. The pegmatite at this place is graphic granite, and only a small amount of scrap mica was obtained.

On Lot 177, there is a small pit dug in 1942 by the Reverend Chastain. This pit is about one-quarter mile due east of the house. Only "A" mica was obtained from this pit.

In the fall of 1942, a pit was made with a power shovel beside the Upper Roswell Road on the northeast corner of Lot 176, 300 feet S. 34° W. of Wesley Chapel. The pegmatite is not exposed. About a ton of "A" mica and some books of flat-spotted mica were obtained here. The spotted or black mica is hard and rum colored but it constitutes a small part of the total amount obtained.

LUTHER CHALKER PROPERTY

This property is half a mile (airline) S. 60° W. of Shiloh Church and is owned by Luther Chalker of Kennesaw. Some mining is said to have been done here about 70 years ago at a point in an open field about one-fifth of a mile west of the tenant house. An old pit at this locality said to be 100 feet deep is now largely filled. No pegmatite or country rock is exposed. An old drift, now unexposed, extended in a northward direction from the pit. Kaolin, mica, and light smoky quartz compose the dump. There is some greenish-colored "A" mica, and the quartz fragments show the impression of mica books. Most of the mica is light rum-colored; fragments in the dump are smaller than punch. The books are hard, flat, and split well, but are spotted. No records regarding production are available to the writers. It is reported that there is another shaft at a point about a fifth of a mile N. 60° E. of this place.

Dawson County**G. W. ELKINS PROPERTY**

This property is located at the junction of the Dawson, Pickens, and Cherokee County lines. It is 13 miles by road southeast of Tate. The property is now owned by A. J. Elkins who lives on the farm, Lot 818, 4th District, 1st Section of Dawson County. A small hole was dug in a field by G. W. Elkins some years ago at a point about one-tenth mile S. 25° E. of the dwelling. The hole is now filled; small pieces of mica may be found in the soil.

Books of mica may be found in the field in the same land lot as above about one-quarter mile S. 25° E. of the dwelling on top of a high, flat hill. The pegmatite is not exposed, but is probably the same one mentioned above. The mica at this locality is of the "A" variety and all specimens observed were very much weathered; however, clear, flat sheet as large as 2 by 3 inches may be trimmed from the centers of the "A" books. Fragments of the pegmatite consists of coarse feldspar, quartz, black tourmaline, and mica books. This spot should be prospected.

A small hole was made about five years ago on Lot 816, about a third of a mile N. 40° W. of the above-described locality. Some good mica is reported to have been taken from the hole which is now considerably filled. The pegmatite is not exposed but it is said to strike about N. 80° W. No "A" mica was noted at this locality and the only mica noted around the pit at the present time is some small books of broken and twisted mica.

The country rock is a fine-grained, gray biotite gneiss and schist which strikes N. 85° E. and dips 80° SE. Numerous narrow pegmatite dikes occur in Lot 816, but only small pieces of mica are observed generally in the soil.

DeKalb County**G. E. VAUGHN PROPERTY**

This property, formerly known as the old Bud Johnson place, is now owned by G. E. Vaughn, Lithonia, Route 2. It lies a mile northwest of the Covington Highway on Philips Road and is one mile (airline) N. 60° W. of Lithonia High School.

The pegmatite has not been prospected and is poorly exposed in cultivated fields. It appears to strike generally N-S. It is 10 feet or more wide and may be traced by mica fragments, and by fragments of very coarsely

granular smoky quartz. The mica is green, but no "A" structures were observed. It is badly cracked and many pieces exhibit minute, almost microscopic black spots. Some sheets as large as 3 by 4 inches occur, but the largest mica cut from them is punch size with some 1½ by 2-inch size. Mica books are largest and most abundant at a point about 300 feet S. 30° E. of the house. Prospects for sheet mica here are not particularly good.

Fragments of potash feldspar, cleavable massive feldspar, quartz, and small books of mica are abundant in the soil just southwest of Philips Road and dwelling. The mica is similar to that described above but contains small garnets. The locality is unprospected but undoubtedly good, commercial feldspar could be obtained here.

Fayette County

PORTER PROPERTY

This property, owned by the Rev. B. D. Porter, lies about 8 miles southwest of Fayetteville and 2 miles northeast of Storr's Mill on the Fayetteville-Senoia Road. It is on Land Lot 190, District 6 of Fayette County.

This pegmatite was prospected by Mr. Porter several years ago. Black tourmaline is common especially associated with quartz lenses. The mica is of the "A" type and is generally spotted. A large piece of columbite found by Mr. Porter on this property is on display in the State Capitol at Atlanta.

Forsyth County

HARRISON PROPERTY

A small pit has been dug in a narrow pegmatite in the search for mica on the property of Mr. Harrison. This property is located in the northwestern part of Forsyth County 4 miles west of Coal Mountain, one mile west of Hurt and Moore's store, and a quarter of a mile southwest of Zion Hill church. It is on Lot 381, 3d District, 1st Section of Forsyth County. The pegmatite, about 3 feet thick, has been exposed by a small pit about 4 feet deep. The dike is medium-grained rock enclosed in garnetiferous mica schist. It strikes N. 30° E., dipping 60° SE. Milky quartz is present in the dike in the form of small lenses. The feldspar is completely kaolinized. Mica occurs rather evenly distributed throughout the entire pegmatite associated with the small quartz lenses.

The mica is flat, rum-colored, hard, and splits well. The books are small, usually measuring less than 3.5 inches across the cleavage. Some of the books of mica contain very small black spots as well as traces of "A" structure.

H. D. HANSARD PROSPECT

In 1925, a mica prospect was opened on the farm of H. D. Hansard. This prospect is located northeast of Mr. Hansard's home, half a mile south of Roanoke church and 10 miles by road northwest of Buford. It is on Lot 62 or 63, District 14, Section 1 of Forsyth County.

The workings on this property consist of a partly filled pit 10 feet deep originally and a caved drift to the northeast 30 feet long which intersects the pit. The pegmatite is not exposed, but it is reported to strike about N. 50° E., dipping to the southeast. Mica schist striking N. 57° E. and dipping to the southeast encloses the pegmatite. From fragments of pegmatite seen on the dump around the mine, apparently the dike is very coarse-grained containing a strong lead of milky quartz up to 18 inches thick, kaolinized feldspar, and mica. The mica appears to occur in the quartz as well as against it, as evidenced by the impressions of mica books in and against the quartz seen in the dump.

All of the mica found around the prospect is rum-colored and hard. It is slightly curved and cracked, also containing small specks of magnetite. The largest mica books found would trim punch and 1½ by 2-inch sheet sizes. Much of the mica is scrap.

O. P. BENNETT PROSPECT

Recently, some prospecting has been done on the property of O. P. Bennett which is located one mile south of the Cumming-Canton Highway, five miles by road west of Cumming. The pegmatite exposed by a pit about four feet deep is 4-5 feet thick striking N. 20° E. and dipping 28° NW. with the biotite gneiss country rock. The dike is composed of small lenticular masses of milky quartz, hard kaolinized feldspar, and mica. The mica books are very small, hard, clear and colorless. All of the mica is of the flat "A" type with sheets large enough to trim only punch mica.

OSCAR McBRAYER PROSPECT

Recent prospects for mica have been made on the Oscar McBrayer farm. This prospect is located in the northwestern part of Forsyth County north of Settingdown Creek. It is three miles west of Hurt and Moore's store, six miles west of Coal Mountain, and two miles west of Zion Hill Church. The prospect is on Lot 378, 3d District, 1st Section of Forsyth County.

In the spring of 1942, Frank B. English of North Carolina dug an incline into a pegmatite one-quarter mile west of Mr. McBrayer's home. Mr. English is reported to have worked here for two weeks and sold his

lease to Ira Gowans, also of North Carolina. Mr. Gowans is said to have worked about three weeks at the prospect and then abandoned it. No work has been done at the prospect since that time.

The pegmatite exposed in the incline is coarse-grained, and about three feet thick. It is enclosed in biotite gneiss with which it is apparently conformable. The dike strikes N. 34° E., dipping 30° SE. The pegmatite is coarse-grained, composed of stringers and lenses of milky quartz, kaolinized feldspar, and mica.

Mica books occur throughout the pegmatite, but are concentrated in and against quartz lenses and stringers. Two types of mica are present in the pegmatite, green "wedge-A" and colorless flat mica. The green "wedge-A" type of mica occurs in quartz lenses and stringers. The books are generally small and contain no sheet at all. Inclusions of magnetite and garnet are common in the "wedge-A" mica. The other variety of mica is colorless, flat, and splits well. This type of mica occurs in the kaolinized feldspar and against the quartz. It is badly cracked and is soft. Mr. McBrayer reported that Mr. English removed one block of mica which weighed 150 pounds, but dimensions on the book were not given to the writers. No doubt, some good sheet mica could be obtained from this prospect; however, a high percentage of the mica taken from this pegmatite will be scrap mica.

Franklin County

PROSPECTS NEAR LAVONIA

Several narrow lensy mica pegmatites cross the Lavonia-Royston Highway between Lavonia and Bowersville. These dikes have not been prospected. The mica is dark green in color, and mainly of the "A" variety. The outcrops exposed along the highway are unpromising.

At Fair View Church on the Lavonia-Carnesville Highway four and one-half miles southwest of Lavonia, prospecting has been done by O. E. Thomas of Tennessee on the property of G. S. Weldon. Three shallow pits were dug recently on the northwest side of the highway near the church. The pits were made in two parallel pegmatite veins. The north-eastern vein is exposed on both sides of the highway where it strikes N. 60° E. and dips 65° to the southeast. The other pegmatite is not exposed in the road but appears to have a similar strike where it occurs 50-60 feet northwest of the former. The pegmatites are associated with a moderately persistent quartz lead. The mica is green in color. Fragments left on the dump are mostly of the "A" type; the sheets are smaller than punch.

Fulton County

In old Milton County, the northern end of Fulton County, narrow pegmatites are numerous locally. Many of these small dikes contain sufficient mica to attract the eye of the untrained prospector, and many of our beginners in mica mining from the vicinity of Atlanta have cut their teeth upon this district; thus far mica mining has not been successful in this particular section.

J. L. DANIELS PROSPECT

Recent prospects for mica have been opened on the farm of J. L. Daniels, Lot 38, Roswell District, Fulton County. The property is one mile south of Mountain Park, seven miles east of Woodstock, 11 miles northeast of Marietta, and a quarter of a mile east of the Mountain Park-Marietta Road. The Cobb County line passes through the farm.

Numerous narrow pegmatites occur in this area. Two pits were dug in Cobb County, 300 yards south of the Daniels' home, in 1943 by Bob Lee and Max Cline. These pits expose narrow stringer-like pegmatites which are lensey and irregular in shape. The mica is of the "A" type, spotted and, although rum-colored, of poor quality. At least seven pits were dug in the summer of 1942, about a quarter of a mile east of the dwelling and over a distance of about 300 yards, by H. H. Arnold and A. G. Haynes. These small pits are from five to eighteen feet deep and were dug in pegmatites which range in thickness up to two feet. The medium-grained pegmatites are enclosed in weathered biotite gneiss. The gneiss strikes N. 35° E., dipping 50° SE. and the pegmatites are generally conformable to it. The dikes are composed of small lenses of smoky quartz, kaolinized feldspar, and mica. The mica is rum-colored but badly spotted, generally of the "A" variety, cracked, and curved. Also, there are inclusions of weathered garnets. The easternmost pit at this locality is about 10 feet deep, 10 feet wide and 15 feet long. The pegmatite here appears to be at least 3 feet thick, striking N. 15° E. and dipping 45° SE. There is considerable "burr-rock" on the hanging wall side. The best mica in this vicinity came from this pit, where good electric mica, that will trim 1½ by 2 and 2 by 2 inches and some larger, were obtained. The mica is badly spotted but there is very little "A" mica here.

Hall County

THE OLD HOPE OR MERCK MINE

This mine is about 1.5 miles northwest of Gainesville by way of Grape Street. According to reports, mica was first mined here by a Mr. Reese about 1890 who operated the mine for several years. Reese is re-

ported to have obtained a considerable amount of good mica here. The mine was later leased to a Mr. Jones, who is said to have taken good mica from the mine in 1912. Later, the mine was sold to George M. Hope, who then sold it to Edwin J. Wessels of Gainesville. Since then, several tunnels and shafts have been made upon the property. Sydney Smith and George Gowder, of Gainesville, worked the mine in 1938. The property is now owned by Mrs. Ruth Starbuck, and is leased by J. S. Rhine.

A plan of the workings of this mine, modified some after Galpin³ is given by Sterrett¹⁷. The plan given in this report was made upon the property recently, and certain data of the underground workings have been added from information supplied by Mr. Rhine. Pits, shafts, drifts, and cross-cuts have been made here over a period of years by a considerable number of operators, but there are no accurate records of those underground workings which are not accessible. An inspection of the property indicates that a good deal of useless work has been done, due to the complicated character of the pegmatite and to the fact that it is seldom exposed.

Much of the work centered around shaft No. 2, known as "The Chimney." According to reports, Reese was operating in a large room just before the time of his departure in which much good mica was exposed. This spot is supposed to be somewhere in the vicinity of "The Chimney" or a little to the west of that location. Most of the work done since the departure of Reese, has been done in search of this "room," each operator directing his work according to his particular view regarding its location.

The country rock is a coarse mica schist which dips and strikes in various directions in the vicinity of the mine. Several pegmatite veins have been encountered by the miners, three of which are mentioned by Galpin³. The dikes are generally conformable with the enclosing schist, but in many places cut across its foliation. Where they may be observed, they are lensey and vary greatly in thickness within short distances. They occur from a few inches to 16 feet thick.

The following is a brief description of the works as they appear today: (1), A shaft now 62 feet deep with a 12-foot tunnel at the bottom striking N. 60° W. Pegmatite is exposed at and near the head of this tunnel. The dike is at least 10 feet thick but it is difficult to determine its strike and dip. It appears to follow generally the strike of the schist which is N. 60° W., dipping 45° SW. The dike consists of coarse feldspar, smoky quartz lenses several feet thick, and mica. Mica appears to be concentrated near the quartz. The mica now exposed is of the "A" type and

light rum in color. The books are warped and very little sheet could be obtained from them; (2), "The Chimney." This shaft is 65 feet deep. No pegmatite is exposed at the bottom of the shaft; (3), "North Carolina" shaft, an old one which North Carolina miners are said to have deepened and from which they removed mica; (4), A shaft 91 feet deep made in 1942 by W. P. A. workers. This shaft does not encounter pegmatite; (5), An old shaft 45 feet deep or more with no evidence of drifting at the bottom; (6), A 30-foot pit in soil; (7), Two old entrances made by Reese. The dumps below these entrances contain mica of very good size and quality; (8), The mouth of the old "Spiral." This work done prior to 1918 winds around, as indicated on the sketch, and practically returns to the position of the entrance; (9), Tunnel. This tunnel winds around, as indicated upon the sketch, and intersects "The Chimney." In the tunnel, the schist is well-exposed where it strikes about N. 25° E., dipping 50° NW. Narrow pegmatite bands, several inches thick, occur parallel with the schistosity. The tunnel crosses an old drift supposed to have been made by Reese; (10), An open cut in schist 40 feet deep at the head, 125 feet long and originally about 12 feet wide. A small tunnel extends from the head of this open cut in the direction of the "North Carolina" shaft, but turns eastward where it is said to connect with the "Spiral;" (11), An old inclined tunnel, 30 to 40 feet long; (12), A 30-foot incline which contains a 20-foot shaft about 20 feet from its mouth; (13), The entrance to an old tunnel reported to extend for 200 feet to the north and to connect with No. 12; (14), A new shaft about 20 feet deep made near the branch. Several narrow pegmatite lenses are exposed in the schist above this shaft. The schist at this place strikes N. 35°-60° E., dipping approximately 45° SE. Mr. Rhine has obtained some mica from this location. The mica is light rum-colored and does not contain spots. Some of the books are wavy and do not split well. The books may be large; one book on exhibit will measure 12 by 14 inches across the cleavage and will weigh about 200 pounds.

Henry County

MADDOX MINE

This mine is located on the old Madison Maddox property, six miles north of McDonough and 5 miles S. 25° E. of Stockbridge, just north of the Stockbridge-Millers Mill Road. It is one mile west of Millers Mill. The mine is 100 yards north of the old Maddox home.

Early history of mica mining on this property is obscure, but it is known that the mine was first opened about 30 years ago. Considerable

mica was removed during the early stage of mining. According to Galpin³: "A remarkable sheet from one block is on exhibition in the Capitol Museum at Atlanta. It is of irregular outline and measures 17 by 27 inches. The properties of cleavage, elasticity and clarity of this specimen are exceptionally good." A small amount of work was done at this mine in early 1942, but at the time of the writer's visit, December 15, 1942, no mining was being done.

The opening at this mine is in the form of an open cut 60 feet long, 4-7 feet wide, and 30 feet deep at the middle. Wash from recent rains has filled the bottom of the open cut to an undetermined depth. The main pegmatite is not exposed but small stringers of pegmatite material up to one foot thick are exposed in both ends of the cut. Only small mica books occur in these stringers. About 100 feet southwest of the above-described cut, the pegmatite is exposed in a cut made by a terrace. About one-quarter mile to the northeast of the open cut and apparently on the same pegmatite, a small pit has been dug in a pegmatite.

The pegmatite appears to be conformable to the enclosing biotite gneiss. It strikes N. 63° E., dipping 80° SE. Galpin states that "the exposed portions of the dike is from 2 to 3 feet wide and contains partly decomposed feldspar, quartz, and scattered books of mica. The dike cuts slightly across the sheeting or foliation of the decomposed biotite gneiss (Carolina) which forms its walls. The quartz is mainly of a massive type and it occurs more or less in stringers and irregular "horses," one of which weighs more than a ton. The quartz is often drusy. Mica books are apparently distributed along irregular planes representing lines of early fracture in the dike, but little of this mineral is at present in sight in the small portion of the dike exposed." Small black crystals of tourmaline occur in the quartz. Numerous fragments of rose quartz occur in the dump.

The only mica seen here was that found around the mine which is flat, clear, light rum-colored, somewhat ruled and cracked, and some of it is of the "A" variety. It splits well and is hard. Some of the discarded mica in the dump would trim 2 by 2 inches. Sizes much larger than this were undoubtedly removed from the mine when it was in operation. From the past history of the work at this time and the character of the pegmatite, apparently much good mica was obtained here, although mining operations were not extensive. This mine represents one of the few properties outside of the known mica belts or areas from which good mica has been produced.

Jasper County

Mica pegmatites are rather common in Jasper County where they frequently intrude hornblende gneiss and basic rocks. In such cases, a considerable amount of vermiculite is produced locally. Some pegmatites contain numerous sheets of vermiculite scattered throughout the masses. In other cases, vermiculite is produced at the contacts between pegmatite and basic country rock.

NEWTON PROSPECT

This property, owned by Mrs. J. L. Newton, is about 1.5 miles north-east of Kelly. The pegmatite is kaolinized and occurs in mica schist. The mica is light rum-colored and is abundant in the pegmatites. No "A" mica occurs but the books are badly bent and cracked, so that very little sheet can be obtained here. The property has possibilities for production of washer punch. A pit about 15 feet deep was made about a year ago by the Morgan County Mica Company.

MRS. ATHEN PROSPECT

This property is three-quarters of a mile southwest of Gladesville near the road to Monticello. It is now owned by the Federal Government. Some prospecting has been done southwest of the tenant house. The mica occurs around the borders of a large quartz lens where prospects have been made. The pegmatite is medium coarse, containing feldspar and smoky quartz. The mica is greenish to clear in color, spotted, and the books are usually bent and warped. The dike offers better prospects for feldspar than for mica. Vermiculite is produced at the contacts between the pegmatite and the basic country rock.

J. H. BARRON PROPERTY

This property is three miles east of the Monticello-Macon Highway from a point 0.5 mile north of Hillsboro. It was recently prospected by L. D. Gray of Sunnyside, and there are also some old pits made 20 years ago. A prominent quartz lens 15 to 20 feet wide strikes east and west. Mica occurs in pegmatite at the borders of the lens where several prospect pits were made. The mica is of the "A" type, and the possibilities for production of sheet mica are not specially promising.

Meriwether County

AB. SNELSON PROSPECT

This prospect is located 5 miles by road due west of Woodbury. It is accessible via the dirt road from Woodbury to Harris and is three-quarters of a mile due west of Cane Creek Church. C. M. Wacaster mined

a little mica on the property in 1942 about one-quarter mile west of the old Snelson home. Mr. Wacaster made two openings. The larger portion of the works consists of an inclined open cut made upon the pegmatite. This cut is about 15 feet deep, 40 feet long, and 8 feet wide. The pegmatite is exposed in the entire length of the cut. A new shaft of undetermined depth was put down by Wacaster about 25 feet west of the north-western end of the open cut. Pegmatite material is exposed in the dump from the shaft.

The dike, as exposed in the open cut, strikes N. 20° W., dipping 60° SW. It is from two to three feet thick and is composed of semi-kaolinized feldspar, milky quartz, and mica. Some massive black tourmaline is present in the pegmatite associated with the quartz. No large quartz lenses occur. The dike is conformable to the enclosing biotite gneiss. Most of the mica is rum-colored and hard, but some of it is badly cracked. All of the mica is spotted and generally is of the "A" variety. Very little good sheet mica could be obtained here.

RUFUS MARTIN PROSPECT

Rufus Martin (colored), Route 1, Box 179, Hogansville, did a small amount of prospecting recently upon his property about 12 miles southeast of Hogansville and 6 miles (by road) N. 40° W. of Greenville. Two small pits were dug about one-quarter mile N. 65° E. of his home.

The pegmatite was concealed at the time of the visit but it is about three feet wide and seems to strike about N. 10° E. It consists of green muscovite, small smoky quartz nodules, and kaolinized feldspar. The mica is similar to that upon the Crosby property at LaGrange, except that the books are somewhat flatter, less cracked, and garnets seem to be less abundant.

Morgan County

Prospecting was done in several localities in this county in 1942 by the Morgan County Mica Company and some mica was sheeted by them at Madison.

ALLISTON PROPERTY

Some prospecting was done 1.5 miles northeast of Madison, a short distance off the Madison-Athens Highway near the old Appalachian Road. A shaft was made from 15 to 20 feet deep in partly-kaolinized pegmatite of irregular shape which strikes about N. 70° E. The pegmatite contains a great deal of mica which is especially concentrated near quartz lenses. The larger books are from 12 to 14 inches, measured along the cleavage surfaces, but are all of the "A" type, thus very little sheet mica could be obtained here.

Paulding County

DR. C. W. DEAN MINE

This old mine is found along the crest of a low ridge about three-eighths mile southwest of Hiram on the old Dr. C. W. Dean property, now owned by H. G. House of Hiram. The pegmatite is exposed in the bed of Copper Mine Creek, or Little Sweetwater Creek, at the site of the old Dean Mill, where it is at least 40 feet wide. It was described by Galpin⁸ (pp. 135-136) who also gives an analysis of the feldspar. The early history of the mine is obscure. Work was done here previous to Galpin's visit and Dr. George Ragsdale worked the property rather extensively in 1919-20, at which time he is said to have employed at least 14 men.

The country rock is chloritized hornblende gneiss which contains some ledges or intrusions of a basic serpentized and chloritized olivine meta-pyroxenite. The main open cut is about 100 feet long, 20-50 feet wide and elongated in the direction N. 25° E. It is reported to have been 40 feet deep originally and a pump was used to clear it of water. The west wall caved in several years ago so that it is now about 25 feet deep and the pegmatite is exposed only in the walls of the excavation. Other small open pits and shafts occur for several hundred feet northeast of the main opening.

The pegmatite appears to be at least 50 feet wide consisting of pegmatite granite and coarse, cleavable, pink feldspar, all considerably stained and kaolinized. It contains quartz nodules and large lenses of milky quartz. The pegmatite appears to strike in the direction of the main cut, but a short distance southwest of the head of the cut, it terminates in a large "blow out" of quartz which is 75-100 feet wide. Several carloads of mica are said to have been shipped from the mine, although the amount of sheet obtained is not known. Some of the books are reported to have been sheeted at the mine. Books as large as 2 by 3 inches may be found in the pegmatite at the present time, but the mica is spotted with magnetite; some books are nearly black. The mica in the quartz is green but books in the pegmatite are hard and light rum-colored. Much of the mica is of "A" variety. Mica of the "electric" grade could be obtained here.

R. S. COLE MINE

This mine is located on the property of R. S. Cole 3.5 miles southeast of Roses' Store (old Embry), near the headwaters of Turkey Creek, and 2.5 miles north of the Carroll-Paulding County line. It is about one and a quarter miles southwest of the 19th Courthouse on Lot 180, 1st District, 3d Section of Paulding County.

Mining was done here about the time of the first World War by Mr. Lambert and Frank Leathers of Atlanta. Some mica was trucked from this mine to Camp Gordon where it was cut. Also, some mica was sheeted and some washers were punched from it on the property by Mr. George Cole. The mine consists of an inclined open pit about 50 feet in diameter and now is about 25 feet deep at the head, the southeast side, where there is a short, partly-filled inclined drift at the bottom. The country rock is massive biotite-granite gneiss. Its poorly developed foliation strikes N. 50° W., dipping 50° SW. Owners state they were not paid for their mica.

The pegmatite is lency, but about 5 feet thick in the opening. It contains schist inclusions; on the southeast side of the pit the pegmatite is divided and is separated by two feet of country rock. The pegmatite is medium-grained in texture and the largest mica books seen in the present exposure would measure about 2 by 2 inches. The dike strikes about N-S, dipping 50° E.

The mica is generally light rum in color, and usually contains small black spots lightly distributed throughout the sheet. Some sheets of "A" mica can be found around the mine. The books are generally curved and cracks occur. It is reliably reported that some flat sheets up to 10 by 12 inches was obtained. Mr. Cole states that a book which weighed at least 125 pounds was found.

B. F. CHORAN PROPERTY

This property is located about three miles southeast of New Georgia Consolidated School on the old A. E. McBerier estate, which is now owned by B. F. Chorán, Route 3, Douglasville. Three small pits were found on the property which had been dug recently. The mica occurs at this locality associated with quartz. Little or no feldspar is present. The mica, of punch size and up to 2- by 2-inch sheet size, is extremely green in color, clear, and is of the "A" type.

PEGMATITE EAST OF NEW GEORGIA CHURCH

Some granite pegmatites occur in this area which have no commercial sheet mica, but which contains an appreciable amount of small scrap mica. A pegmatite of this type crosses the new soil road 5.2 miles east of New Georgia Church on the Villa Rica-Dallas Highway. The pegmatite strikes about N. 37° E. where its zone of outcrop along the highway is 60-70 feet in width. The pink feldspar is partly kaolinized and contains much scrap mica generally in small books.

C. H. MILLER PROPERTY

This property is located about one-quarter mile southwest of the 19th Courthouse, about 3 miles southeast of Embry (Roses' Store) in Lot 1168, 19th District, 3d Section of Paulding County. The property is owned by C. H. Miller, Temple, Route 2. A pegmatite dike, which strikes N. 35° W, cuts biotite gneiss striking N. 5° W. The pegmatite is not well-exposed and no prospecting has been done upon the property. Quartz float and mica books may be picked up along the strike for a distance of at least one-third mile. The mica is clear, free of spots, and splits well, but is of the "A" type. Books as large as 5 by 6 inches occur in the soil, some of which will produce punch and some 1½- by 2-inch sheet.

J. F. POOLE PROPERTY

This property is located about 3 miles northwest of Dallas near the Southern Railroad on the farm of J. F. Poole. This property is known locally as the old Gurley Place. A few openings have been made south of the road and about 100 yards southeast of the dwelling. Specimens of mica exhibited from this property by Mr. Poole are green, spotted and of the "A" type.

W. J. MILLER PROPERTY

This property is located about one-half mile east of the old Grady School House and about one-quarter mile east of the 19th Courthouse on the farm of W. J. Miller. A shaft about 20 feet deep was dug in a field on this property about two years ago. About 25 sacks of mica were reported to have been taken from this opening, but reports indicate that no mica was sold from this locality. The mica is green, spotted, and of the "A" type.

Pike County

Narrow "burr-rock" pegmatites are common in Pike County, north and west of Zebulon. Mica is frequently reported from this district, but the dikes are narrow, the mica is small, and thus far a commercial grade of mica has not been mined. Small pegmatites, a foot thick, crop out on the J. D. Pitts property, seven miles south of Griffin on No. 3 Highway. The mica is clear, free of spots, some of it is of the "A" type, and the larger books will measure 1 by 1 inch. A similar type of mica is found upon the property of M. C. Ballard of Williamson. This property is 1.5 miles (airline) N. 55° W. of the Court House at Zebulon.

Rockdale County**JACK BELL PROSPECT**

This prospect is located two miles northwest of Magnet, about one mile north of South Ocmulgee River on the farm owned by Jack Bell of Magnet. The prospect is on the northeast bank of the road. Work was first done at this prospect in the fall of 1942. At that time, a circular shaft was sunk to a depth of about 25 feet in the pegmatite with a short drift extending from the bottom of the shaft along the strike of the pegmatite to the southwest. This work was done by a Mr. Chapman and a Mr. Severinghaus who live near Lithonia.

The pegmatite exposed in both road banks, is a medium to coarse-grained rock striking N. 53° E. with a vertical dip. It is from 4 to 5 feet thick, and is enclosed in a biotite gneiss dipping 30° SE. A lenticular mass of milky quartz from 8-12 inches thick occurs near the middle of the kaolinized pegmatite. A small amount of oxidized sulphides occur in the pegmatite associated with the quartz. Mica is present in the dike associated with both the quartz lens and kaolinized feldspar.

The mica is colorless, free of spots and hard. It appears to be all of the "flat-A" variety containing much ruling and cracking. Most of the mica around the mine is rather small because a large amount of it is in "burr-rock." No books larger than 2 by 3 inches which would make punch and a small amount of 1½- by 2-inch sheet were found at the time of the writers' visit. According to local reports, no mica has been sold from this prospect.

Spaulding County**H. B. MELTON PROPERTY**

This property lies one and one-half miles east of Griffin upon the property of Mrs. H. B. Melton. It is accessible via a paved road from Griffin and lies near a power line. Mica pegmatites are common in the vicinity of Griffin but they are generally narrow. The mica is small and commercial mica has not been produced. A "burr-rock" pegmatite crops out in a field S. 55° E. of the Melton dwelling. The country rock is coarsely crystalline mica schist striking N. 40° E. and dipping 45° SE. The pegmatic is narrow; the mica is hard, flat and rum-colored, but smaller than punch.

In another pegmatite nearby, a pit about 10 feet deep was made recently by H. H. Martin. The dike is about one foot thick and is generally conformable to the country rock, striking N. 70° W., dipping 45° NE. The mica is flat, rum-colored, and the larger books will trim 1 by 1 inch.

Troup County

HOGG ESTATE

This property lies eight miles due south of LaGrange, one mile south of Smith's store and Hardins Crossroads, in Lot 184, District 4. It is found on the west side of the road west of the tenant house. This pegmatite corresponds to the type represented by figure 37. It consists of two large quartz lenses enclosed by pegmatite. The dike strikes about E-W and the width, including the quartz lens, may be as great as 450 feet; it attains a length of better than 2000 feet. The quartz of the lenses is usually white in color, but not infrequently smoky or pink near contacts with pegmatite. Pegmatitic material varies greatly in thickness around the quartz lenses but seems to be thickest along the southern side.

The pegmatite consists of kaolinized feldspar, smoky quartz, and green "A" mica. Black tourmaline and beryl occur locally. Tourmaline also occurs as crystals in the quartz lenses, especially near their margins. Rutile is present locally in the quartz, especially near the eastern end of the exposure. The pegmatite is best exposed and has been more extensively prospected along the southern side of the dike. West of the road, beryl is encountered on this side of the dike at a point about 300 feet N. 70° W. of the dwelling. The beryl does not seem to lie against the quartz lens but occurs in a zone of kaolinized pegmatite from ten to thirty feet wide, which is separated locally from the lens by numerous books of green "wedge-A" mica. The beryl occurs as well-formed crystals.

No commercial sheet mica was found at this locality although a considerable amount of scrap could be obtained. The mica is green, "wedge-A," exhibits "herring-bone" structure, and is so badly spotted that some of the books are nearly black. Some biotite occurs at the eastern and western ends of the western quartz lens. It is especially abundant at the latter locality where the muscovite books do not exhibit "A" structure, their principal defects being ruling, spots and cracks. The mica here is rum-colored. According to reports, several cars of scrap mica have been shipped from this property. Some more prospecting should be done upon the beryl.

PROSPECT WEST OF SMITH'S STORE

A peculiar pegmatite corresponding to type illustrated by Figure 8, crops out on the north side of the dirt road to Grady Hill School which crosses its southeastern end 0.6 mile west of Smith's store. The intrusion consists of an oval milky and rose-colored quartz lens about 225 feet long, striking N. 75° W. The maximum width is about 125 feet. The quartz is

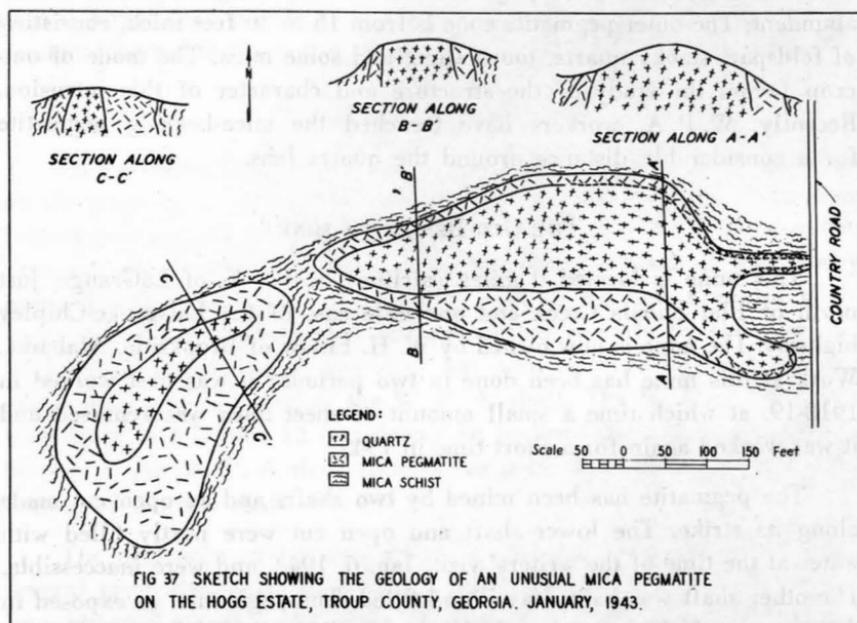


FIGURE 38, Part of a day's production at a Georgia mica mine.

Photo by Joe Stearns

surrounded by a zone of pegmatite in which "wedge-A" mica is very abundant. The outer pegmatite zone is from 15 to 30 feet thick, consisting of feldspar, smoky quartz, tourmaline, and some mica. The mode of outcrop favors the study of the structure and character of this intrusion. Recently, W. P. A. workers have trenched the mica-bearing pegmatite for a considerable distance around the quartz lens.

THE OLD BEN BURTS MINE

This mine is located 9 miles (airline) S. 47° E. of LaGrange, just north of Flat Shoals Creek and one mile east of the LaGrange-ChIPLEY highway. The mine is now owned by W. H. Enlaw of Brookside, Alabama. Work at this mine has been done in two periods; it was first worked in 1918-19, at which time a small amount of sheet mica was removed and it was worked again for a short time in 1942.

The pegmatite has been mined by two shafts and an open cut made along its strike. The lower shaft and open cut were partly filled with water at the time of the writers' visit, Jan. 6, 1943, and were inaccessible. The other shaft was badly caved and filled. The pegmatite, as exposed in the open cut, is from 2-6 feet thick and is striking N. 15° E., and dipping 70° SE., conformable to the biotite gneiss country rock.

On the property near the mine is a small shed where the scrap mica from the last period of mining is stored. About 2000 pounds of mica were stored there when the property was investigated. This mica is hard, clear, and colorless. All of the mica appears to be of the "A" type. A small amount of sheet mica of strategic grade might be obtained here, but the percentage of scrap will be high. The mine is now leased by C. H. Lowe of Jacksonville, Florida.

W. B. WORD PROPERTY

This property is 10 miles S. 45° W. of LaGrange and about one mile, by road, west of the railroad station at Gabbettville. A small prospect pit was made on the west side of a tributary to Long Cane Creek by W. P. A. workers in 1942. This pit is about 15 feet in horizontal dimensions and about 8 feet deep with water in the bottom. Pegmatite is exposed in the southwest wall of the pit, but there has not been sufficient prospecting to determine its width and strike. The country rock is hornblende gneiss which dips southeastward at an angle of about 35°. Some stringers of gneiss included in the pegmatite have a similar dip. The pegmatite consists of potash feldspar, smoky quartz, muscovite, beryl, and some vermiculite. Tourmaline occurs in the quartz and in the feldspar. The mus-

covite is greenish-rum in color, spotted to almost black, and very little of it is larger than punch. It is improbable that commercial mica can be produced here, but the pegmatite should be prospected further for beryl.

LEE AND CLINE PROSPECT

This prospect lies 1.0 mile due north of the City Square of LaGrange on the property of Mrs. Crosby. It is accessible by the road north from LaGrange and is within the city limits. In 1942, the W. P. A. dug two prospect pits on the side of the hill, 400 feet northeast of the Crosby home. The openings are one-sixth mile west of the new Franklin Highway. The property was leased and prospected recently by Bob Lee and M. L. Cline of Atlanta. A new shaft has been made to intersect the pegmatite about 30 feet west of the W. P. A. shaft. The W. P. A. shaft was back-filled and is now 12 feet deep. An inclined drift from the present bottom of the W. P. A. shaft follows the pegmatite down the dip to the bottom of the new shaft.

The pegmatite strikes about N-S, dipping 20° - 35° W. It consists of several pegmatite bands, a foot to four or five feet in thickness separated by schist and generally parallel with the schistosity of the enclosing rock. The total thickness of the zone of pegmatite and schist is from eight to fifteen feet. Lenses of coarsely crystalline smoky quartz, which dip and strike generally with the pegmatite, occur in the dike which consists usually of kaolin, nodules of smoky quartz, books of green muscovite, and some "burr-rock" near the margin of the dike. The mica is generally scattered throughout the pegmatite, but is abundant only locally in it. There is some tendency for mica to be concentrated near the wall rock, narrow included schist bands, and near quartz nodules and lenses. The mica is green in color and without spots, but small, flat red garnets are numerous in the books.

Several tons of mica have been produced and some of the books are as large as 6 by 8 inches, weighing several pounds. Many of the books are tangled and are curved; some "ribbon" occurs. Some of the mica exhibits "A" structure, and most of the books are cracked, thus good sheet mica will be difficult to obtain here.

REFERENCES

1. Bayley, W. S., Geology of the Tate quadrangle, Georgia: Georgia Geol. Survey Bull. 43, 1928.
2. Clark, George Huntington, Mica deposits of Alabama: Alabama Geol. Survey Bull. 24, 1921.
3. Galpin, S. L., A preliminary report on the mica and feldspar deposits of Georgia: Georgia Geol. Survey Bull. 30, 1915.
4. Geologic map of Georgia: Georgia Division of Mines, Mining and Geology, 1939.
5. Hess, Frank L., Pegmatites: Econ. Geology, vol. 28, pp. 447-462, 1933.
6. Hess, Frank L., and others, The rare alkalies in New England: U. S. Bur. Mines Inf. Cir. 7232, 1943.
7. Horton, F. W., Mica: U. S. Bur. Mines Inf. Cir. 6822, 1935.
8. Houk, Lawrence G., Marketing strategic mica: U. S. Bur. Mines Inf. Cir. 7219, 1942.
9. Kesler, T. L., and Olson, J. C., Muscovite in the Spruce Pine district, North Carolina: U. S. Geol. Survey Bull. 936-A, 1942.
10. LaForge, L., and Phalen, W. C., U. S. Geol. Survey Geol. Atlas, Ellijay folio (No. 187), 1913.
11. McCallie, S. W., Mineral resources of Georgia: Georgia Geol. Survey Bull. 23, 1910.
12. Murdock, T. G., Production of mica in North Carolina: North Carolina Dept. Conservation, Div. Mineral Resources, Inf. Cir. 2, 1942.
13. Olson, J. C., Mica-bearing pegmatites of New Hampshire: U. S. Geol. Survey Bull. 931-P, 1942.
14. Pegau, A. A., Pegmatite deposits of Virginia: Virginia Geol. Survey Bull. 33, 1932.
15. Smith, Richard W., Notes on mica deposits in Georgia: Files, Georgia Dept. Mines, Mining and Geology, (mostly 1931-32).
16. Smith, Richard W., Mica in Georgia: Forestry and Geological Review, Vol. 3, No. 9, Sept., 1933.
17. Sterrett, Douglas B., Mica deposits of the United States: U. S. Geol. Survey Bull. 740, 1923.
18. Watts, A. S., Mining and treatment of feldspar and kaolin: U. S. Bur. Mines Bull. 53, 1913.