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OCCURRENCE OF MICA-BEARING PEGMATITE IN THE SOUTHEASTERN UNITED STATES

by

Wallace R. Griffitts

(59)

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INTRODUCTION

Many of the pegmatite districts in the southeastern United States were described in U.S.G.S. folios of the Geologic Atlas of the United States by Arthur Keith and his collaborators and several exceptional deposits have been described mineralogically. The only studies of the pegmatites of the entire region have been made by Sterrett 1/ and Landes 2/, who have compiled maps showing

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1/ Sterrett, D. B., Mica Deposits of the United States: U. S. Geol. Survey Bull. 740, pp. 28-47, 70-86, 167-289, 307-330, 1923.

2/ Landes, K. K., Age and Distribution of Pegmatites: Amer. Miner. vol. 20, pp. 81-106, 153-176, 1935.

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the distribution of pegmatite over large areas.

The present study was made in an attempt to correlate the pegmatite geology with the regional structure. The composition and distribution of the pegmatite are considered as well as the attitudes of the deposits. Where possible deposits which lie parallel to the country rock foliation are distinguished from those which are cross-cutting.

Although pegmatite occurs in the region in thousands of deposits with widely ranging composition, shape,

size, and age, only those in districts in which mining of prospecting of pegmatite has been active have been studied widely. Hence, only those deposits can be used in this compilation. Geologically this probably means a restriction to coarse-grained pegmatite that was emplaced in bodies at least several feet thick as the last pre-Triassic event in the igneous history of the various districts.

GENERAL GEOLOGY

The crystalline rocks of the southern Appalachians consist of mica and hornblende schists and gneisses, small bodies of peridotite, and small to large bodies of quartz-monzonite and quartz diorite. No granite is known to occur in the region. Arguments for a Paleozoic age for most of the metamorphic rocks appear to be strong but the view that they are all pre-Cambrian still has many adherents. Most of the quartz-bearing igneous rocks are considered to be of Carboniferous age. The pegmatites of the region, like the larger intrusive masses, are quartz monzonitic and quartz-dioritic in composition rather than granitic.

Many thrust faults have been mapped in the sedimentary rocks west of the crystalline area but the

exact nature of some structures indicated as thrust faults in the crystalline rocks is uncertain. In some places thrust faults have been shown to exist. In others, for example, along the east front of the Blue Ridge, Keith originally mapped a long narrow syncline but Stose reinterpreted the structure as a thrust fault. Areas of rocks with low rank or retrograde metamorph~~osis~~ism were considered by Stose and Jones to be evidence of faulting as their position beside more strongly altered rocks appeared abnormal. In the present study the significant feature is the presence of long structural zones. Although their nature is not known, their relations to the igneous geology may be studied. As they are shown on Plate I as thrust faults they will be referred to as such in the report. The position of some faults is inaccurately indicated on the map, Plate I, falling within pegmatite districts where no such structures have been found. These discrepancies have not been eliminated in the accompanying map as they serve to indicate the probable accuracy of the rest of the map.

A broad zone which contains large intrusive masses lies in the eastern part of the crystalline area. The outlines of the individual bodies are not known but the general position of the belt can be shown. No thrust

faults have been reported in this eastern area.

References

Stose, G. W., and others, Tectonic Map of the United States, 1944.

Stose, G. W., Geologic Map of North America, 1946.

Keith, Arthur, U. S. Geol. Survey, Geol. Atlas of U. S., Cranberry, N. C. and Tenn. folio 90, Asheville N. C. and Tenn. folio 116, Mount Mitchell N. C. and Tenn. folio 124, Nantahala N. C. and Tenn. folio 143, Pisgah, N. C. and Tenn. folio 151, Roan Mountain N. C. and Tenn. folio 151.

DISTRIBUTION OF PEGMATITES AND RELATION TO REGIONAL STRUCTURE

Two major northeast trending belts of pegmatite districts are sharply defined in the Carolinas and northern Georgia, as is shown on Plates I and 2. The western, or Blue Ridge belt, contains the larger pegmatite-bearing areas. It is divided by a narrow barren strip into an eastern and a western division. Southward the number and size of the districts in the eastern unit becomes smaller until the division amounts to little more than a series of widely spaced groups of deposits. The western division similarly contains fewer deposits to the southwest, although it is still distinct in central Alabama at the edge of the cover of Cretaceous sediments. The same longitudinal two-fold division is evident in

the eastern or Piedmont belt with a similar southward decrease in size and number of pegmatite-bearing districts. In this belt the eastern division persists much more strongly than the western, remaining prominent as far south as central Georgia, where both units are buried by Coastal Plain sediments. The Piedmont and Blue Ridge belts diverge in Georgia and an irregular cluster of deposits occurs in the broad intervening area. (Plate I)

Delimiting of the belts becomes difficult northward, not because of the decrease in the number of deposits but because of an abrupt shift to the east of the pegmatite-bearing areas. The deposits in southwestern Virginia may fall in the Blue Ridge belt and those in central Virginia in the Piedmont belt. On the other hand those to the southwest may belong in the Piedmont belt. The eastern ones would then constitute a third belt that extends northward from the latitude of the abrupt northward termination of the Blue Ridge belt. (See Fig. I.)

Similar uncertainties involve the relations of the Maryland-Pennsylvania series of pegmatite areas, which may be an extension of one of the belts to the south or a separate shorter belt.

It can hardly be a coincidence that the size of the

pegmatite districts and the number of deposits are greatest and their segregation into belts most pronounced in the region east of the area of greatest thrusting in the Appalachian Valley. As the number of thrust faults decreases to the northeast and southwest, the pegmatite deposits become fewer and more dispersed, and irregularities break the normal trend of the belts. Additional evidence that the position of the pegmatite-bearing belts is determined by the regional structure is provided by their parallelism to the faults and by the position of the Blue Ridge belt, where best defined, between two thrust faults. Farther south the western boundary of the belt is marked by a fault. Another fault, whose position is uncertain, is near the eastern boundary. A third fault passes through the belt but appears to be unrelated to the distribution of pegmatite. Its existence may be somewhat doubtful. In North Carolina the Piedmont belt is bounded on the east by a thrust fault but no such fault has been recorded in Georgia.

The composition and structural relations of the pegmatites are not uniform throughout each belt. Most deposits in the western division of the Blue Ridge belt in Georgia and Alabama contain green muscovite and are parallel to the foliation of the country rock. In the central and northern parts of the division most of the

deposits conform to the country rock structure, although those of the Franklin-Sylva district do not. The deposits of the eastern division of the Blue Ridge belt contain green muscovite in Alabama, brown muscovite in Georgia, green muscovite in North Carolina, and brown and green muscovite in Virginia, if those deposits are to be included. Most of these deposits, like those of the western division, are parallel to the foliation of the country rock. The pegmatite in the Blue Ridge belt contains a low to moderate percentage of microcline, although several small groups of deposits contain much of it. The deposits in southwestern Virginia conform to the typical Blue Ridge deposits as they are sills and concordant lenses and contain green muscovite.

The deposits of the eastern division of the Piedmont belt are nearly all lenses 5 to 20 feet wide, a few hundred feet long, well zoned, and characteristically contain red-brown mica. Most deposits in central Virginia are of the same type. The deposits of the western division of this belt and central Virginia are similar but contain green muscovite and may be larger. The microcline content of the deposits of both divisions is moderately high.

The deposits in northeastern North Carolina contain green mica and contain much microcline. Some are parallel to the foliation, others are not.

SUMMARY AND CONCLUSIONS

The outstanding feature brought out by the compilation of the attitudes and positions of the deposits is the strong control exerted by the northeastward-trending major structures over both the distribution of the pegmatite and the attitude of the individual deposits (Figure I). The separation of the pegmatite-bearing belts from the zone of large intrusive masses appears to be nearly complete. The small groups of deposits in northeastern North Carolina are the only ones within the intrusive zone. Only one large intrusive body - that in southwestern Virginia - lies within the pegmatite belts. The intrusive rocks with granitic texture with which the pegmatites of the other districts are genetically related occur in relatively small bodies. That of the Pinckneyville quartz-diorite in Alabama and the Whiteside quartz-monzonite in southwestern North Carolina are by far the largest. The reason for this separation is not clear. It may be that the formation of pegmatite of the type considered here requires special tectonic conditions that were not present in the eastern belt. The pegmatite may have formed in the upper part and hood of the batholiths and has been eroded.

It is likely that the intrusion of most of the

magma in the pegmatite belts took place after much of the deformation and metamorphism of the area but before the orogenic forces had subsided completely, as was shown for the Pinckneyville material by Gault 3/ and was suggested by Hershey 4/ as possible for the Port

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3/ Gault, H. R., Petrography, Structures, and Petrofabrics of the Pinckneyville Quartz Diorite, Alabama: Bull. Geol. Assoc. Amer., vol. 56, pp. 241, 244.

4/ Hershey, H. G., Structure and Age of the Port Deposit Granodiorite: complex: Maryland Geol. Surv., vol. 13, p. 147, 1937.

Deposit intrusive of northern Maryland. The parallelism between planar and linear structures of the pegmatite and country rock in some districts in the Blue Ridge series, especially Alabama, suggests that the orogenic forces were still active when they were intruded, although the small number of strongly deformed deposits indicates that such forces were weak. Some exceptionally strongly deformed deposits in Alabama may have been emplaced at an earlier stage in the orogeny than most. In the Piedmont belt and central Virginia pegmatite was emplaced in fractures whose attitudes do not appear to have been determined by the forces accompanying orogeny and intrusion of the granitic rocks. The predominant northeasterly direction of the fractures may have been determined by the direction of the planes of weakness represented by the foliation of the rocks.

In these eastern deposits the pegmatites thus appear to have been emplaced later in the intrusive period than that farther west. The rather uniform properties of the muscovite and the development of clear-cut zones may well be a result of the longer period of differentiation preceeding emplacement or of the absence of stress during part of that period. Similarly the properties of the muscovite and composition of the deposits in the Blue Ridge belt may be attributed to the short period of differentiation or the squeezing of the residual magma by still feebly acting orogenic forces.

DESCRIPTIONS OF DISTRICTS

In the following descriptions the available information about the attitude, relation to country rock structure, zoning within deposits, and zoning through the districts as a whole are presented. The color of the muscovite and abundance of microcline are mentioned where possible as they are compositional features related to the position of the district in the region. The references listed with each district include only those publications actually used as sources of information about that district. The publications listed below have provided information about many districts but to conserve space they will not be listed repeatedly.

Sterrett, D. B., Mica Deposits of the United States: U. S. Geol. Survey Bull. 740, pp. 28-47, 70-86, 167-289, 307-330,1923.

Landes, K. K., Age and Distribution of Pegmatites: Amer. Miner. vol. 20, pp. 81-106, 153-176, 1935.

PENNSYLVANIA, DELAWARE, AND NORTHERN MARYLAND

Two distinctly different types of pegmatite occur in this area. The first, which is the more common, occurs in dikes which may reach a length of 3 miles and a width of 1/10 mile. It is composed of microcline, oligoclase, green muscovite, and quartz, with accessory biotite, tourmaline, garnet, and beryl, and is poorly to moderately well zoned. This type of pegmatite occurs in all the pre-Triassic rocks of the area, including limestone and quartz-monzonite. The second type of pegmatite lies entirely in periodotite. It is composed largely of oligoclase and microcline or orthoclase with small amounts of quartz, green muscovite, biotite, hornblende, tourmaline, and garnet.

All the bodies of the first type of pegmatite whose attitudes are known strike N. 30° E. to N. 80° E. whereas 14 of the 17 deposits of the second type strike in the northwest quadrant, as indicated on Figure 2. The deposits in the eastern part of the district strike in the range from N. 50° E. to N. 70° E. and those in the western part strike N. 30° E. to N. 55° E.

References

Stone, R. W., and Hughes, H. H., Feldspar in Pennsylvania: Pennsylvania Geol. Survey, fourth series Bull. M-13, 1931.

Bascom, F., and Miller, B. L., Elkton-Wilmington Folio, Maryland, Delaware, New Jersey, and Pennsylvania: U. S. Geol. Survey, Geol. Folio 211, 1920.

Bascom, F., and Stose, G. W., Coatesville-West Chester Folio, Pennsylvania and Delaware: U. S. Geol. Survey Geol. Folio 223, 1932.

Singewald, J. T., Jr., The Feldspar Industry in Maryland: Maryland Geol. Survey, vol. 12, pp. 106-110, 1928.

SOUTHERN MARYLAND

The deposits in southern Maryland are much smaller than those in the northern part of the state. One is reported to be a mile long but few if any appear to be wider than 50 feet. They contain microcline, oligoclase, quartz, green muscovite, and garnet. None occur in peridotite but two deposits remote from such rocks are mineralogically similar to those in the mafic rocks farther north. The deposits in the eastern part of this area strike in the north-west quadrant whereas those in the western and southwestern parts strike in the northeastern quadrant.(Figure 2)

References

Singewald, J. T., Jr., Feldspar in Maryland: Maryland Geol. Survey, vol. 12, pp. 110-131, 1928.

Bastin, E. S., Economic Geology of the Feldspar Deposits of the United States: U. S. Geol. Survey Bull. 420, pp. 72-76, 1910.

EASTERN VIRGINIA

The deposits in Amelia, Powhatan, and Goochland Counties, Virginia, form a group with well developed zones, and moderately high microcline content. In addition to the microcline the deposits contain albite-oligoclase, quartz, and green and brown muscovite. Tourmaline and beryl are widespread accessory minerals. Four deposits in various parts of the district have had their composition and internal structure greatly changed through hydrothermal action. Most of the deposits contain massive quartz cores, coarse microcline intermediate zones and plagioclase-quartz wall zones.

The strikes of the deposits fall in three groups, as shown in figure 3. All the deposits striking west of north are in the eastern part of the region. Those striking N. 40 to 45° E. are in the western and southern part and those striking nearly east are in the central part. The deposits are 5 to 20 feet thick. Those in the western and southern parts are several hundred feet long. The others are 100 to 200 feet long.

References

Pegau, A. A., Pegmatite Deposits of Virginia: Virginia Geol. Survey. Bull. 33, pp. 55-66, 1932.

Lemke, R. W., Jahns, R. H., and Griffitts, W. R.,Amelia District, Virginia: U. S. Geol. Survey, unpublished manuscript, 1945.

Griffitts, W. R., Cullen-Charlotte Court House Area, Virginia: U .S. Geol. Survey, unpublished manuscript, 1945.

WESTERN VIRGINIA AND ADJACENT PARTS OF NORTH CAROLINA

The deposits in western Virginia occur near a large irregular body of Leatherwood quartz-monzonite and their properties are to some extent related to their proximity to that body. The mica that occurs close to the intrusive mass is green and heavily stained whereas that that occurs farther away is brown and clear.

In three northeastward-trending belts through the area the deposits are of uniform strike. In the northwestern belt the deposits on Brown Mountain, North Carolina, and in the Moneta-Bells district, Virginia, strike northeast. In the adjacent belt to the southeast deposits near Sandy Ridge, North Carolina and on Chestnut Mountain, Virginia, strike nearly east. In the next belt, including the deposits near Ridgeway and Axton, Virginia, the strike is northeast. Finally, a group of deposits east of Axton strikes east. Thus, each series of northeast-trending deposits is succeeded farther east by one of deposits that trend east. The composition and size of the deposits appears not to depend upon the belt in which they occur. All are short concordant lenses, irregular dikes, or pipes with low to moderately high microcline content.

References

Pegau, A. A., Pegmatite Deposits of Virginia: Virginia Geol. Survey Bull. 33, pp. 66-93, 1932.

Griffitts, W. R., Jahns, R. H., and Lemke, R. W., Ridgeway-Sandy Ridge District, Virginia and North Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

DEPOSITS IN NORTHEASTERN NORTH CAROLINA

Stained and clear green mica occurs in microcline-rich pegmatite in northeastern Caswell County and in Wake, Warren, and Franklin Counties, North Carolina. Some are reported to lie parallel to the foliation of the country rock but many appear to cross it.

References

Griffitts, W. R., Caswell County, North Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

Griffitts, W. R., Northeastern Piedmont Area, North Carolina: U. S. Geol. Survey, unpublished manuscript,1945.

WILKES DISTRICT, NORTH CAROLINA

In the Wilkes district the foliation of the country rocks trends northeast and dips southeast at low to moderate angles. Granitic rocks occur in small sills in many places. The pegmatite bodies range from small stringers to sills at least 25 feet thick. Very few are known to cross the foliation of the country rock. Microcline is a rather uncommon primary mineral in the pegmatite and large irregularly located tabular masses of quartz and quartz-muscovite rock in some deposits may have formed by replacement of older pegmatite. Warping and orientation of minerals in the pegmatite of

this district indicates that it was deformed, probably near the close of the period of crystallization. The muscovite in the district is green. Some is stained but much is clear.

References

Griffitts, W. R., Wilkes District, North Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

JEFFERSON-BOONE DISTRICT, NORTH CAROLINA

In the Jefferson-Boone district an arcuate belt of hornblend gneiss is concave toward the east and lies east of an irregular, broad belt of Cranberry quartz-monzonite.

A large thrust fault trends northeast, passing several miles west of the gneiss belt. Another is exposed south of the gneiss around the rim of a large window in which Cambrian sandstone and shale as well as igneous and metamorphic rocks are exposed. As shown on the tectonic map the western thrust fault bends, forming an eastward opening cusp a few miles west of the gneiss belt.

The pegmatite occurs in the gneiss belt east of the cusp in the western fault and northeast of the window in the other fault. It may be related to the Beech "granite" that is exposed near-by. The deposits are parallel to the foliation of the gneiss and contain brown mica. Microcline apparently is not abundant but beryl is wide-

spread.

References

Keith, Arthur, Cranberry Folio, North Carolina: U. S. Geol. Survey, Geol. Folio, 90, 1903.

Jahns, R. H., Jefferson-Boone District, North Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

SPRUCE PINE DISTRICT, NORTH CAROLINA

The pegmatite-bearing area of the Spruce Pine district forms an arc northwest of several stocks of coarse-grained quartz-diorite toward which they dip and to which they appear to be genetically related. They strike tangentially to the arc, hence strike north in the western part of the district, northeast in the northern part, and east in the northeastern part. Most plunge southwest parallel to the linear structures of the country rock.

The muscovite near the stocks is green, and much is stained whereas that in the western and northern parts is brown. Both green and brown muscovite occur in the northeastern part of the district. Beryl is rare but occurs in all parts of the district.

References

Olson, J. C., Economic Geology of the Spruce Pine Pegmatite District, North Carolina: North Carolina Div. of Mineral Resources Bull. 43, pp. 1-67, 1944.

Kesler, T. L., and Olson, J. C., Muscovite in the Spruce

Pine District, North Carolina: U. S. Geol. Survey Bull. 936-A, pp. 1-38, 1942.

SHELBY DISTRICT, NORTH CAROLINA

The deposits of the Shelby district occur in the older of two quartz-monzonites as well as in the metamorphic rocks but appear to be genetically related to the younger quartz-monzonite. All the pegmatite bodies cross the foliation of the enclosing rocks, striking nearly east in the eastern part of the district and north or northeast in the western part. They range in length from 100 to 700 feet and in thickness from 5 to 140 feet. A small group of deposits in the east-central part of the district contain green muscovite but that in most deposits is pale red-brown. The microcline content of the pegmatite is moderately high; plagioclase, quartz, and muscovite are the other major constituents of the rock. Biotite, tourmaline, beryl, and apatite are widespread accessories. All deposits are well zoned and two have been modified by hydrothermal replacement.

A belt 1 to 2 miles wide and 27 miles long at the eastern edge of the district contains a large number of cassiterite and spodumene-bearing pegmatite dikes. Many are a thousand feet or more in length and several dozen feet wide. Their relation to the mica-bearing pegmatite is unknown.

Several thrust faults and a northeastward-trending strip of Cambrian (?) rocks mark the eastern boundary of the district.

References

Griffitts, W. R., Shelby-Hickory District, North Carolina: U. S., Geol. Survey, unpublished manuscript, 1945.

Keith, Arthur, and Sterrett, D. B., Kings Mountain-Gaffney Folio, North and South Carolina: U. S. Geol. Survey Geol. Folio 222, 1931, and unpublished geologic map of the Lincolnton quadrangle, North Carolina, 1910-1912.

Kesler, T. L., The Tin-Spodumene Belt of the Carolinas: U. S. Geol. Survey Bull. 936-J, pp. 245-269, 1942.

FRANKLIN-SYLVA DISTRICT, NORTH CAROLINA

The deposits in the southeastern part of the Franklin-Sylva district lie parallel to the foliation of the country rock in a zone of injection gneiss northwest of the bodies of parent Whiteside quartz-monzonite. They contain green muscovite and a wider suite of accessory minerals than do deposits elsewhere in the district. The deposits farther away from the stocks transect the country rock foliation, but most trend northeast. These deposits contain brown muscovite in warped books. Microcline is not abundant in any part of the district. The deposits are well zoned.

The eastern edge of the district, like that of the Spruce Pine and Wilkes districts, is marked by a thrust

fault or narrow syncline in Cambrian (?) rocks.

References

Olson, J. C., Mica Deposits of the Franklin-Sylva District, North Carolina: North Carolina Div. of Mineral Resources Bull. 49, 1946.

Heinrich, E. Wm., Franklin-Sylva District, North Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

SOUTH CAROLINA

The deposits in the northwesternmost group in South Carolina transect the foliation of the country rocks and contain much green muscovite. The deposits in the group to the southeast contain red-brown muscovite. All are well zoned, with massive quartz cores, microcline-rich intermediate zones, and mica-bearing plagioclase-quartz wall zones. Beryl and biotite are common accessory minerals. The northwestern deposits strike north to north-north east and the southeastern deposits strike northeast or east.

References

Griffitts, W. R., South Carolina: U. S. Geol. Survey, unpublished manuscript, 1945.

Olson, J. C., Mica Deposits in the Clemson Project Area, South Carolina: U. S. Geol. Survey Memorandum, 1943.

HARTWELL DISTRICT, GEORGIA AND SOUTH CAROLINA

The pegmatite in the southeastern part of the Hartwell district contains much microcline and occurs in long

dikes that strike northeast (figure 4). The mica in the easternmost part is green and stained whereas that farther west is clear and brown. The pegmatite in the northwestern part of the district contains no microcline and occurs in relatively short dikes and sills. In this as in the other group the pegmatite appears to have been emplaced in fractures that are parallel or inclined to the foliation of the country rock. All the deposits are well zoned and many in all parts of the district contain beryl or tourmaline.

References

Griffitts, W. R., Hartwell District, South Carolina and Georgia: U. S. Geol. Survey, unpublished manuscript, 1945.

Furcron, A. S., and Teague, K. H., Mica-bearing Pegmatites of Georgia: Georgia Dept. of Mines, Mining, and Geol. Bull 48, pp. 160-171, 1943.

Galpin, S. L., A Preliminary Report on the Feldspar and Mica Deposits of Georgia: Georgia Geol. Survey Bull. 30, pp. 111-116, 1915.

THOMASTON-BARNESVILLE DISTRICT, GEORGIA

At least 148 pegmatite dikes and discordant lenses are known to occur in this district. Most are shorter than 200 feet, thinner than 10 feet, and strike between north and N. 60° E., as is indicated in figure 4. They are well zoned and their inner parts contain much microcline and the outer parts contain plagioclase, quartz,

and muscovite. Biotite is a very common accessory mineral and garnet, tourmaline, beryl, and apatite are less common. The muscovite is flat and pale red-brown in color.

References

Heinrich, E. Wm., Thomaston-Barnesville District, Georgia: U. S. Geol. Survey, unpublished manuscript, 1945.

Furcron, A. S., and Teague, K. H., Mica-bearing Pegmatites of Georgia: Georgia Dept. of Mines, Mining, and Geol. Bull. 48, pp. 18-79, 1943.

Galpin, S. L., A Preliminary Report on the Feldspar and Mica Deposits of Georgia: Georgia Geol. Survey, Bull. 30, pp. 79-82, 85-86, 1915.

DAHLONEGA DISTRICT, GEORGIA

Most of the pegmatite in the Dahlonega district contains little microcline and a small to moderate amount of stained and clear green mica. Thirty seven of the 47 known deposits strike in the northeast quadrant (Figure 4). Many are parallel to the foliation of the enclosing rock.

References

Furcron, A. S., and Teague, K. H., Mica-bearing Pegmatites of Georgia: Georgia Dept. of Mines, Mining, and Geol. Bull. 48, pp. 119-134, 1943.

Galpin, S. L., A Preliminary Report on the Feldspar and Mica Deposits of Georgia: Georgia Geol. Survey, Bull. 30, pp. 156-165, 1915.

CANTON DISTRICT, GEORGIA

Pegmatite containing little or no microcline occurs

in sills which trend northeast in Cobb, Cherokee, and Pickens Counties, Georgia. A small group of deposits in the northeastern part of the district strike northwest. Zones appear not to be very clearly developed in the deposits, which contain green muscovite, some of which is stained.

References

Furcron, A. S., and Teague, K. H., Mica-bearing Pegmatites of Georgia: Georgia Dept. of mines, Mining, and Geol. Bull. 48, pp. 80-119, 172-174, 1943.

Galpin, S. L., A Preliminary Report on the Feldspar and Mica Deposits of Georgia: Georgia Geol. Survey, Bull. 30, pp. 134-135, 145-155, 1915.

ALABAMA DISTRICT

The metamorphic rocks in Alabama trend northeast, and in most places in the pegmatite-bearing area, dip to the east at moderate to steep angles. Folds are common and several reverse faults have been mapped in Clay County.

A large body of Pinckneyville quartz-diorite extends 24 miles northeast from the Cretaceous sediments of the Coastal Plain. It is a compound intrusive mass, containing separate bodies of quartz-diorite, granodiorite, and quartz-monzonite. Flow lines indicate that the magma moved upward from the southwest, parallel to the axes of the folds of the metamorphic rocks.

The pegmatite consits largely of plagioclase, microcline, and quartz. Muscovite, black tourmaline, biotite, and garnet are the common accessories. Cassiterite is common in some deposits in Coosa County, in the southwest part of the district, in which tantalite is also reported to occur.

The pegmatite occurs in five major groups. The southwesternmost one differs from the others in that the pegmatite therein contains cassiterite and an abnormally high content of quartz. The pegmatites in the other groups of deposits are very similar in mineralogy as well as in structure.

Three of the groups lie a few miles east of major thrust faults. It is, perhaps, significant that 137 of the known 179 deposits are northeast of the largest quartz-diorite body and a few miles east of a marked westward buldge in the western boundary fault. No other relation is evident between the distribution of pegmatite and the structure of the district.

Nearly 80% of the deposits are parallel to the foliation of the country rock, trending northeast, as is shown on Figure 4. Those in which linear elements can be measured plunge gently southward, parallel to the axes of minor folds.

References

Prouty, W. F., Geology and Mineral Resources of Clay

County, Alabama: Geol. Survey of Alabama County Report No. 1, pp. 1-78, 1923.

Clark, G. H., Mica Deposits of Alabama: Geol. Survey of Alabama Bull. 24, pp. 42-105, 1921.

Heinrich, E. Wm., Alabama District: U. S. Geol. Survey, unpublished manuscript, 1945.

Figure 1

Strikes of all pegmatites in the southeastern United States whose attitudes are known, exclusive of those in Western North Carolina.

Detailed information about the strikes of deposits in the Franklin-Sylva district is not now available. Its incorporation would not change the chart greatly as the major strike direction is northeast.

Geo. Wahr, Publisher, Ann Arbor, Mich.

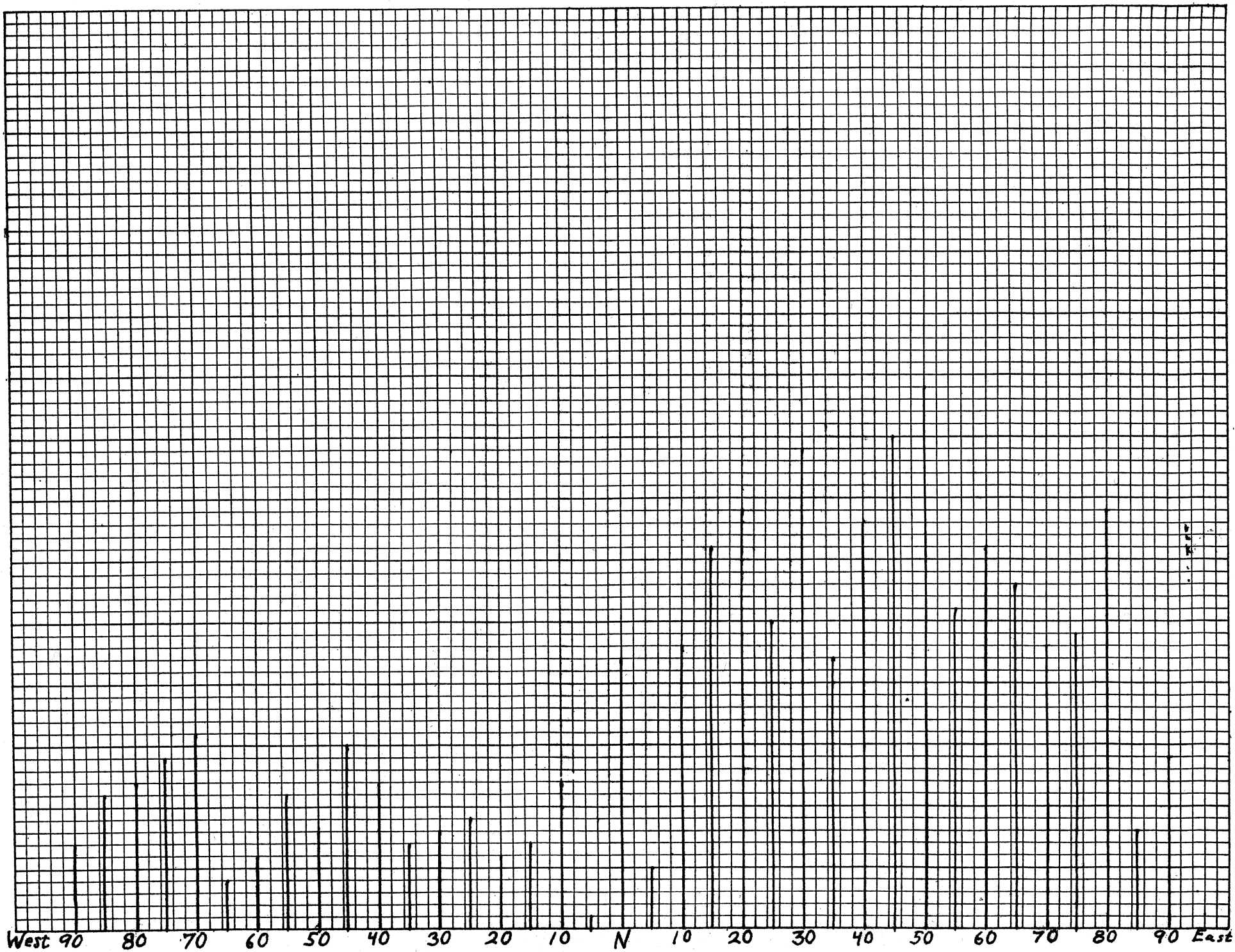

Figure 2

I Strikes of pegmatite deposits in northern Maryland, Delaware, and Pennsylvania. Those indicated in blue are sodic deposits in peridotite, those indicated in red are normal deposits in the northern and eastern parts of the district and those indicated in black are normal deposits in the western part.

II Strikes of deposits in southern Maryland. Those indicated in blue are in the eastern part of the district, those in black are in the western and southwestern parts.

W 90 80 70 60 50 40 30 20 10 N 10 20 30 40 50 60 70 80 90 E

I

II

Geo. Wahr, Publisher, Ann Arbor, Mich.

Form 33—10 x 10 to 1 inch

Figure 3

Strikes of pegmatite deposits in Virginia

I Eastern Virginia, Amelia, Powhatan, and Goochland Counties. Deposits indicated in blue are in the eastern area, those in red are in the western area and those in black are in the central area.

II Axton area. Deposits indicated in blue are in the eastern part of the area, those indicated in red are in the western part.

III Deposits in southwestern Virginia other than those in the Axton area. Those indicated in blue are in the Altavista area, those indicated in red are in the Moneta-Bells area, and those indicated in black are in the Chestnut Mountain area.

IV Deposits in the Ridgeway-Sandy Ridge district. Those indicated in blue are near Ridgeway, those in red are near Sandy Ridge.

Geo. Wahr, Publisher, Ann Arbor, Mich.

Form 33—10 x 10 to 1 inch

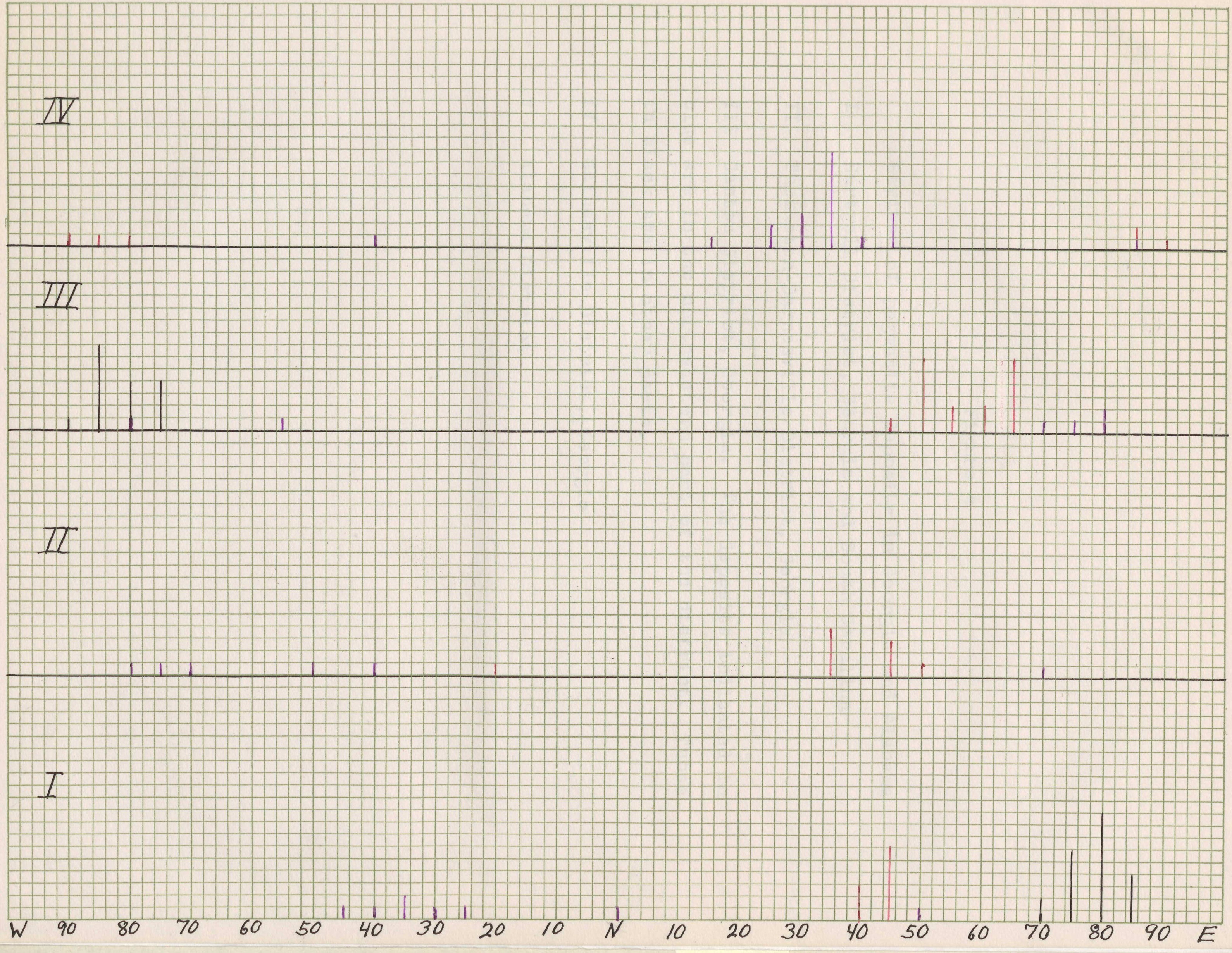

Figure 4

Strikes of pegmatite deposits in Georgia and Alabama

I Hartwell District, Georgia and South Carolina

II Thomaston-Barnesville District, Georgia

III Canton District, Georgia. The deposits indicated in blue are in the northeastern part of the district. Those in black are in other parts.

IV Gainesville District, Georgia

V Alabama District

Geo. Wahr, Publisher, Ann Arbor, Mich.

Form 33—10 x 10 to 1 inch

V

IV

III

II

I

W 90 80 70 60 50 40 30 20 10 N 10 20 30 40 50 60 70 80 90 E.

STRUCTURE AND PEGMATITE DISTRICTS IN SOUTHEASTERN UNITED STATES

Post-Paleozoic sedimentary rocks

Paleozoic sedimentary rocks

Metamorphic rocks

Pegmatite district

Thrust fault,
Dashed where hypothetical

Boundary between pegmatite belts

Zone of large intrusive masses

39
37
35
33
86
84
82
80
78
76

0 50 100 150 200 Miles