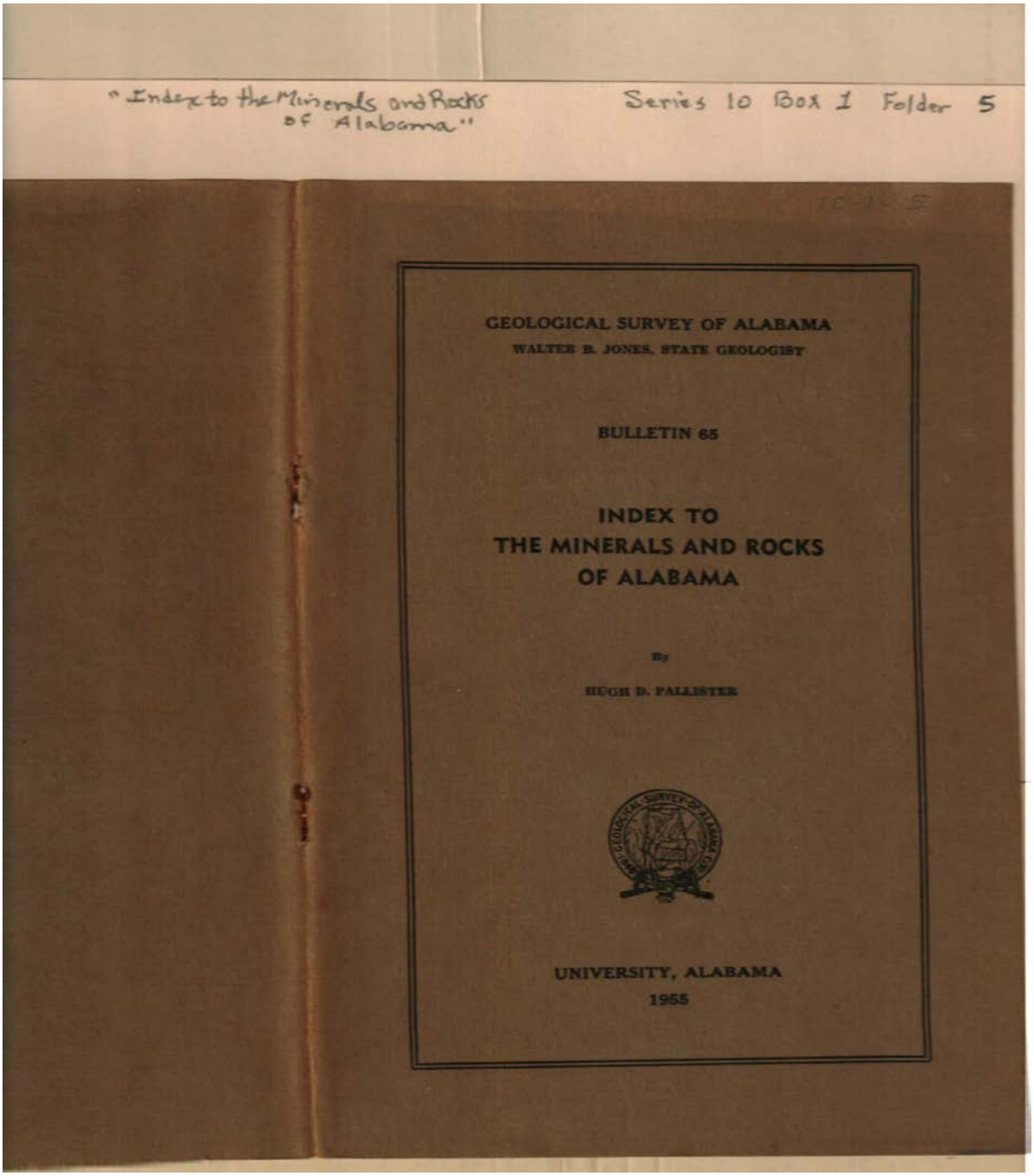

Names:

Jones, Walter B.
Pallister, Hugh D.

Mineral & Rocks of Alabama Index

Places:

University, AL

Types:

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Dates:

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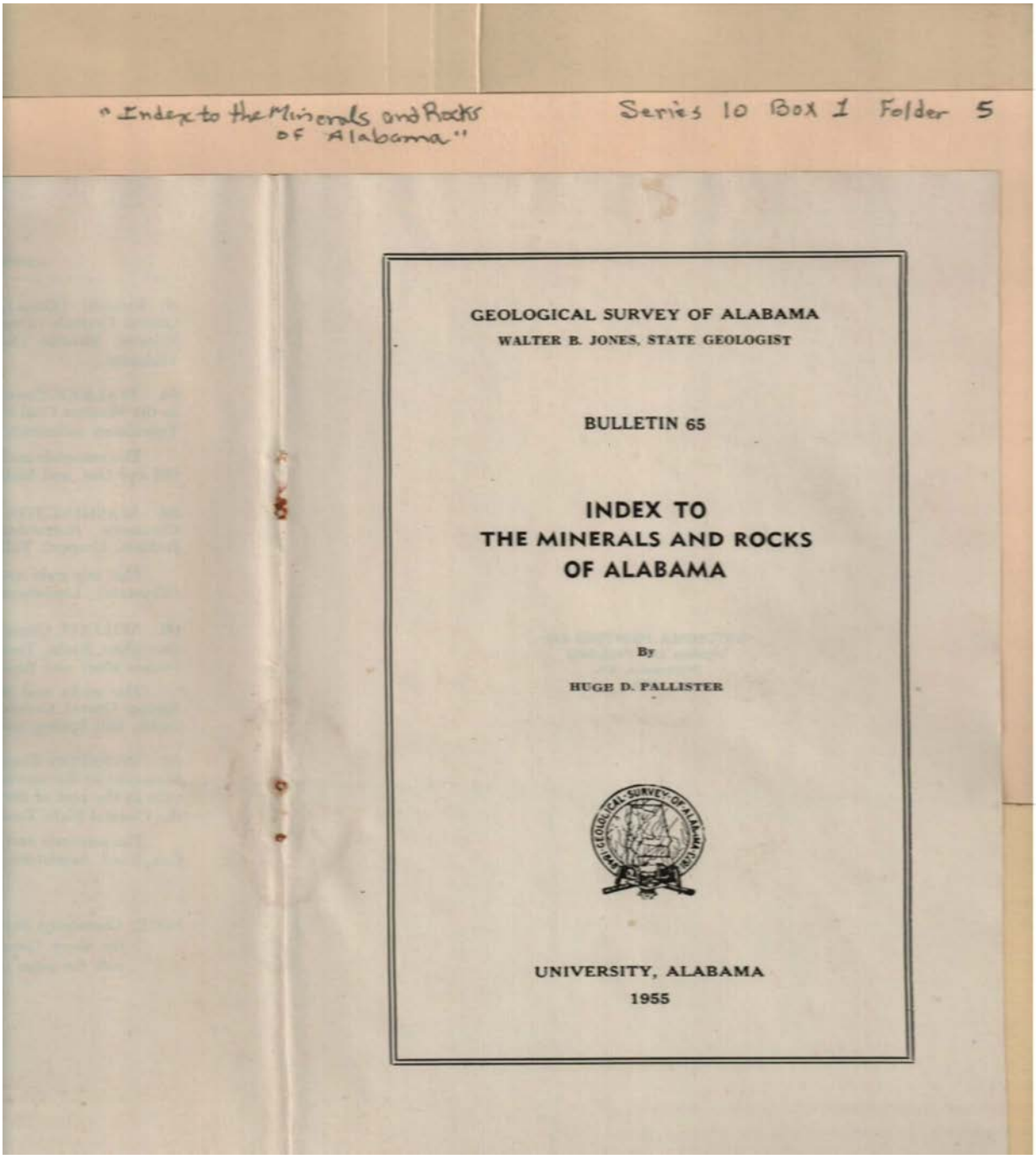

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Pallister, Hugh D.

Mineral & Rocks of Alabama Index

Places:

University, AL

Types:

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Dates:

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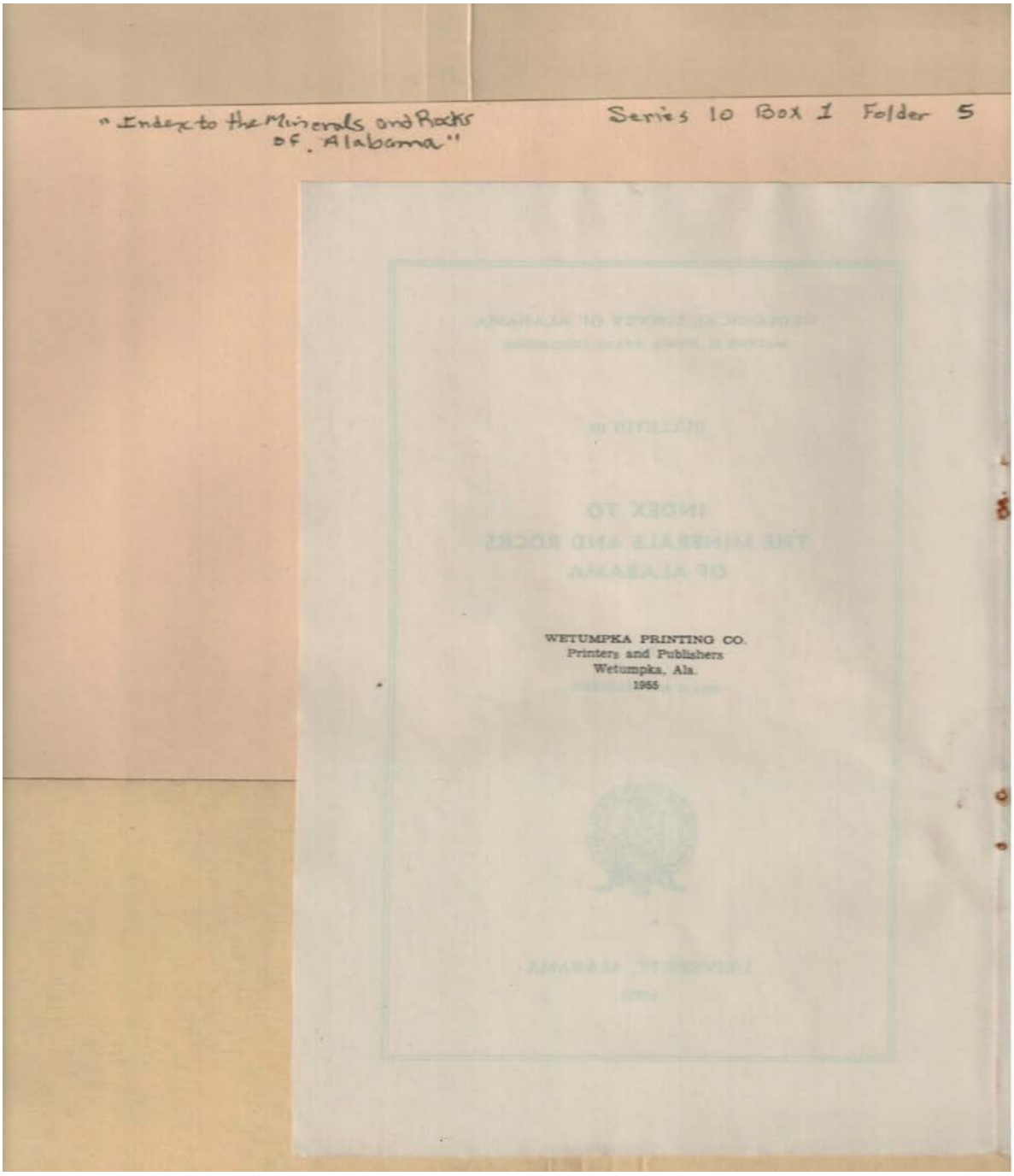

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Wetumpka Printing Co.

Places:
Wetumpka, AL

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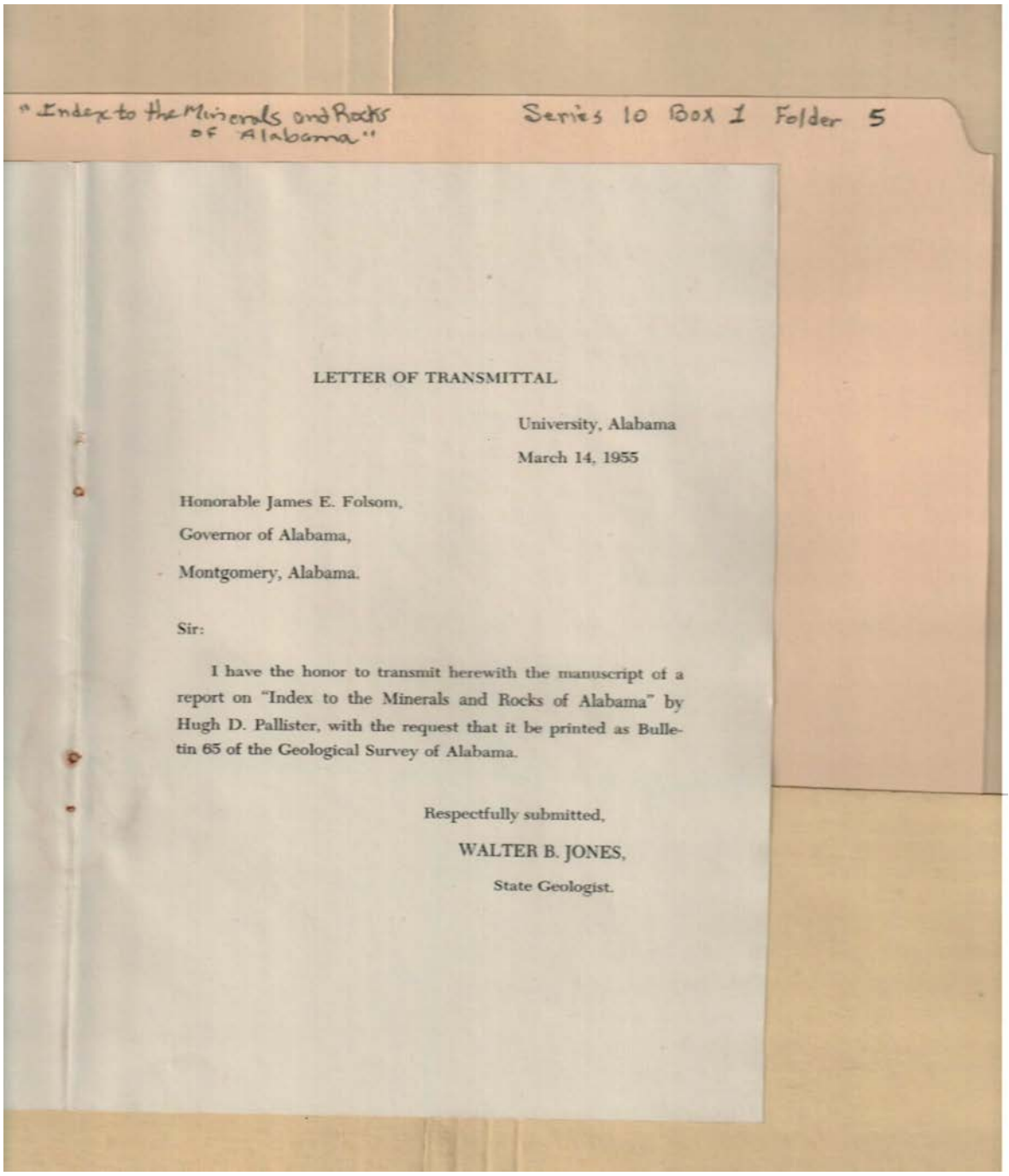
Dates:
1955

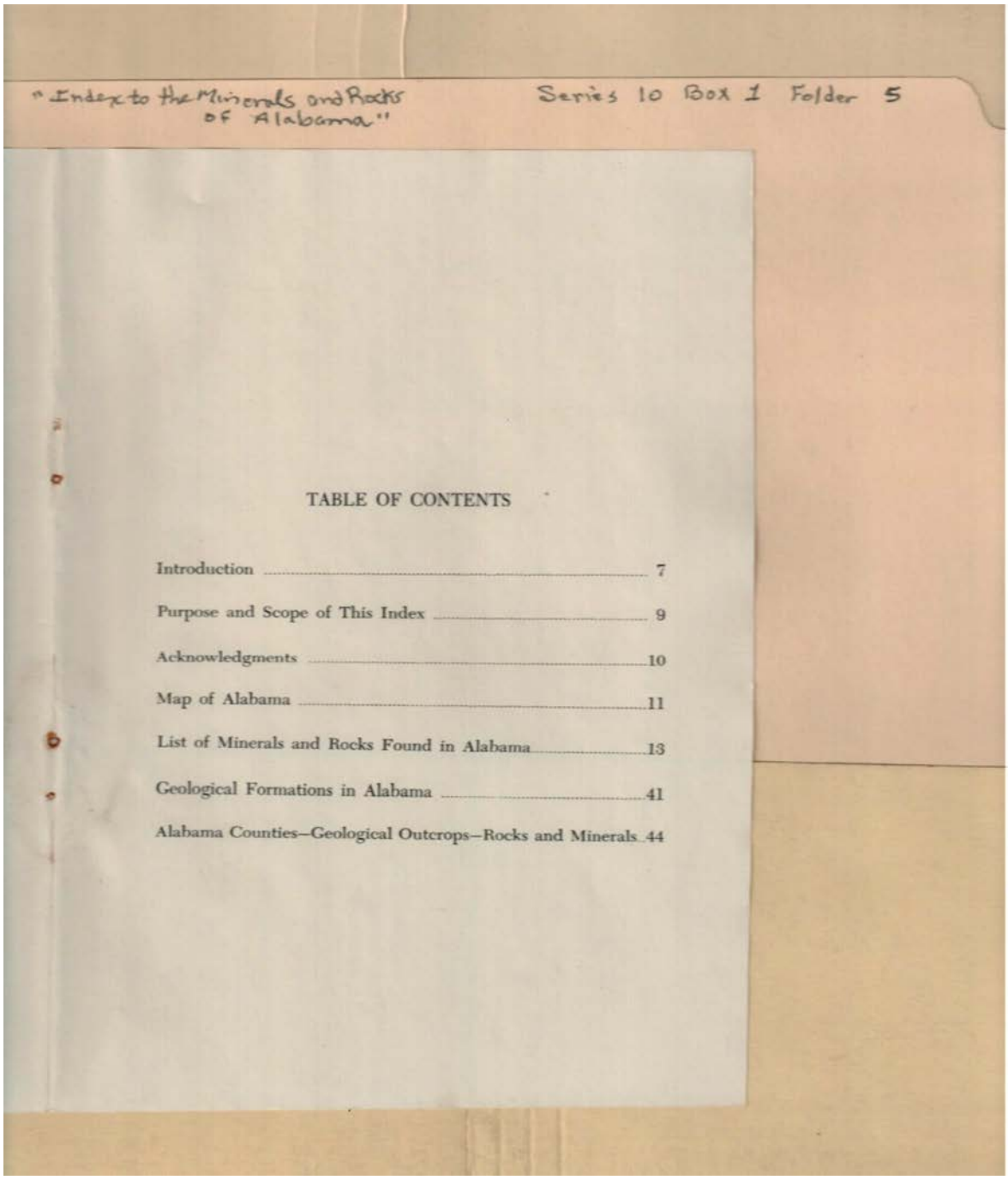


Names:
Folsom, James E., Governor
Jones, Walter B.
Pallister, Hugh D.

Places:
University, AL

Types:
correspondence

Dates:
Mar 14, 1955



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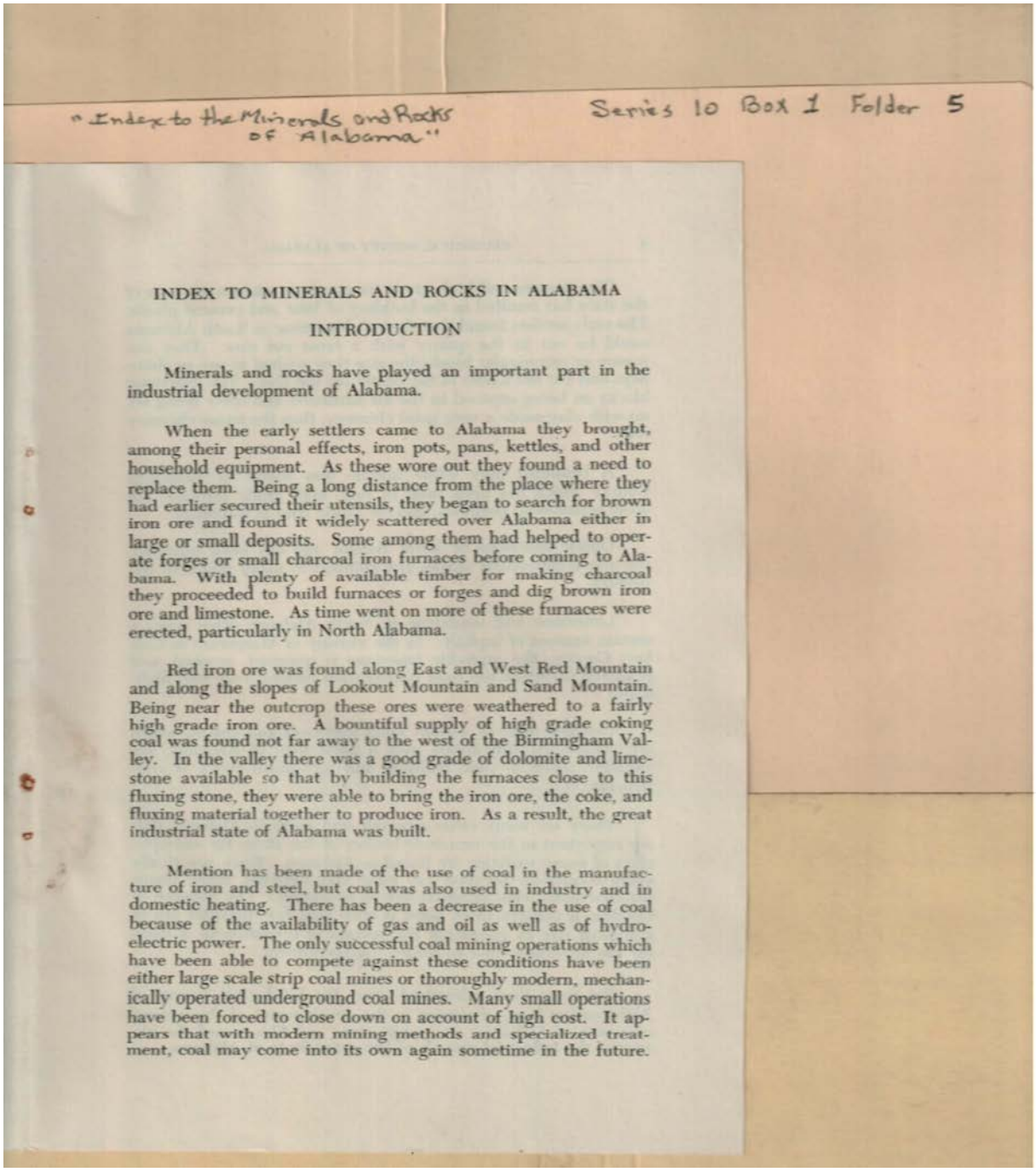

INDEX TO MINERALS AND ROCKS IN ALABAMA

INTRODUCTION

Minerals and rocks have played an important part in the industrial development of Alabama.

When the early settlers came to Alabama they brought, among their personal effects, iron pots, pans, kettles, and other household equipment. As these wore out they found a need to replace them. Being a long distance from the place where they had earlier secured their utensils, they began to search for brown iron ore and found it widely scattered over Alabama either in large or small deposits. Some among them had helped to operate forges or small charcoal iron furnaces before coming to Alabama. With plenty of available timber for making charcoal they proceeded to build furnaces or forges and dig brown iron ore and limestone. As time went on more of these furnaces were erected, particularly in North Alabama.

Red iron ore was found along East and West Red Mountain and along the slopes of Lookout Mountain and Sand Mountain. Being near the outcrop these ores were weathered to a fairly high grade iron ore. A bountiful supply of high grade coking coal was found not far away to the west of the Birmingham Valley. In the valley there was a good grade of dolomite and limestone available so that by building the furnaces close to this fluxing stone, they were able to bring the iron ore, the coke, and fluxing material together to produce iron. As a result, the great industrial state of Alabama was built.

Mention has been made of the use of coal in the manufacture of iron and steel, but coal was also used in industry and in domestic heating. There has been a decrease in the use of coal because of the availability of gas and oil as well as of hydroelectric power. The only successful coal mining operations which have been able to compete against these conditions have been either large scale strip coal mines or thoroughly modern, mechanically operated underground coal mines. Many small operations have been forced to close down on account of high cost. It appears that with modern mining methods and specialized treatment, coal may come into its own again sometime in the future.

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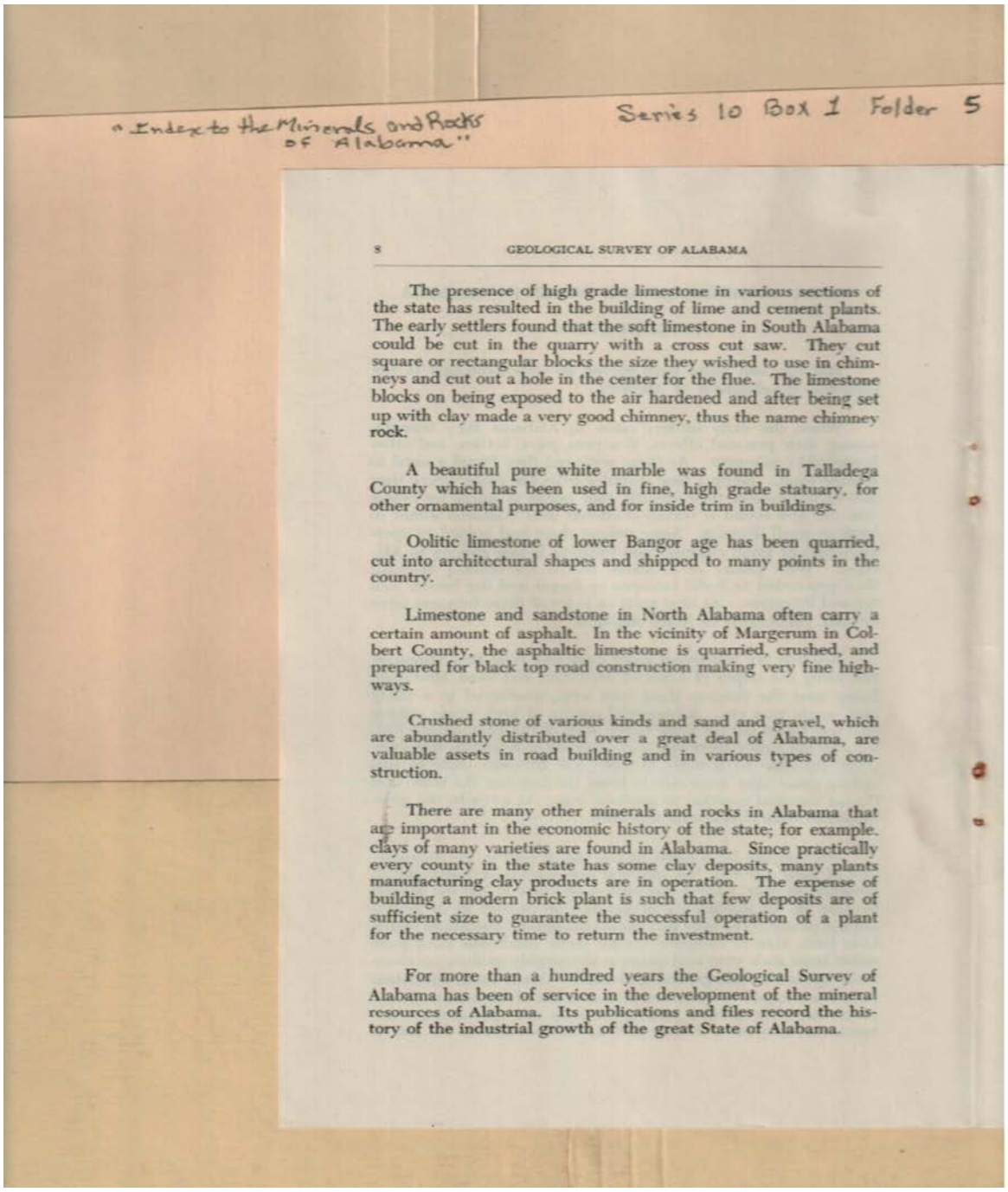

8 GEOLOGICAL SURVEY OF ALABAMA

The presence of high grade limestone in various sections of the state has resulted in the building of lime and cement plants. The early settlers found that the soft limestone in South Alabama could be cut in the quarry with a cross cut saw. They cut square or rectangular blocks the size they wished to use in chimneys and cut out a hole in the center for the flue. The limestone blocks on being exposed to the air hardened and after being set up with clay made a very good chimney, thus the name chimney rock.

A beautiful pure white marble was found in Talladega County which has been used in fine, high grade statuary, for other ornamental purposes, and for inside trim in buildings.

Oolitic limestone of lower Bangor age has been quarried, cut into architectural shapes and shipped to many points in the country.

Limestone and sandstone in North Alabama often carry a certain amount of asphalt. In the vicinity of Margerum in Colbert County, the asphaltic limestone is quarried, crushed, and prepared for black top road construction making very fine highways.

Crushed stone of various kinds and sand and gravel, which are abundantly distributed over a great deal of Alabama, are valuable assets in road building and in various types of construction.

There are many other minerals and rocks in Alabama that are important in the economic history of the state; for example, clays of many varieties are found in Alabama. Since practically every county in the state has some clay deposits, many plants manufacturing clay products are in operation. The expense of building a modern brick plant is such that few deposits are of sufficient size to guarantee the successful operation of a plant for the necessary time to return the investment.

For more than a hundred years the Geological Survey of Alabama has been of service in the development of the mineral resources of Alabama. Its publications and files record the history of the industrial growth of the great State of Alabama.

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Index to Mineral &
Rocks in Alabama

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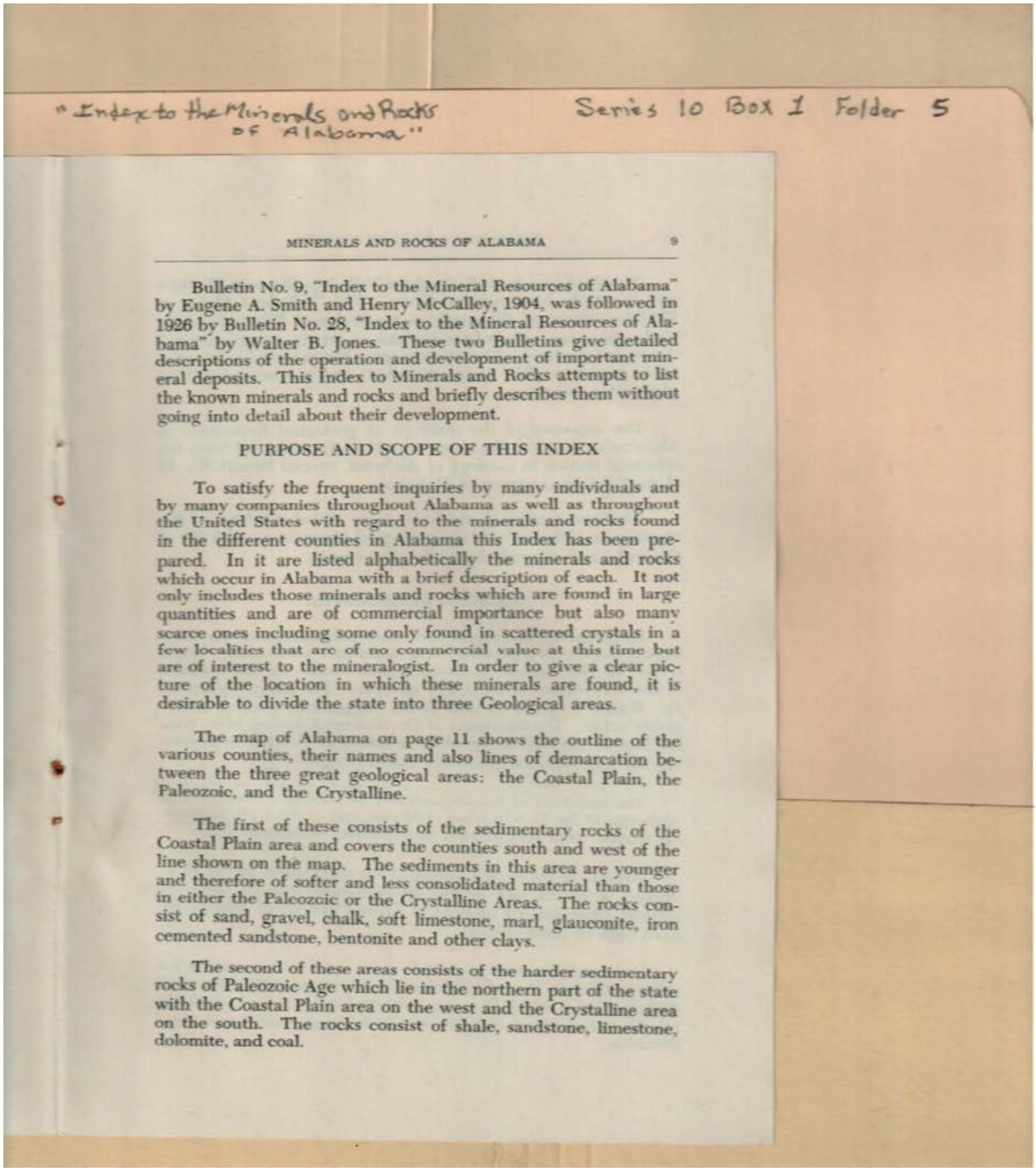

Bulletin No. 9, "Index to the Mineral Resources of Alabama" by Eugene A. Smith and Henry McCalley, 1904, was followed in 1926 by Bulletin No. 28, "Index to the Mineral Resources of Alabama" by Walter B. Jones. These two Bulletins give detailed descriptions of the operation and development of important mineral deposits. This Index to Minerals and Rocks attempts to list the known minerals and rocks and briefly describes them without going into detail about their development.

PURPOSE AND SCOPE OF THIS INDEX

To satisfy the frequent inquiries by many individuals and by many companies throughout Alabama as well as throughout the United States with regard to the minerals and rocks found in the different counties in Alabama this Index has been prepared. In it are listed alphabetically the minerals and rocks which occur in Alabama with a brief description of each. It not only includes those minerals and rocks which are found in large quantities and are of commercial importance but also many scarce ones including some only found in scattered crystals in a few localities that are of no commercial value at this time but are of interest to the mineralogist. In order to give a clear picture of the location in which these minerals are found, it is desirable to divide the state into three Geological areas.

The map of Alabama on page 11 shows the outline of the various counties, their names and also lines of demarcation between the three great geological areas: the Coastal Plain, the Paleozoic, and the Crystalline.

The first of these consists of the sedimentary rocks of the Coastal Plain area and covers the counties south and west of the line shown on the map. The sediments in this area are younger and therefore of softer and less consolidated material than those in either the Paleozoic or the Crystalline Areas. The rocks consist of sand, gravel, chalk, soft limestone, marl, glauconite, iron cemented sandstone, bentonite and other clays.

The second of these areas consists of the harder sedimentary rocks of Paleozoic Age which lie in the northern part of the state with the Coastal Plain area on the west and the Crystalline area on the south. The rocks consist of shale, sandstone, limestone, dolomite, and coal.

Names:
Jones, Walter B. McCalley, Henry Smith, Eugene A.

Types:
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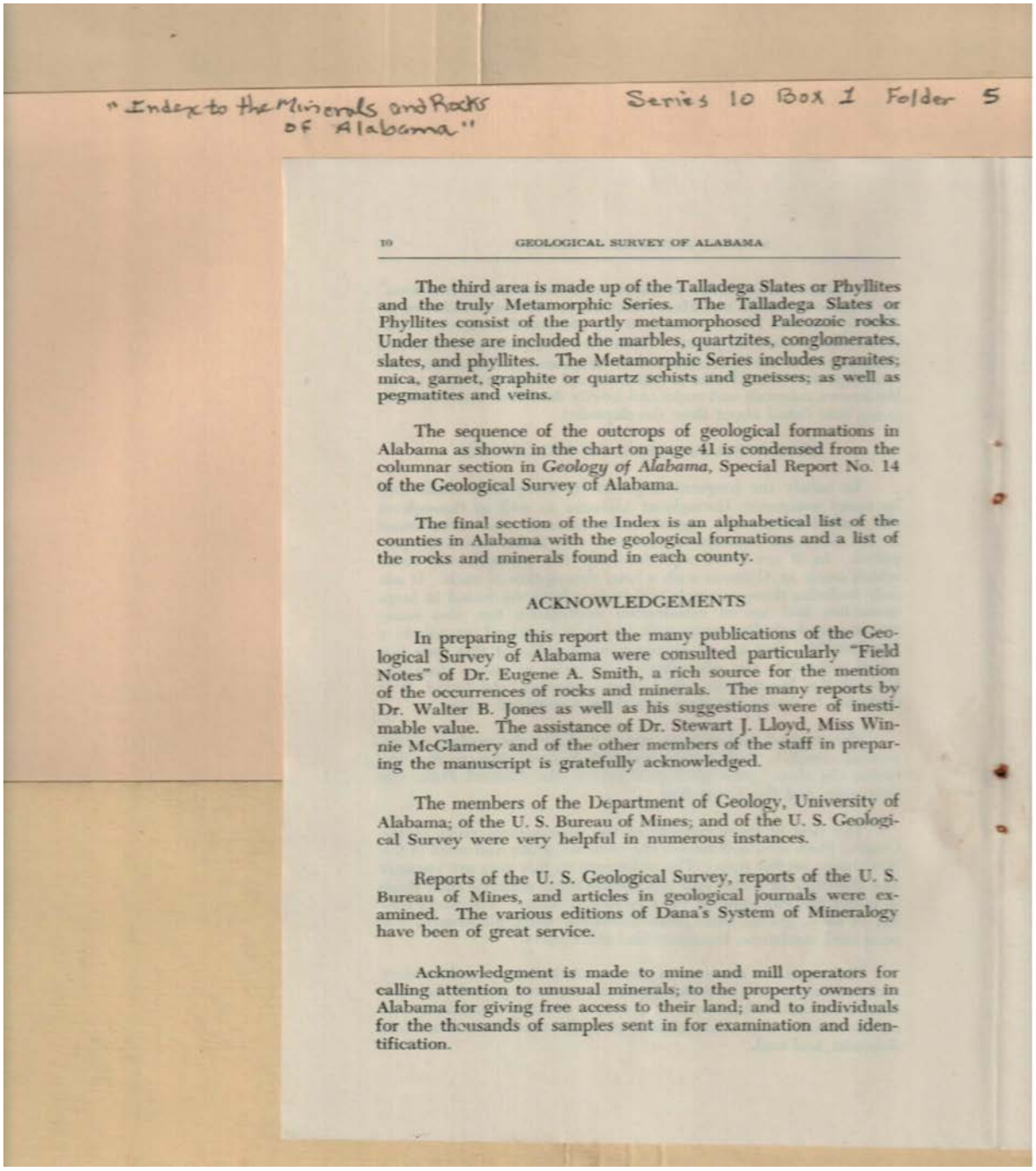

The third area is made up of the Talladega Slates or Phyllites and the truly Metamorphic Series. The Talladega Slates or Phyllites consist of the partly metamorphosed Paleozoic rocks. Under these are included the marbles, quartzites, conglomerates, slates, and phyllites. The Metamorphic Series includes granites; mica, garnet, graphite or quartz schists and gneisses; as well as pegmatites and veins.

The sequence of the outcrops of geological formations in Alabama as shown in the chart on page 41 is condensed from the columnar section in *Geology of Alabama*, Special Report No. 14 of the Geological Survey of Alabama.

The final section of the Index is an alphabetical list of the counties in Alabama with the geological formations and a list of the rocks and minerals found in each county.

ACKNOWLEDGEMENTS

In preparing this report the many publications of the Geological Survey of Alabama were consulted particularly "Field Notes" of Dr. Eugene A. Smith, a rich source for the mention of the occurrences of rocks and minerals. The many reports by Dr. Walter B. Jones as well as his suggestions were of inestimable value. The assistance of Dr. Stewart J. Lloyd, Miss Winnie McGlamery and of the other members of the staff in preparing the manuscript is gratefully acknowledged.

The members of the Department of Geology, University of Alabama; of the U. S. Bureau of Mines; and of the U. S. Geological Survey were very helpful in numerous instances.

Reports of the U. S. Geological Survey, reports of the U. S. Bureau of Mines, and articles in geological journals were examined. The various editions of Dana's System of Mineralogy have been of great service.

Acknowledgment is made to mine and mill operators for calling attention to unusual minerals; to the property owners in Alabama for giving free access to their land; and to individuals for the thousands of samples sent in for examination and identification.

Names:

Jones, Walter B., Dr.
Lloyd, Stewart J., Dr.
McGlamery, Willie, Miss
Smith, Eugene A., Dr.

Types:

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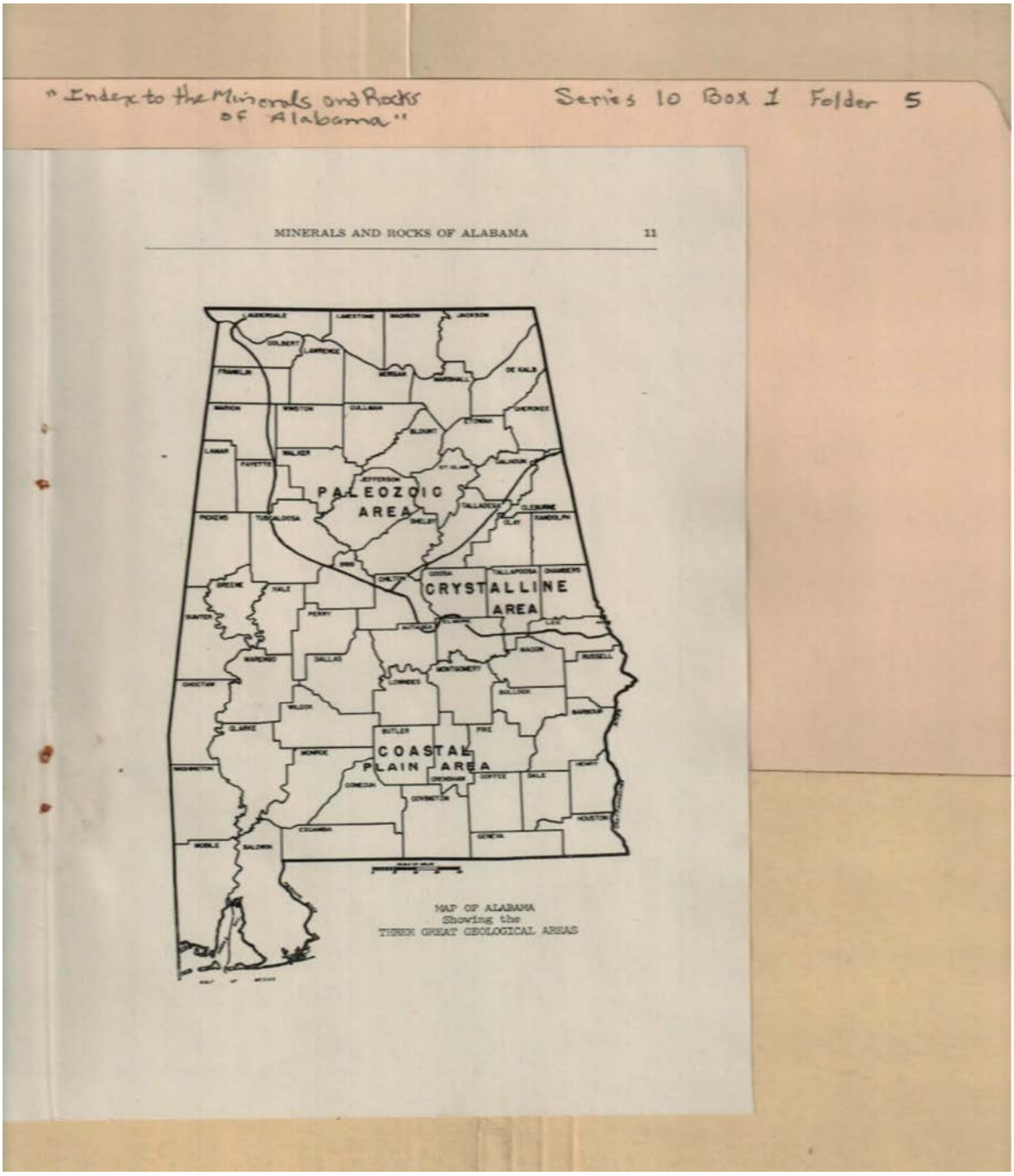

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Map of Alabama

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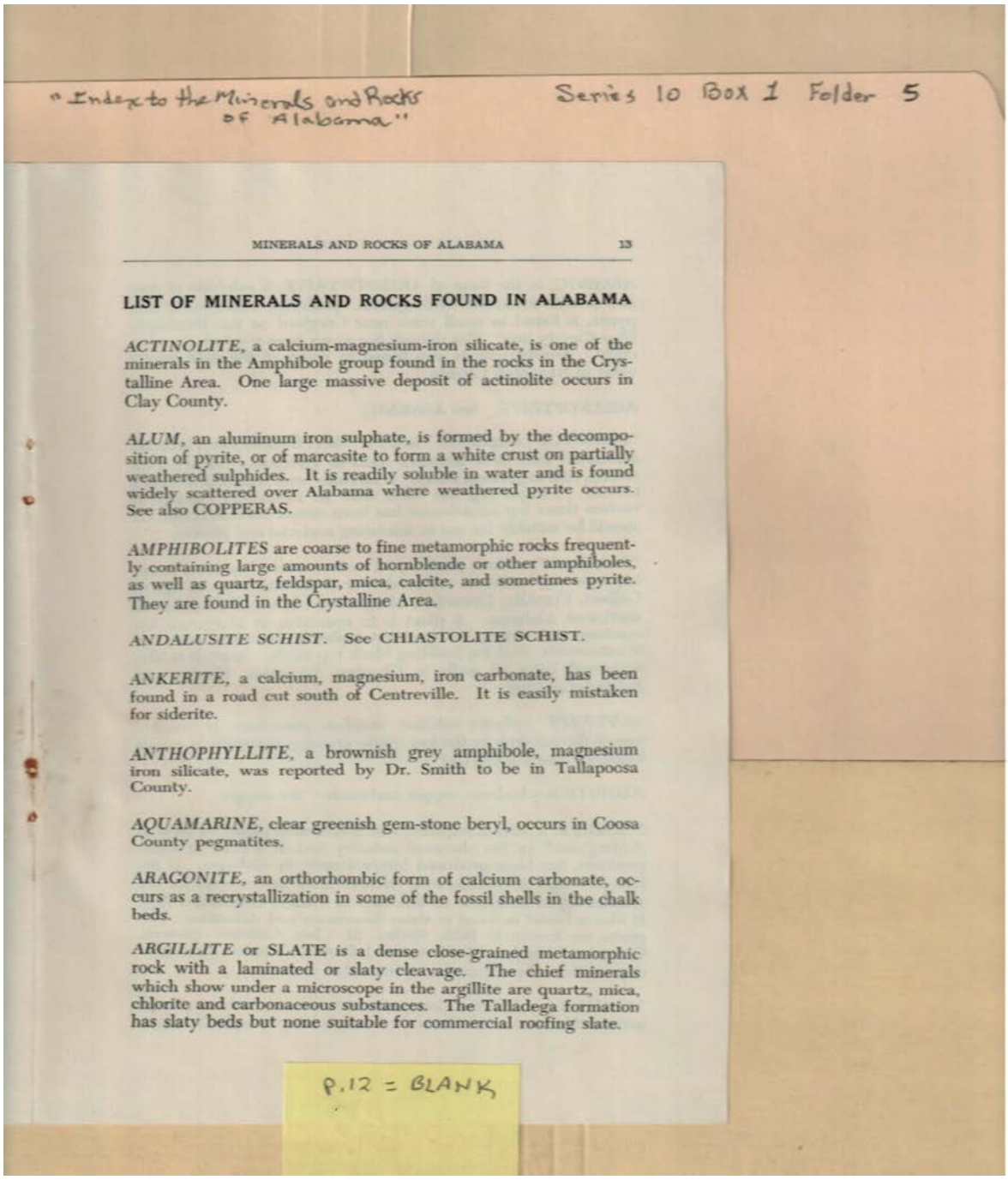

LIST OF MINERALS AND ROCKS FOUND IN ALABAMA

ACTINOLITE, a calcium-magnesium-iron silicate, is one of the minerals in the Amphibole group found in the rocks in the Crystalline Area. One large massive deposit of actinolite occurs in Clay County.

ALUM, an aluminum iron sulphate, is formed by the decomposition of pyrite, or of marcasite to form a white crust on partially weathered sulphides. It is readily soluble in water and is found widely scattered over Alabama where weathered pyrite occurs. See also COPPERAS.

AMPHIBOLITES are coarse to fine metamorphic rocks frequently containing large amounts of hornblende or other amphiboles, as well as quartz, feldspar, mica, calcite, and sometimes pyrite. They are found in the Crystalline Area.

ANDALUSITE SCHIST. See CHIASTOLITE SCHIST.

ANKERITE, a calcium, magnesium, iron carbonate, has been found in a road cut south of Centreville. It is easily mistaken for siderite.

ANTHOPHYLLITE, a brownish grey amphibole, magnesium iron silicate, was reported by Dr. Smith to be in Tallapoosa County.

AQUAMARINE, clear greenish gem-stone beryl, occurs in Coosa County pegmatites.

ARAGONITE, an orthorhombic form of calcium carbonate, occurs as a recrystallization in some of the fossil shells in the chalk beds.

ARGILLITE or SLATE is a dense close-grained metamorphic rock with a laminated or slaty cleavage. The chief minerals which show under a microscope in the argillite are quartz, mica, chlorite and carbonaceous substances. The Talladega formation has slaty beds but none suitable for commercial roofing slate.

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Names:
List of Minerals &
Rocks in Alabama

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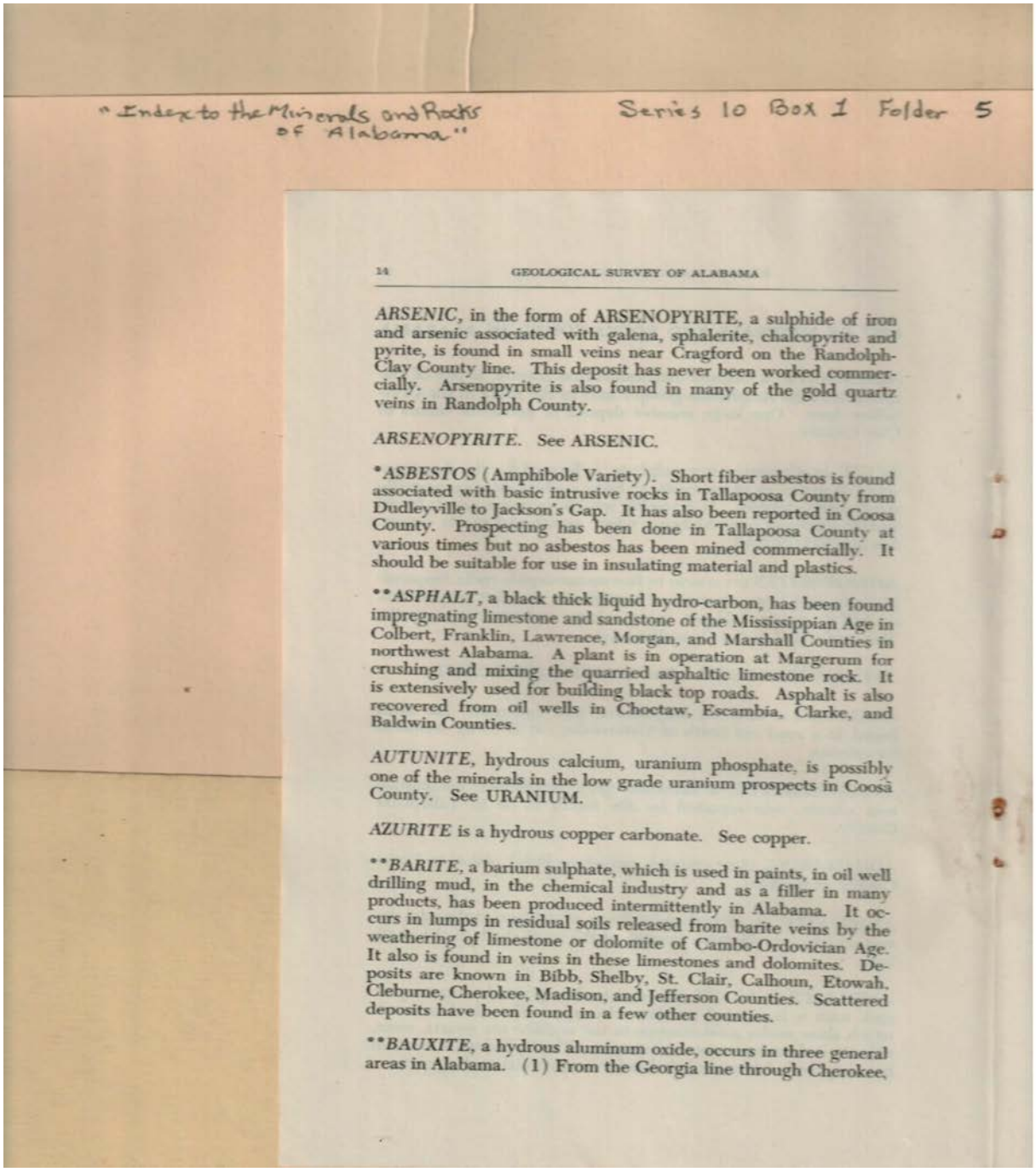

ARSENIC, in the form of ARSENOPYRITE, a sulphide of iron and arsenic associated with galena, sphalerite, chalcopyrite and pyrite, is found in small veins near Cragford on the Randolph-Clay County line. This deposit has never been worked commercially. Arsenopyrite is also found in many of the gold quartz veins in Randolph County.

ARSENOPYRITE. See ARSENIC.

**ASBESTOS* (Amphibole Variety). Short fiber asbestos is found associated with basic intrusive rocks in Tallapoosa County from Dudleyville to Jackson's Gap. It has also been reported in Coosa County. Prospecting has been done in Tallapoosa County at various times but no asbestos has been mined commercially. It should be suitable for use in insulating material and plastics.

***ASPHALT*, a black thick liquid hydro-carbon, has been found impregnating limestone and sandstone of the Mississippian Age in Colbert, Franklin, Lawrence, Morgan, and Marshall Counties in northwest Alabama. A plant is in operation at Margerum for crushing and mixing the quarried asphaltic limestone rock. It is extensively used for building black top roads. Asphalt is also recovered from oil wells in Choctaw, Escambia, Clarke, and Baldwin Counties.

AUTUNITE, hydrous calcium, uranium phosphate, is possibly one of the minerals in the low grade uranium prospects in Coosa County. See URANIUM.

AZURITE is a hydrous copper carbonate. See copper.

***BARITE*, a barium sulphate, which is used in paints, in oil well drilling mud, in the chemical industry and as a filler in many products, has been produced intermittently in Alabama. It occurs in lumps in residual soils released from barite veins by the weathering of limestone or dolomite of Cambo-Ordovician Age. It also is found in veins in these limestones and dolomites. Deposits are known in Bibb, Shelby, St. Clair, Calhoun, Etowah, Cleburne, Cherokee, Madison, and Jefferson Counties. Scattered deposits have been found in a few other counties.

***BAUXITE*, a hydrous aluminum oxide, occurs in three general areas in Alabama. (1) From the Georgia line through Cherokee,

Names:
List of Minerals & Rocks in Alabama

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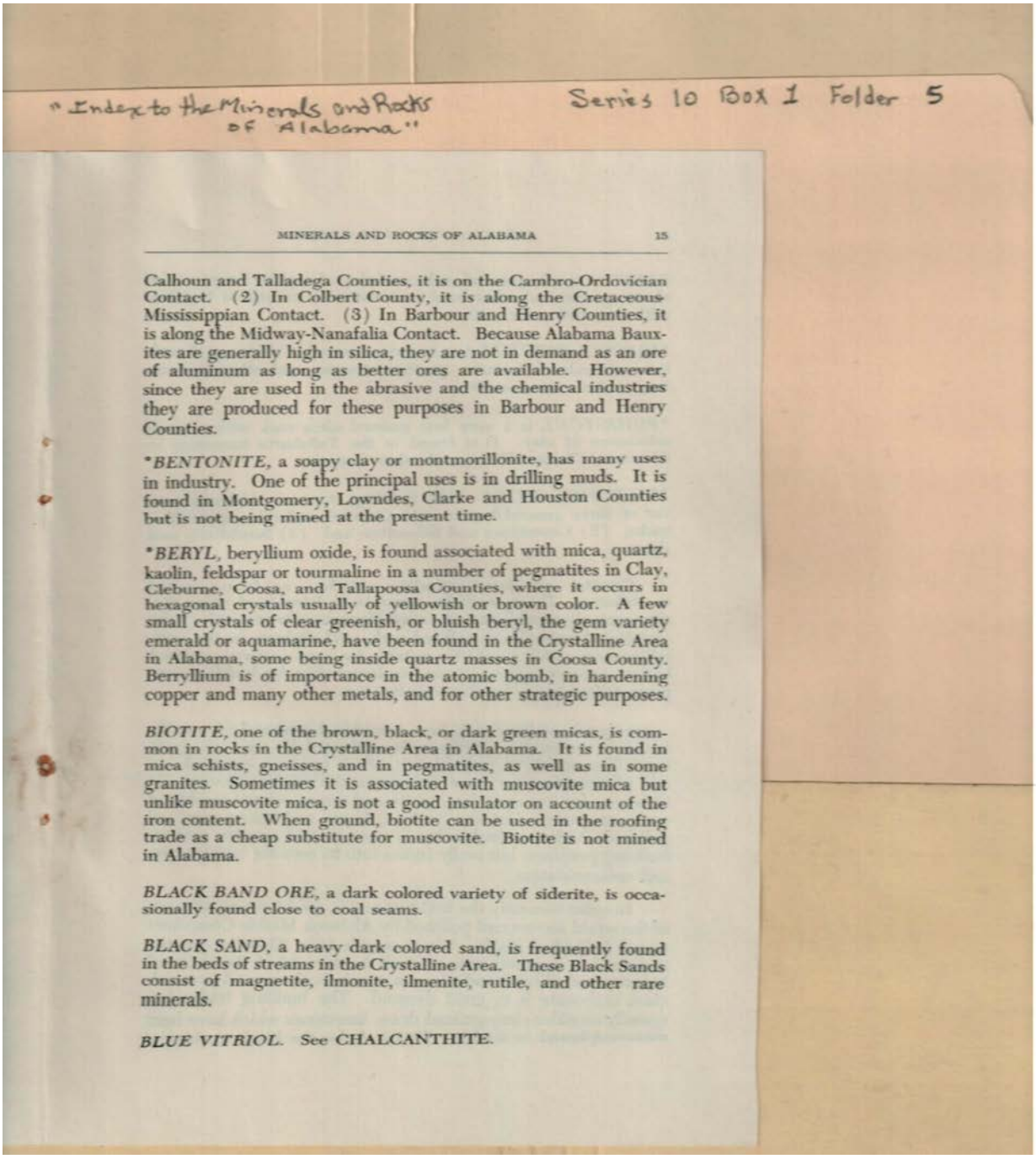

Calhoun and Talladega Counties, it is on the Cambro-Ordovician Contact. (2) In Colbert County, it is along the Cretaceous-Mississippian Contact. (3) In Barbour and Henry Counties, it is along the Midway-Nanafalia Contact. Because Alabama Bauxites are generally high in silica, they are not in demand as an ore of aluminum as long as better ores are available. However, since they are used in the abrasive and the chemical industries they are produced for these purposes in Barbour and Henry Counties.

**BENTONITE*, a soapy clay or montmorillonite, has many uses in industry. One of the principal uses is in drilling muds. It is found in Montgomery, Lowndes, Clarke and Houston Counties but is not being mined at the present time.

**BERYL*, beryllium oxide, is found associated with mica, quartz, kaolin, feldspar or tourmaline in a number of pegmatites in Clay, Cleburne, Coosa, and Tallapoosa Counties, where it occurs in hexagonal crystals usually of yellowish or brown color. A few small crystals of clear greenish, or bluish beryl, the gem variety emerald or aquamarine, have been found in the Crystalline Area in Alabama, some being inside quartz masses in Coosa County. Berryllium is of importance in the atomic bomb, in hardening copper and many other metals, and for other strategic purposes.

BIOTITE, one of the brown, black, or dark green micas, is common in rocks in the Crystalline Area in Alabama. It is found in mica schists, gneisses, and in pegmatites, as well as in some granites. Sometimes it is associated with muscovite mica but unlike muscovite mica, is not a good insulator on account of the iron content. When ground, biotite can be used in the roofing trade as a cheap substitute for muscovite. Biotite is not mined in Alabama.

BLACK BAND ORE, a dark colored variety of siderite, is occasionally found close to coal seams.

BLACK SAND, a heavy dark colored sand, is frequently found in the beds of streams in the Crystalline Area. These Black Sands consist of magnetite, ilmonite, ilmenite, rutile, and other rare minerals.

BLUE VITRIOL. See CHALCANTHITE.

Names:
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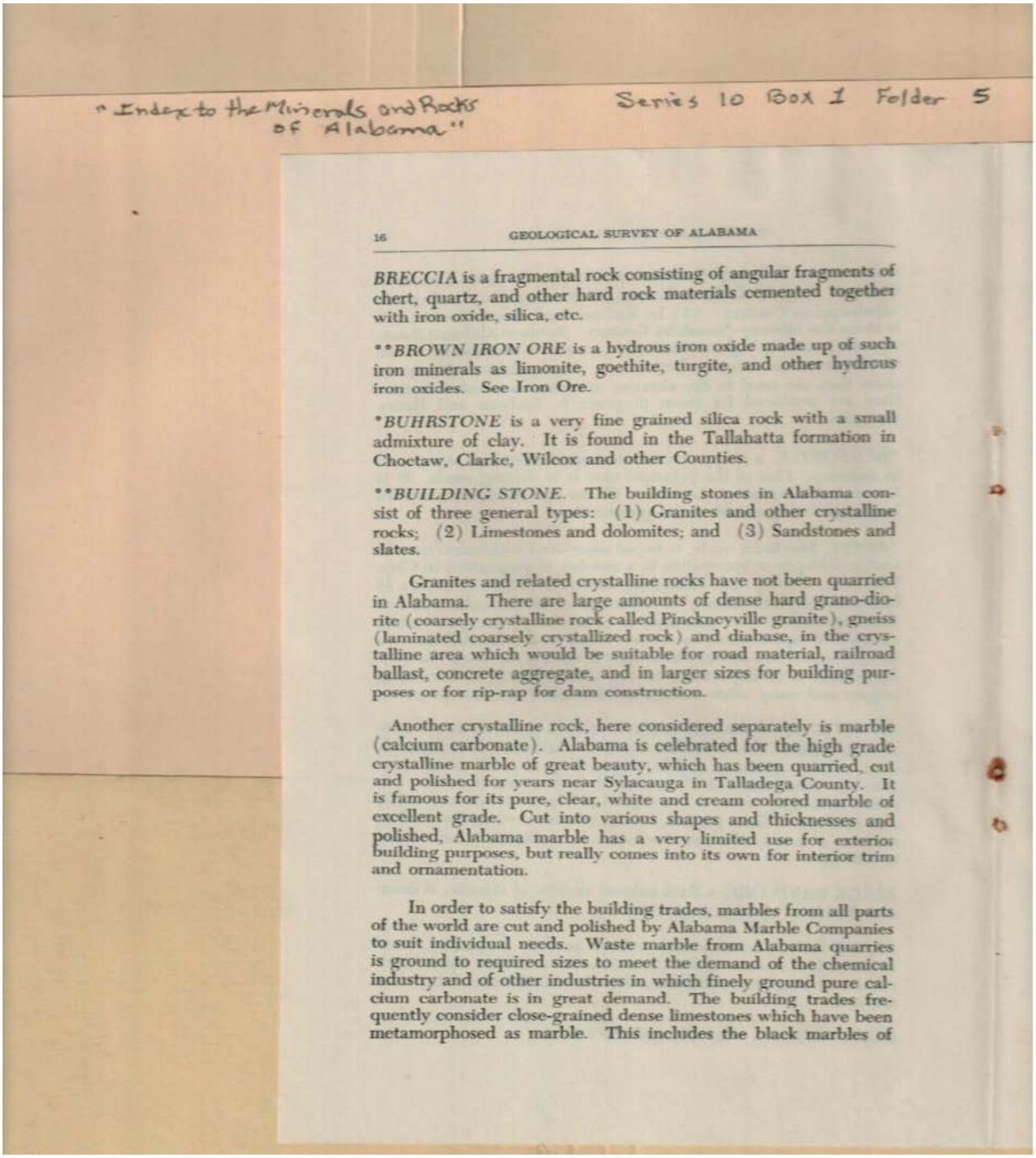

BRECCIA is a fragmental rock consisting of angular fragments of chert, quartz, and other hard rock materials cemented together with iron oxide, silica, etc.

***BROWN IRON ORE* is a hydrous iron oxide made up of such iron minerals as limonite, goethite, turgite, and other hydrous iron oxides. See Iron Ore.

**BUHRSTONE* is a very fine grained silica rock with a small admixture of clay. It is found in the Tallahatta formation in Choctaw, Clarke, Wilcox and other Counties.

***BUILDING STONE*. The building stones in Alabama consist of three general types: (1) Granites and other crystalline rocks; (2) Limestones and dolomites; and (3) Sandstones and slates.

Granites and related crystalline rocks have not been quarried in Alabama. There are large amounts of dense hard grano-diorite (coarsely crystalline rock called Pinckneyville granite), gneiss (laminated coarsely crystallized rock) and diabase, in the crystalline area which would be suitable for road material, railroad ballast, concrete aggregate, and in larger sizes for building purposes or for rip-rap for dam construction.

Another crystalline rock, here considered separately is marble (calcium carbonate). Alabama is celebrated for the high grade crystalline marble of great beauty, which has been quarried, cut and polished for years near Sylacauga in Talladega County. It is famous for its pure, clear, white and cream colored marble of excellent grade. Cut into various shapes and thicknesses and polished, Alabama marble has a very limited use for exterior building purposes, but really comes into its own for interior trim and ornamentation.

In order to satisfy the building trades, marbles from all parts of the world are cut and polished by Alabama Marble Companies to suit individual needs. Waste marble from Alabama quarries is ground to required sizes to meet the demand of the chemical industry and of other industries in which finely ground pure calcium carbonate is in great demand. The building trades frequently consider close-grained dense limestones which have been metamorphosed as marble. This includes the black marbles of

Names:
List of Minerals & Rocks in Alabama

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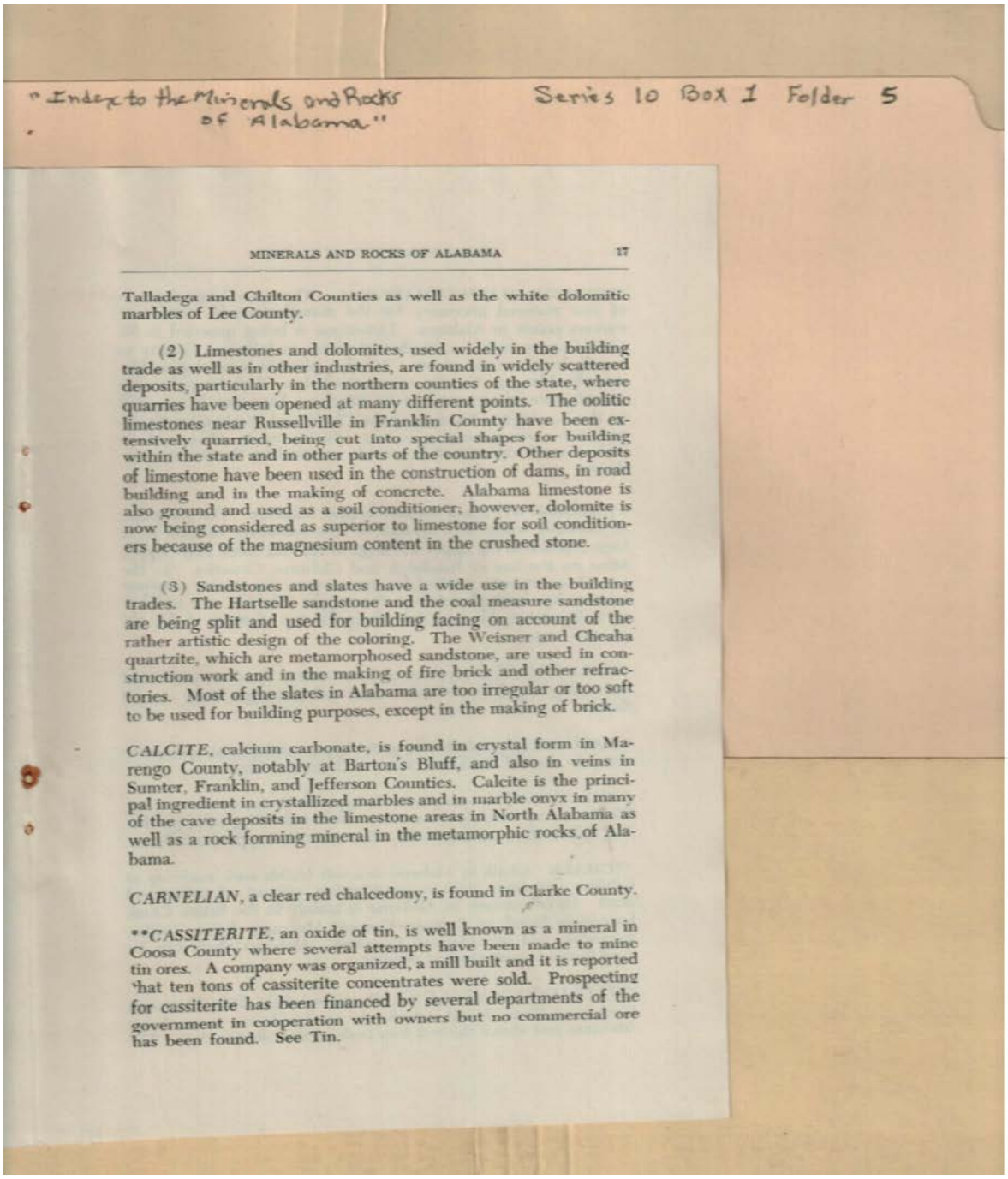

Talladega and Chilton Counties as well as the white dolomitic marbles of Lee County.

(2) Limestones and dolomites, used widely in the building trade as well as in other industries, are found in widely scattered deposits, particularly in the northern counties of the state, where quarries have been opened at many different points. The oolitic limestones near Russellville in Franklin County have been extensively quarried, being cut into special shapes for building within the state and in other parts of the country. Other deposits of limestone have been used in the construction of dams, in road building and in the making of concrete. Alabama limestone is also ground and used as a soil conditioner; however, dolomite is now being considered as superior to limestone for soil conditioners because of the magnesium content in the crushed stone.

(3) Sandstones and slates have a wide use in the building trades. The Hartselle sandstone and the coal measure sandstone are being split and used for building facing on account of the rather artistic design of the coloring. The Weisner and Cheaha quartzite, which are metamorphosed sandstone, are used in construction work and in the making of fire brick and other refractories. Most of the slates in Alabama are too irregular or too soft to be used for building purposes, except in the making of brick.

CALCITE, calcium carbonate, is found in crystal form in Marengo County, notably at Barton's Bluff, and also in veins in Sumter, Franklin, and Jefferson Counties. Calcite is the principal ingredient in crystallized marbles and in marble onyx in many of the cave deposits in the limestone areas in North Alabama as well as a rock forming mineral in the metamorphic rocks of Alabama.

CARNELIAN, a clear red chalcedony, is found in Clarke County.

***CASSITERITE*, an oxide of tin, is well known as a mineral in Coosa County where several attempts have been made to mine tin ores. A company was organized, a mill built and it is reported that ten tons of cassiterite concentrates were sold. Prospecting for cassiterite has been financed by several departments of the government in cooperation with owners but no commercial ore has been found. See Tin.

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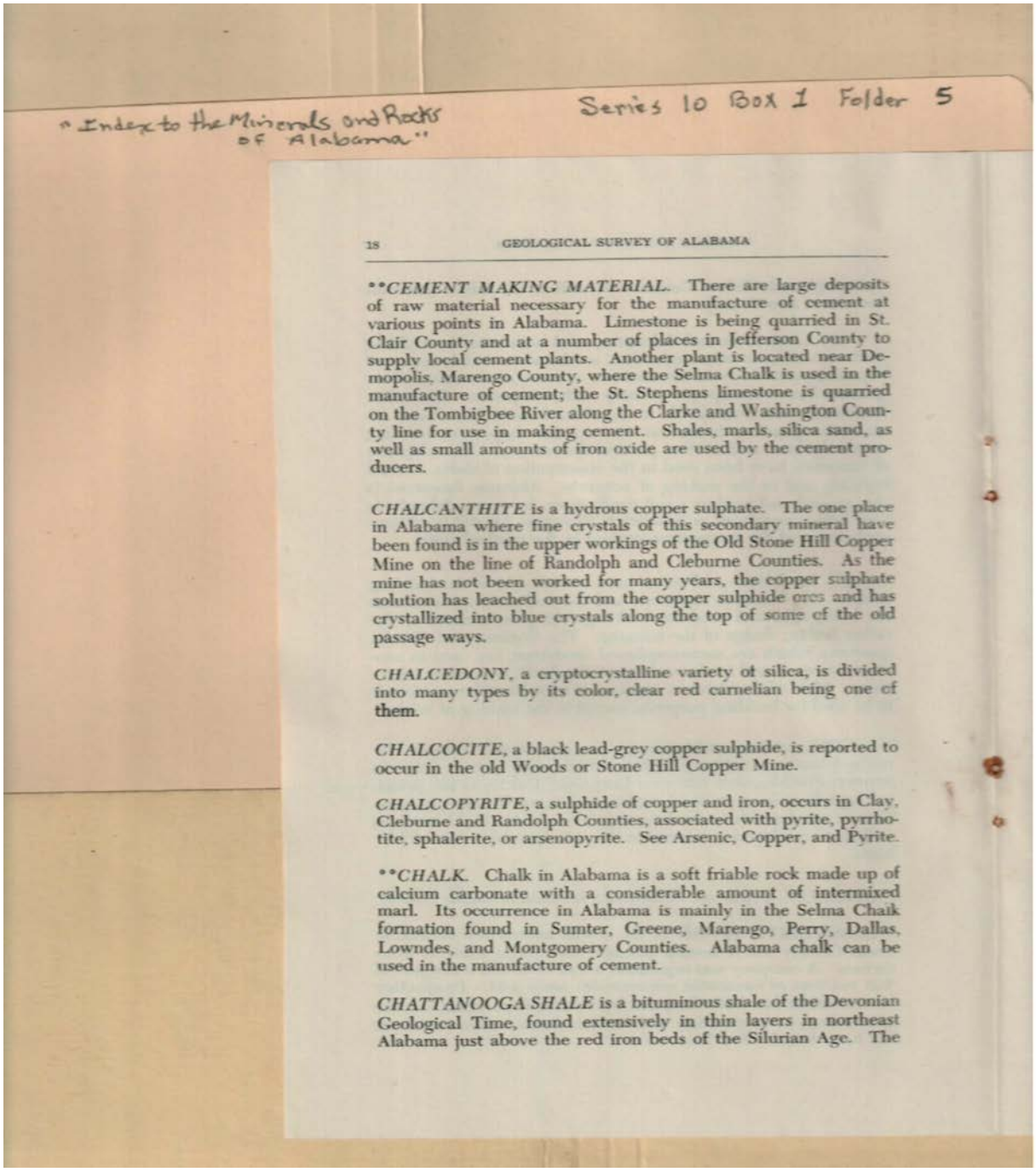

18 GEOLOGICAL SURVEY OF ALABAMA

****CEMENT MAKING MATERIAL.** There are large deposits of raw material necessary for the manufacture of cement at various points in Alabama. Limestone is being quarried in St. Clair County and at a number of places in Jefferson County to supply local cement plants. Another plant is located near Demopolis, Marengo County, where the Selma Chalk is used in the manufacture of cement; the St. Stephens limestone is quarried on the Tombigbee River along the Clarke and Washington County line for use in making cement. Shales, marls, silica sand, as well as small amounts of iron oxide are used by the cement producers.

CHALCANTHITE is a hydrous copper sulphate. The one place in Alabama where fine crystals of this secondary mineral have been found is in the upper workings of the Old Stone Hill Copper Mine on the line of Randolph and Cleburne Counties. As the mine has not been worked for many years, the copper sulphate solution has leached out from the copper sulphide ores and has crystallized into blue crystals along the top of some of the old passage ways.

CHALCEDONY, a cryptocrystalline variety of silica, is divided into many types by its color, clear red carnelian being one of them.

CHALCOCITE, a black lead-grey copper sulphide, is reported to occur in the old Woods or Stone Hill Copper Mine.

CHALCOPYRITE, a sulphide of copper and iron, occurs in Clay, Cleburne and Randolph Counties, associated with pyrite, pyrrhotite, sphalerite, or arsenopyrite. See Arsenic, Copper, and Pyrite.

****CHALK.** Chalk in Alabama is a soft friable rock made up of calcium carbonate with a considerable amount of intermixed marl. Its occurrence in Alabama is mainly in the Selma Chalk formation found in Sumter, Greene, Marengo, Perry, Dallas, Lowndes, and Montgomery Counties. Alabama chalk can be used in the manufacture of cement.

CHATTANOOGA SHALE is a bituminous shale of the Devonian Geological Time, found extensively in thin layers in northeast Alabama just above the red iron beds of the Silurian Age. The

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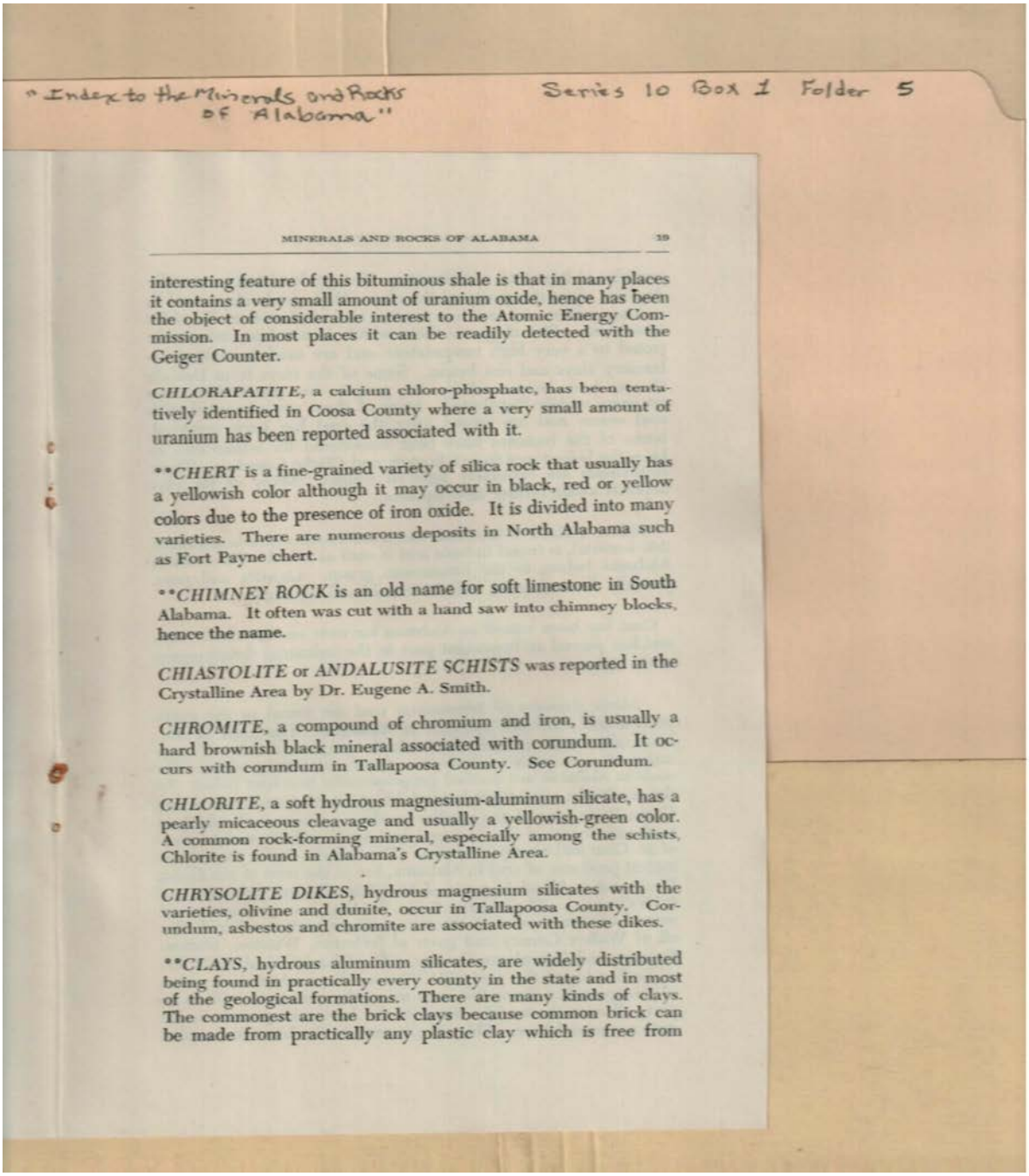

interesting feature of this bituminous shale is that in many places it contains a very small amount of uranium oxide, hence has been the object of considerable interest to the Atomic Energy Commission. In most places it can be readily detected with the Geiger Counter.

CHLORAPATITE, a calcium chloro-phosphate, has been tentatively identified in Coosa County where a very small amount of uranium has been reported associated with it.

****CHERT** is a fine-grained variety of silica rock that usually has a yellowish color although it may occur in black, red or yellow colors due to the presence of iron oxide. It is divided into many varieties. There are numerous deposits in North Alabama such as Fort Payne chert.

****CHIMNEY ROCK** is an old name for soft limestone in South Alabama. It often was cut with a hand saw into chimney blocks, hence the name.

CHIASTOLITE or *ANDALUSITE SCHISTS* was reported in the Crystalline Area by Dr. Eugene A. Smith.

CHROMITE, a compound of chromium and iron, is usually a hard brownish black mineral associated with corundum. It occurs with corundum in Tallapoosa County. See Corundum.

CHLORITE, a soft hydrous magnesium-aluminum silicate, has a pearly micaceous cleavage and usually a yellowish-green color. A common rock-forming mineral, especially among the schists, Chlorite is found in Alabama's Crystalline Area.

CHRYSOLITE DIKES, hydrous magnesium silicates with the varieties, olivine and dunite, occur in Tallapoosa County. Corundum, asbestos and chromite are associated with these dikes.

****CLAYS**, hydrous aluminum silicates, are widely distributed being found in practically every county in the state and in most of the geological formations. There are many kinds of clays. The commonest are the brick clays because common brick can be made from practically any plastic clay which is free from

Names:
Smith, Eugene A., Dr.

Types:
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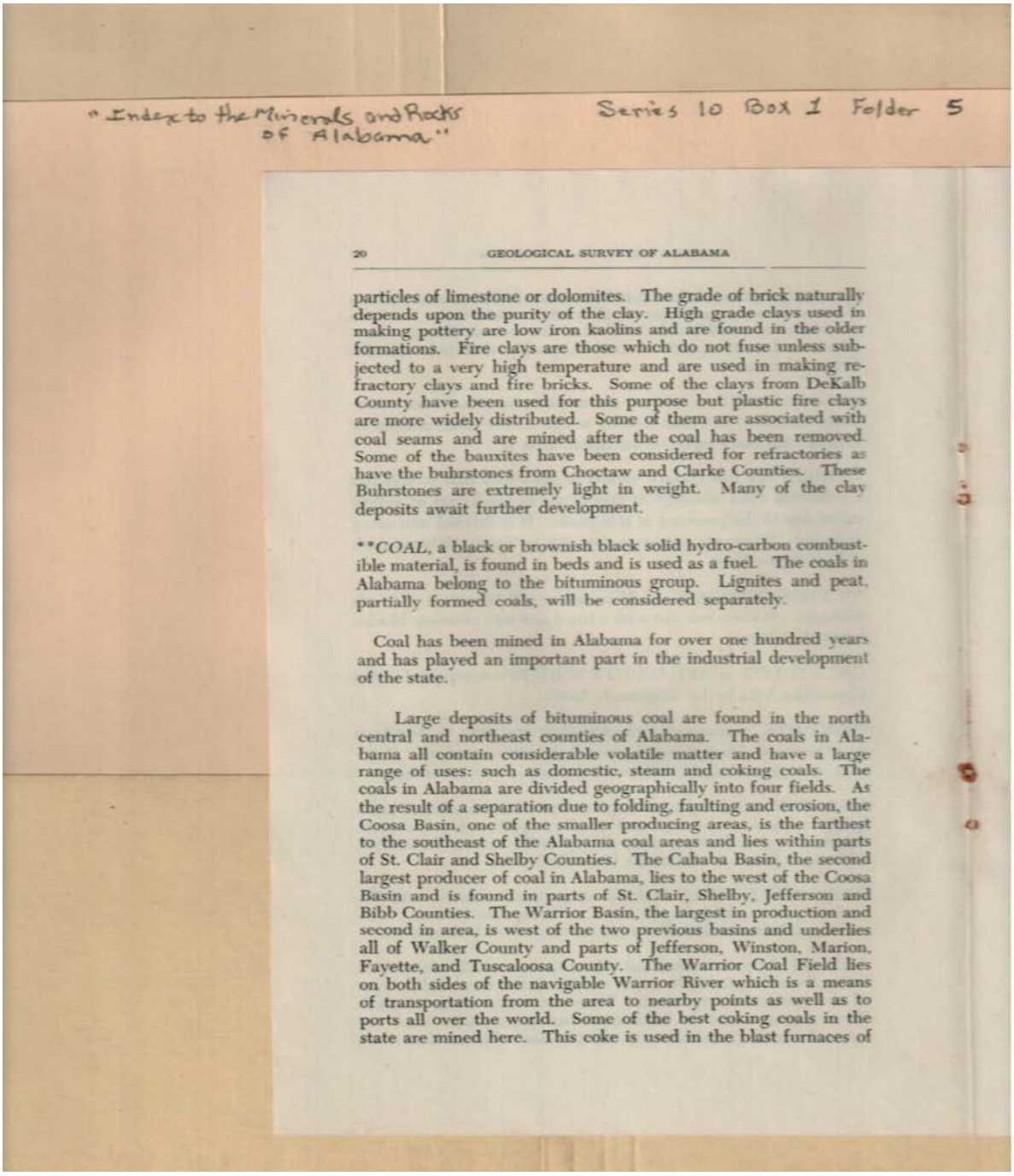

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particles of limestone or dolomites. The grade of brick naturally depends upon the purity of the clay. High grade clays used in making pottery are low iron kaolins and are found in the older formations. Fire clays are those which do not fuse unless subjected to a very high temperature and are used in making refractory clays and fire bricks. Some of the clays from DeKalb County have been used for this purpose but plastic fire clays are more widely distributed. Some of them are associated with coal seams and are mined after the coal has been removed. Some of the bauxites have been considered for refractories as have the buhrstones from Choctaw and Clarke Counties. These Buhrstones are extremely light in weight. Many of the clay deposits await further development.

****COAL**, a black or brownish black solid hydro-carbon combustible material, is found in beds and is used as a fuel. The coals in Alabama belong to the bituminous group. Lignites and peat, partially formed coals, will be considered separately.

Coal has been mined in Alabama for over one hundred years and has played an important part in the industrial development of the state.

Large deposits of bituminous coal are found in the north central and northeast counties of Alabama. The coals in Alabama all contain considerable volatile matter and have a large range of uses: such as domestic, steam and coking coals. The coals in Alabama are divided geographically into four fields. As the result of a separation due to folding, faulting and erosion, the Coosa Basin, one of the smaller producing areas, is the farthest to the southeast of the Alabama coal areas and lies within parts of St. Clair and Shelby Counties. The Cahaba Basin, the second largest producer of coal in Alabama, lies to the west of the Coosa Basin and is found in parts of St. Clair, Shelby, Jefferson and Bibb Counties. The Warrior Basin, the largest in production and second in area, is west of the two previous basins and underlies all of Walker County and parts of Jefferson, Winston, Marion, Fayette, and Tuscaloosa County. The Warrior Coal Field lies on both sides of the navigable Warrior River which is a means of transportation from the area to nearby points as well as to ports all over the world. Some of the best coking coals in the state are mined here. This coke is used in the blast furnaces of

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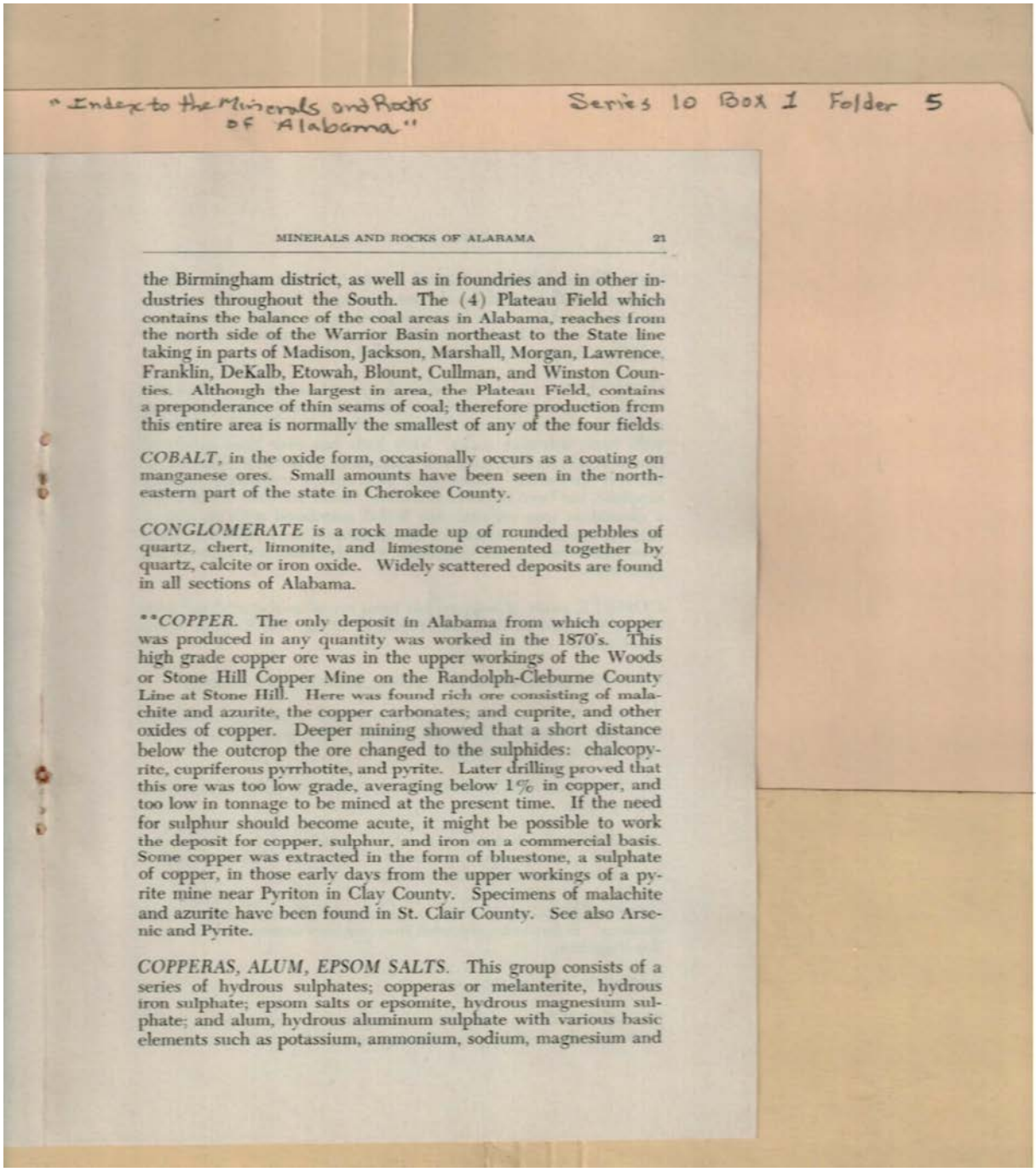

the Birmingham district, as well as in foundries and in other industries throughout the South. The (4) Plateau Field which contains the balance of the coal areas in Alabama, reaches from the north side of the Warrior Basin northeast to the State line taking in parts of Madison, Jackson, Marshall, Morgan, Lawrence, Franklin, DeKalb, Etowah, Blount, Cullman, and Winston Counties. Although the largest in area, the Plateau Field, contains a preponderance of thin seams of coal; therefore production from this entire area is normally the smallest of any of the four fields.

COBALT, in the oxide form, occasionally occurs as a coating on manganese ores. Small amounts have been seen in the northeastern part of the state in Cherokee County.

CONGLOMERATE is a rock made up of rounded pebbles of quartz, chert, limonite, and limestone cemented together by quartz, calcite or iron oxide. Widely scattered deposits are found in all sections of Alabama.

***COPPER*. The only deposit in Alabama from which copper was produced in any quantity was worked in the 1870's. This high grade copper ore was in the upper workings of the Woods or Stone Hill Copper Mine on the Randolph-Cleburne County Line at Stone Hill. Here was found rich ore consisting of malachite and azurite, the copper carbonates; and cuprite, and other oxides of copper. Deeper mining showed that a short distance below the outcrop the ore changed to the sulphides: chalcopyrite, cupriferous pyrrhotite, and pyrite. Later drilling proved that this ore was too low grade, averaging below 1% in copper, and too low in tonnage to be mined at the present time. If the need for sulphur should become acute, it might be possible to work the deposit for copper, sulphur, and iron on a commercial basis. Some copper was extracted in the form of bluestone, a sulphate of copper, in those early days from the upper workings of a pyrite mine near Pyriton in Clay County. Specimens of malachite and azurite have been found in St. Clair County. See also Arsenic and Pyrite.

COPPERAS, ALUM, EPSOM SALTS. This group consists of a series of hydrous sulphates; copperas or melanterite, hydrous iron sulphate; epsom salts or epsomite, hydrous magnesium sulphate; and alum, hydrous aluminum sulphate with various basic elements such as potassium, ammonium, sodium, magnesium and

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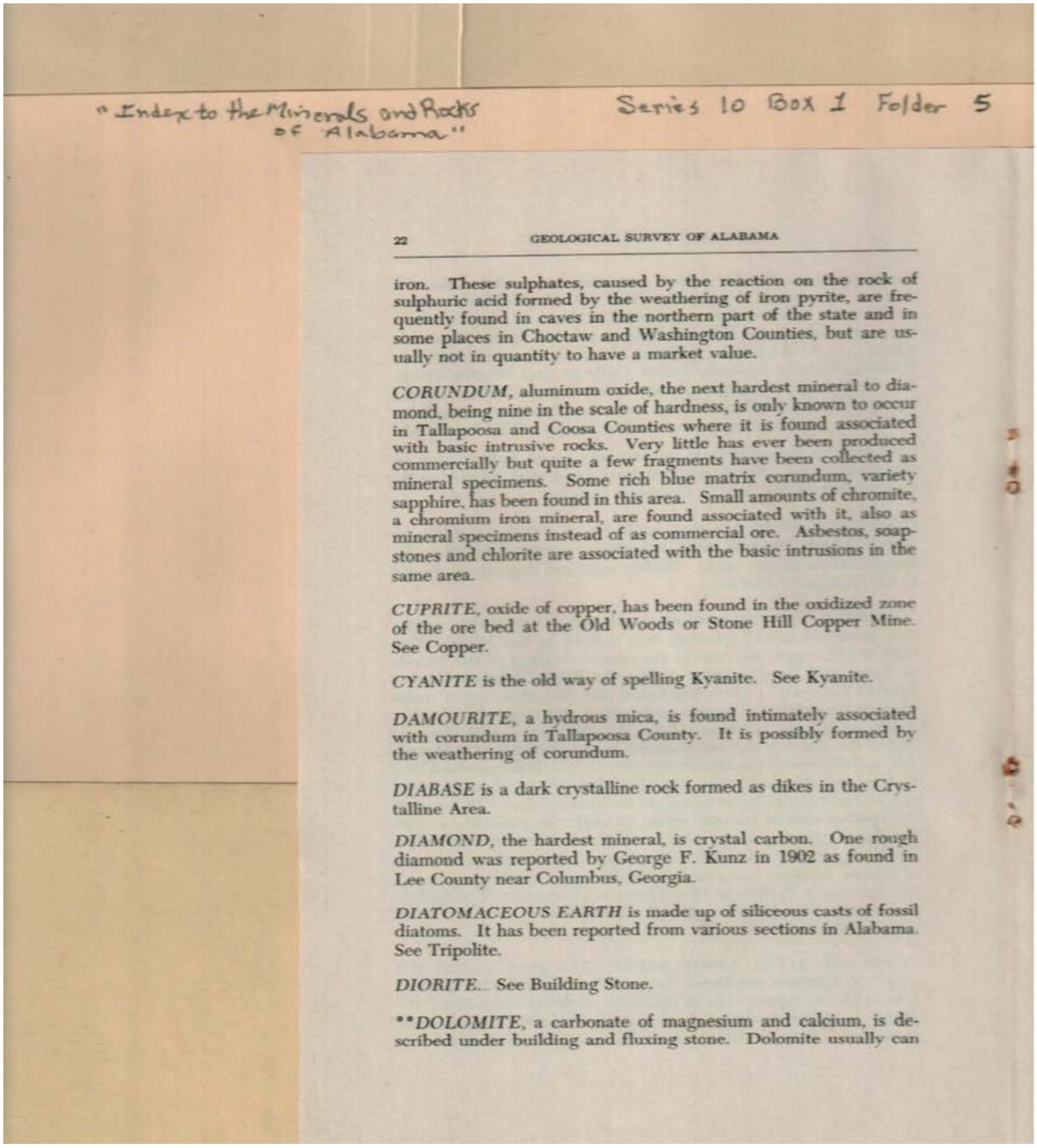

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iron. These sulphates, caused by the reaction on the rock of sulphuric acid formed by the weathering of iron pyrite, are frequently found in caves in the northern part of the state and in some places in Choctaw and Washington Counties, but are usually not in quantity to have a market value.

CORUNDUM, aluminum oxide, the next hardest mineral to diamond, being nine in the scale of hardness, is only known to occur in Tallapoosa and Coosa Counties where it is found associated with basic intrusive rocks. Very little has ever been produced commercially but quite a few fragments have been collected as mineral specimens. Some rich blue matrix corundum, variety sapphire, has been found in this area. Small amounts of chromite, a chromium iron mineral, are found associated with it, also as mineral specimens instead of as commercial ore. Asbestos, soapstones and chlorite are associated with the basic intrusions in the same area.

CUPRITE, oxide of copper, has been found in the oxidized zone of the ore bed at the Old Woods or Stone Hill Copper Mine. See Copper.

CYANITE is the old way of spelling Kyanite. See Kyanite.

DAMOURITE, a hydrous mica, is found intimately associated with corundum in Tallapoosa County. It is possibly formed by the weathering of corundum.

DIABASE is a dark crystalline rock formed as dikes in the Crystalline Area.

DIAMOND, the hardest mineral, is crystal carbon. One rough diamond was reported by George F. Kunz in 1902 as found in Lee County near Columbus, Georgia.

DIATOMACEOUS EARTH is made up of siliceous casts of fossil diatoms. It has been reported from various sections in Alabama. See Tripolite.

DIORITE.. See Building Stone.

***DOLOMITE*, a carbonate of magnesium and calcium, is described under building and fluxing stone. Dolomite usually can

Names:
Kunz, George F.

Types:
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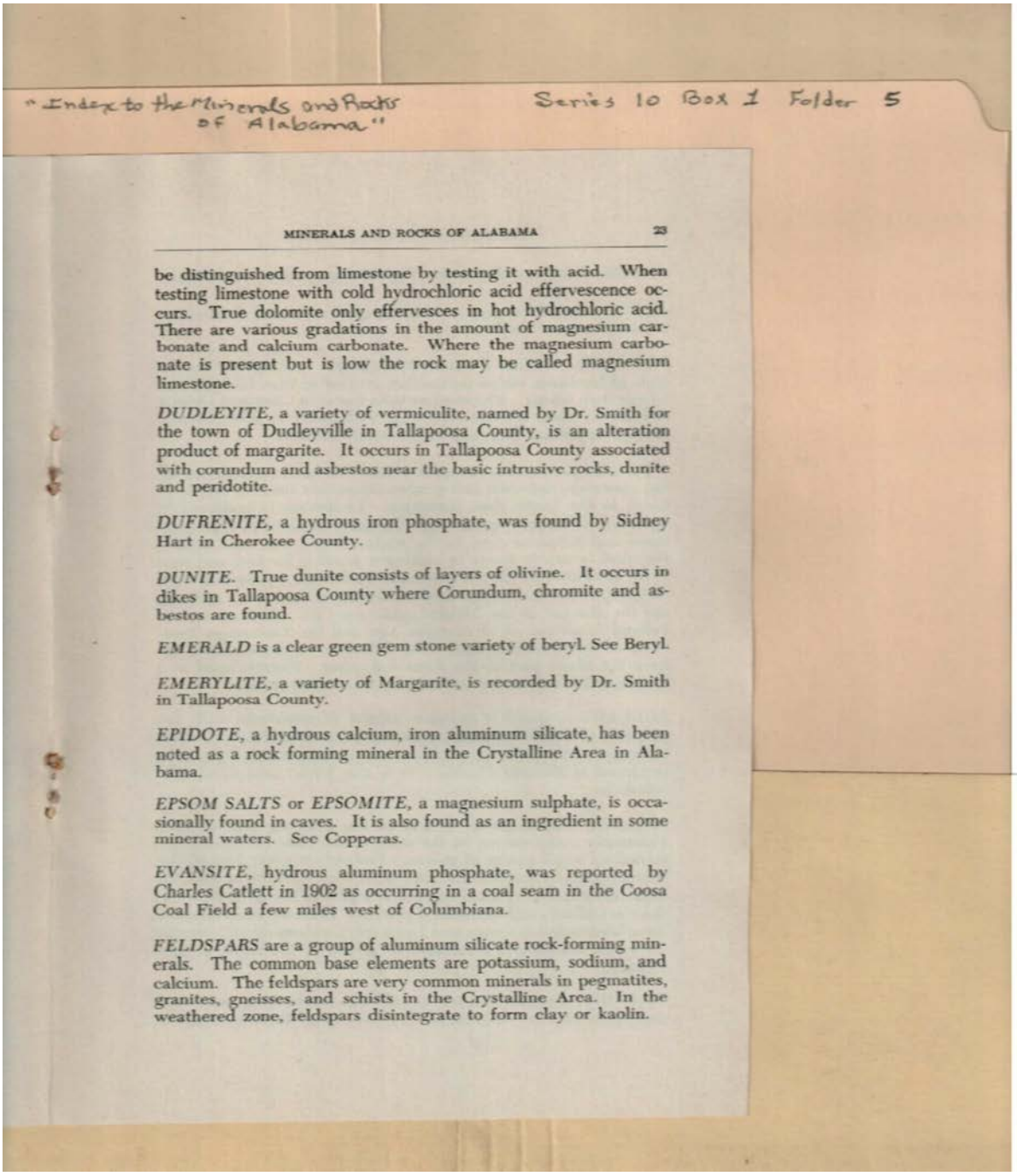

be distinguished from limestone by testing it with acid. When testing limestone with cold hydrochloric acid effervescence occurs. True dolomite only effervesces in hot hydrochloric acid. There are various gradations in the amount of magnesium carbonate and calcium carbonate. Where the magnesium carbonate is present but is low the rock may be called magnesium limestone.

DUDLEYITE, a variety of vermiculite, named by Dr. Smith for the town of Dudleyville in Tallapoosa County, is an alteration product of margarite. It occurs in Tallapoosa County associated with corundum and asbestos near the basic intrusive rocks, dunite and peridotite.

DUFRENITE, a hydrous iron phosphate, was found by Sidney Hart in Cherokee County.

DUNITE. True dunite consists of layers of olivine. It occurs in dikes in Tallapoosa County where Corundum, chromite and asbestos are found.

EMERALD is a clear green gem stone variety of beryl. See Beryl.

EMERYLITE, a variety of Margarite, is recorded by Dr. Smith in Tallapoosa County.

EPIDOTE, a hydrous calcium, iron aluminum silicate, has been noted as a rock forming mineral in the Crystalline Area in Alabama.

EPSOM SALTS or *EPSOMITE*, a magnesium sulphate, is occasionally found in caves. It is also found as an ingredient in some mineral waters. See Copperas.

EVANSITE, hydrous aluminum phosphate, was reported by Charles Catlett in 1902 as occurring in a coal seam in the Coosa Coal Field a few miles west of Columbiana.

FELDSPARS are a group of aluminum silicate rock-forming minerals. The common base elements are potassium, sodium, and calcium. The feldspars are very common minerals in pegmatites, granites, gneisses, and schists in the Crystalline Area. In the weathered zone, feldspars disintegrate to form clay or kaolin.

Names:
Smith, Dr.

Types:
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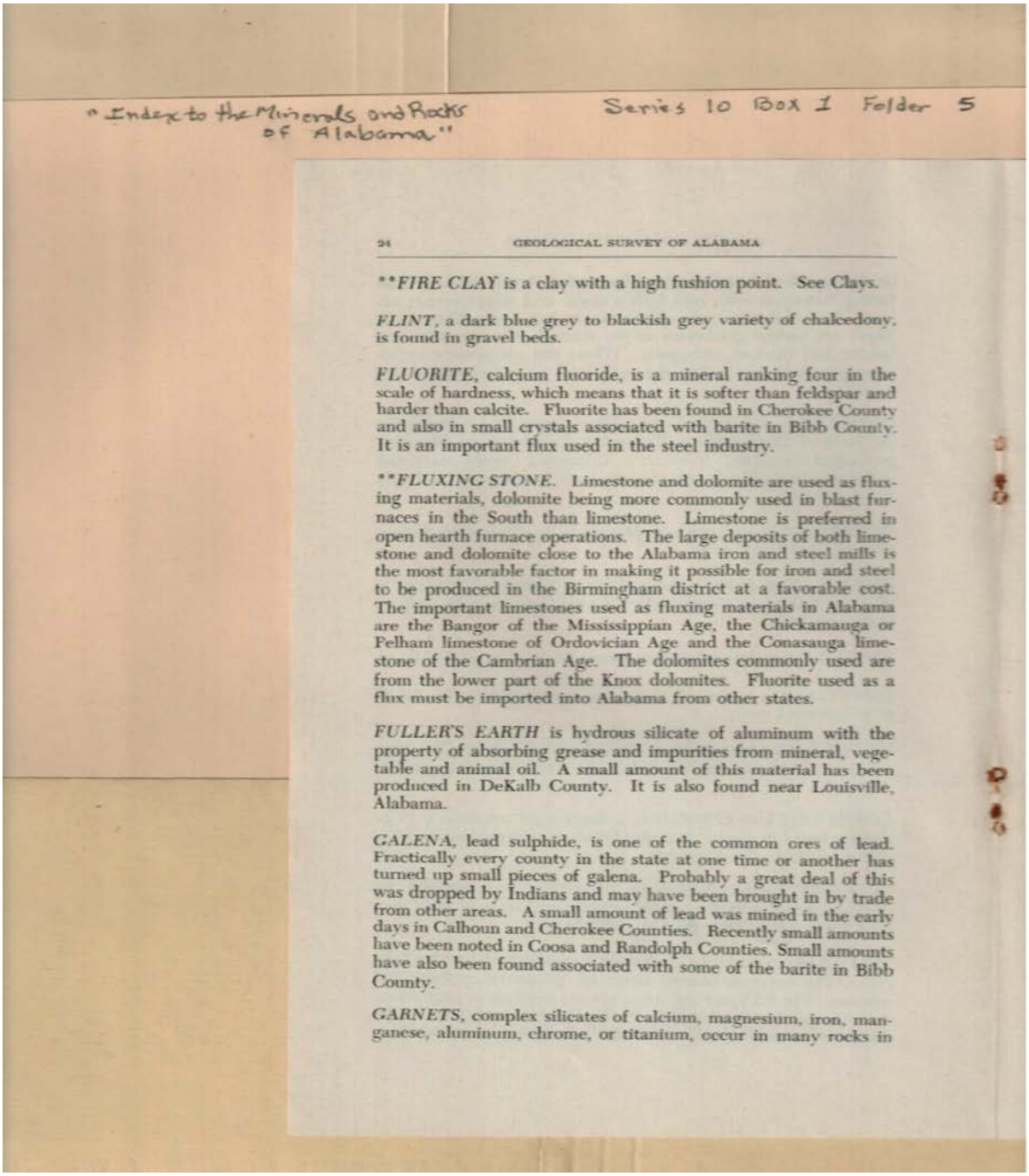
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****FIRE CLAY** is a clay with a high fushion point. See Clays.

FLINT, a dark blue grey to blackish grey variety of chalcedony, is found in gravel beds.

FLUORITE, calcium fluoride, is a mineral ranking four in the scale of hardness, which means that it is softer than feldspar and harder than calcite. Fluorite has been found in Cherokee County and also in small crystals associated with barite in Bibb County. It is an important flux used in the steel industry.

****FLUXING STONE.** Limestone and dolomite are used as fluxing materials, dolomite being more commonly used in blast furnaces in the South than limestone. Limestone is preferred in open hearth furnace operations. The large deposits of both limestone and dolomite close to the Alabama iron and steel mills is the most favorable factor in making it possible for iron and steel to be produced in the Birmingham district at a favorable cost. The important limestones used as fluxing materials in Alabama are the Bangor of the Mississippian Age, the Chickamauga or Pelham limestone of Ordovician Age and the Conasauga limestone of the Cambrian Age. The dolomites commonly used are from the lower part of the Knox dolomites. Fluorite used as a flux must be imported into Alabama from other states.

FULLER'S EARTH is hydrous silicate of aluminum with the property of absorbing grease and impurities from mineral, vegetable and animal oil. A small amount of this material has been produced in DeKalb County. It is also found near Louisville, Alabama.

GALENA, lead sulphide, is one of the common ores of lead. Practically every county in the state at one time or another has turned up small pieces of galena. Probably a great deal of this was dropped by Indians and may have been brought in by trade from other areas. A small amount of lead was mined in the early days in Calhoun and Cherokee Counties. Recently small amounts have been noted in Coosa and Randolph Counties. Small amounts have also been found associated with some of the barite in Bibb County.

GARNETS, complex silicates of calcium, magnesium, iron, manganese, aluminum, chrome, or titanium, occur in many rocks in

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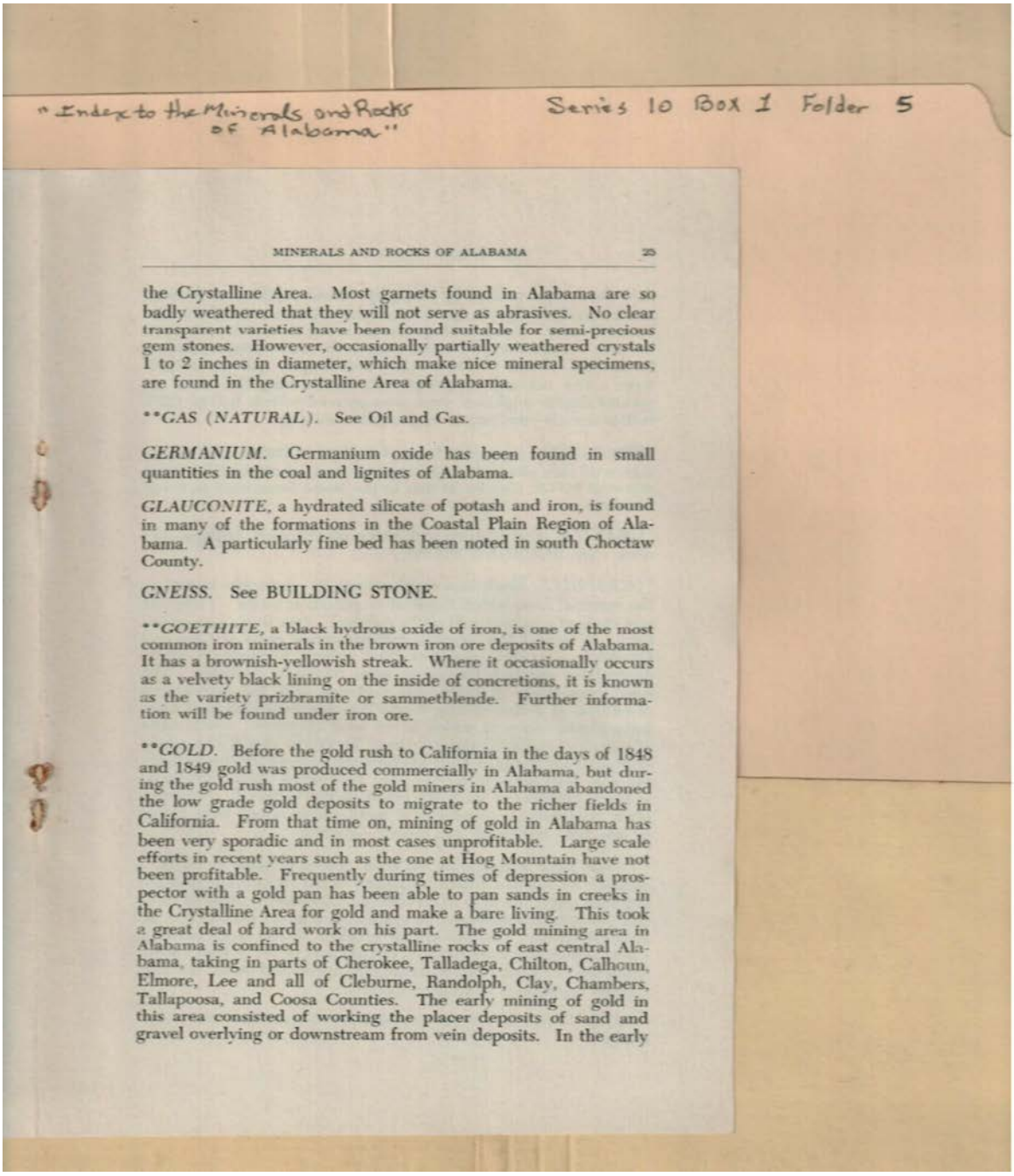

the Crystalline Area. Most garnets found in Alabama are so badly weathered that they will not serve as abrasives. No clear transparent varieties have been found suitable for semi-precious gem stones. However, occasionally partially weathered crystals 1 to 2 inches in diameter, which make nice mineral specimens, are found in the Crystalline Area of Alabama.

****GAS (NATURAL)**. See Oil and Gas.

GERMANIUM. Germanium oxide has been found in small quantities in the coal and lignites of Alabama.

GLAUCONITE, a hydrated silicate of potash and iron, is found in many of the formations in the Coastal Plain Region of Alabama. A particularly fine bed has been noted in south Choctaw County.

GNEISS. See BUILDING STONE.

****GOETHITE**, a black hydrous oxide of iron, is one of the most common iron minerals in the brown iron ore deposits of Alabama. It has a brownish-yellowish streak. Where it occasionally occurs as a velvety black lining on the inside of concretions, it is known as the variety prizbramite or sammetblende. Further information will be found under iron ore.

****GOLD**. Before the gold rush to California in the days of 1848 and 1849 gold was produced commercially in Alabama, but during the gold rush most of the gold miners in Alabama abandoned the low grade gold deposits to migrate to the richer fields in California. From that time on, mining of gold in Alabama has been very sporadic and in most cases unprofitable. Large scale efforts in recent years such as the one at Hog Mountain have not been profitable. Frequently during times of depression a prospector with a gold pan has been able to pan sands in creeks in the Crystalline Area for gold and make a bare living. This took a great deal of hard work on his part. The gold mining area in Alabama is confined to the crystalline rocks of east central Alabama, taking in parts of Cherokee, Talladega, Chilton, Calhoun, Elmore, Lee and all of Cleburne, Randolph, Clay, Chambers, Tallapoosa, and Coosa Counties. The early mining of gold in this area consisted of working the placer deposits of sand and gravel overlying or downstream from vein deposits. In the early

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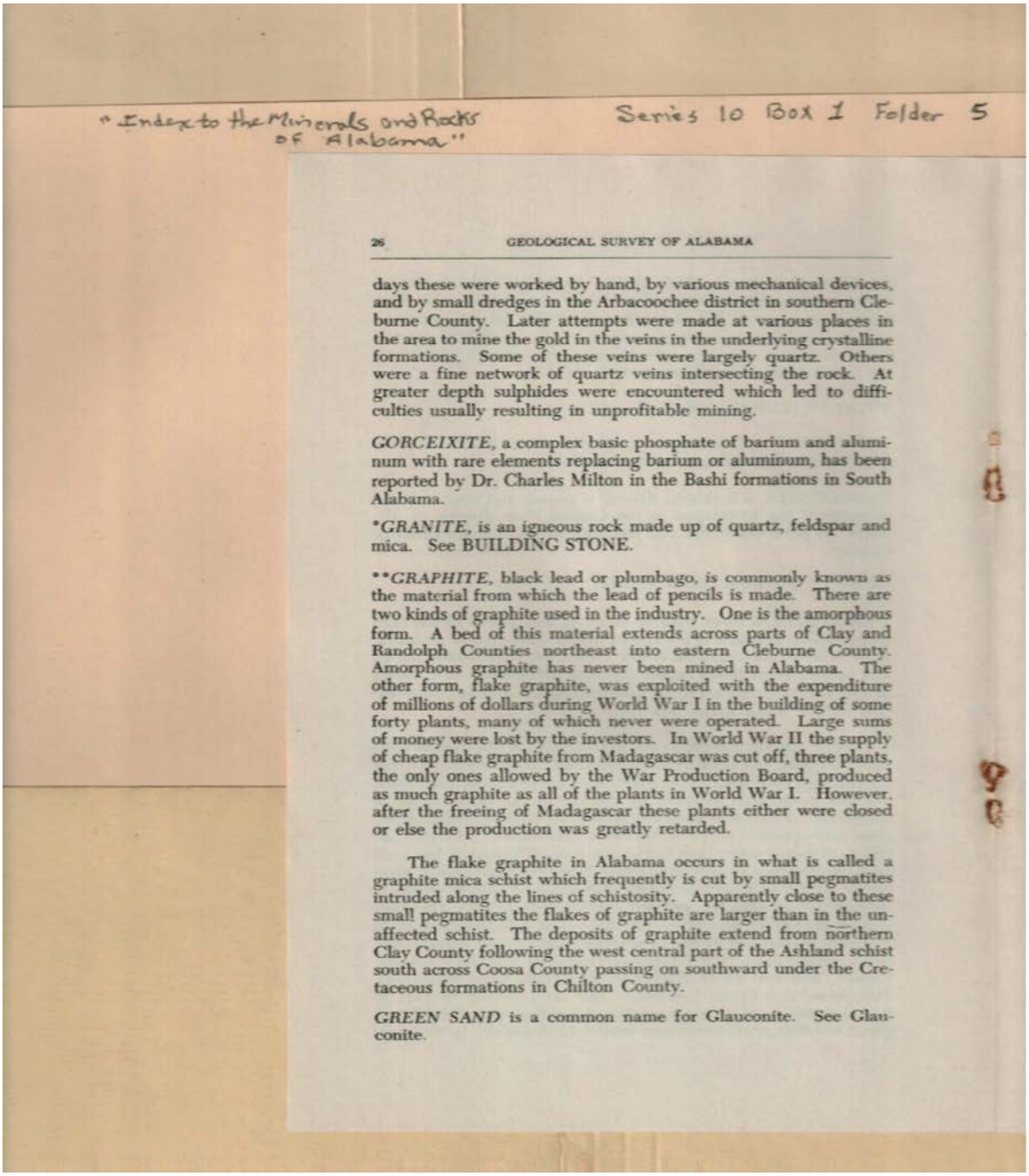
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days these were worked by hand, by various mechanical devices, and by small dredges in the Arbacoochee district in southern Cleburne County. Later attempts were made at various places in the area to mine the gold in the veins in the underlying crystalline formations. Some of these veins were largely quartz. Others were a fine network of quartz veins intersecting the rock. At greater depth sulphides were encountered which led to difficulties usually resulting in unprofitable mining.

GORCEIXITE, a complex basic phosphate of barium and aluminum with rare elements replacing barium or aluminum, has been reported by Dr. Charles Milton in the Bashi formations in South Alabama.

**GRANITE*, is an igneous rock made up of quartz, feldspar and mica. See BUILDING STONE.

***GRAPHITE*, black lead or plumbago, is commonly known as the material from which the lead of pencils is made. There are two kinds of graphite used in the industry. One is the amorphous form. A bed of this material extends across parts of Clay and Randolph Counties northeast into eastern Cleburne County. Amorphous graphite has never been mined in Alabama. The other form, flake graphite, was exploited with the expenditure of millions of dollars during World War I in the building of some forty plants, many of which never were operated. Large sums of money were lost by the investors. In World War II the supply of cheap flake graphite from Madagascar was cut off, three plants, the only ones allowed by the War Production Board, produced as much graphite as all of the plants in World War I. However, after the freeing of Madagascar these plants either were closed or else the production was greatly retarded.

The flake graphite in Alabama occurs in what is called a graphite mica schist which frequently is cut by small pegmatites intruded along the lines of schistosity. Apparently close to these small pegmatites the flakes of graphite are larger than in the unaffected schist. The deposits of graphite extend from northern Clay County following the west central part of the Ashland schist south across Coosa County passing on southward under the Cretaceous formations in Chilton County.

GREEN SAND is a common name for Glauconite. See Glauconite.

Names:
Milton, Charles, Dr.

Types:
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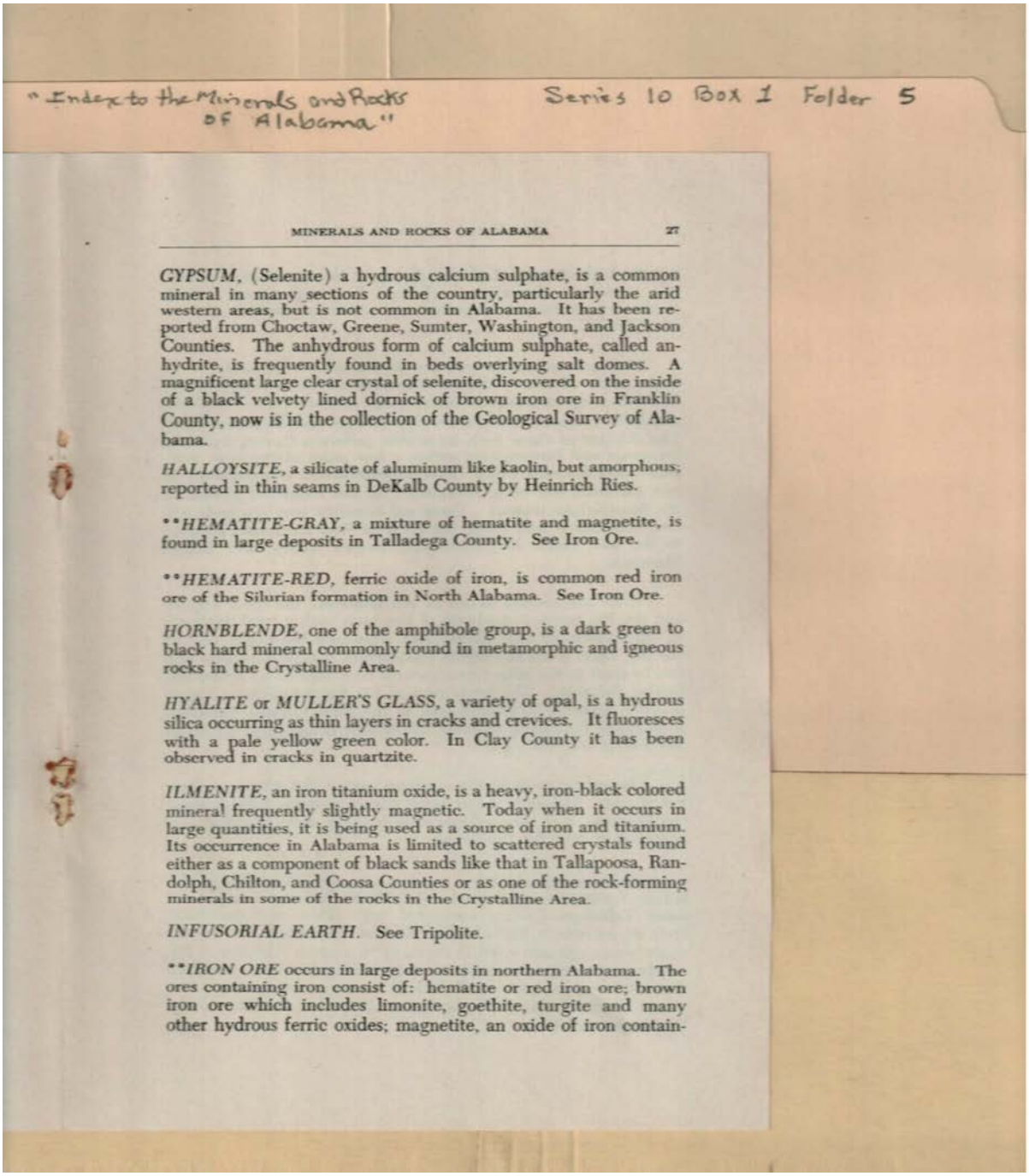

GYPSUM, (Selenite) a hydrous calcium sulphate, is a common mineral in many sections of the country, particularly the arid western areas, but is not common in Alabama. It has been reported from Choctaw, Greene, Sumter, Washington, and Jackson Counties. The anhydrous form of calcium sulphate, called anhydrite, is frequently found in beds overlying salt domes. A magnificent large clear crystal of selenite, discovered on the inside of a black velvety lined dornick of brown iron ore in Franklin County, now is in the collection of the Geological Survey of Alabama.

HALLOYSITE, a silicate of aluminum like kaolin, but amorphous; reported in thin seams in DeKalb County by Heinrich Ries.

***HEMATITE-GRAY*, a mixture of hematite and magnetite, is found in large deposits in Talladega County. See Iron Ore.

***HEMATITE-RED*, ferric oxide of iron, is common red iron ore of the Silurian formation in North Alabama. See Iron Ore.

HORNBLENDE, one of the amphibole group, is a dark green to black hard mineral commonly found in metamorphic and igneous rocks in the Crystalline Area.

HYALITE or *MULLER'S GLASS*, a variety of opal, is a hydrous silica occurring as thin layers in cracks and crevices. It fluoresces with a pale yellow green color. In Clay County it has been observed in cracks in quartzite.

ILMENITE, an iron titanium oxide, is a heavy, iron-black colored mineral frequently slightly magnetic. Today when it occurs in large quantities, it is being used as a source of iron and titanium. Its occurrence in Alabama is limited to scattered crystals found either as a component of black sands like that in Tallapoosa, Randolph, Chilton, and Coosa Counties or as one of the rock-forming minerals in some of the rocks in the Crystalline Area.

INFUSORIAL EARTH. See Tripolite.

***IRON ORE* occurs in large deposits in northern Alabama. The ores containing iron consist of: hematite or red iron ore; brown iron ore which includes limonite, goethite, turgite and many other hydrous ferric oxides; magnetite, an oxide of iron contain-

Names:
Ries, Heinrich

Types:
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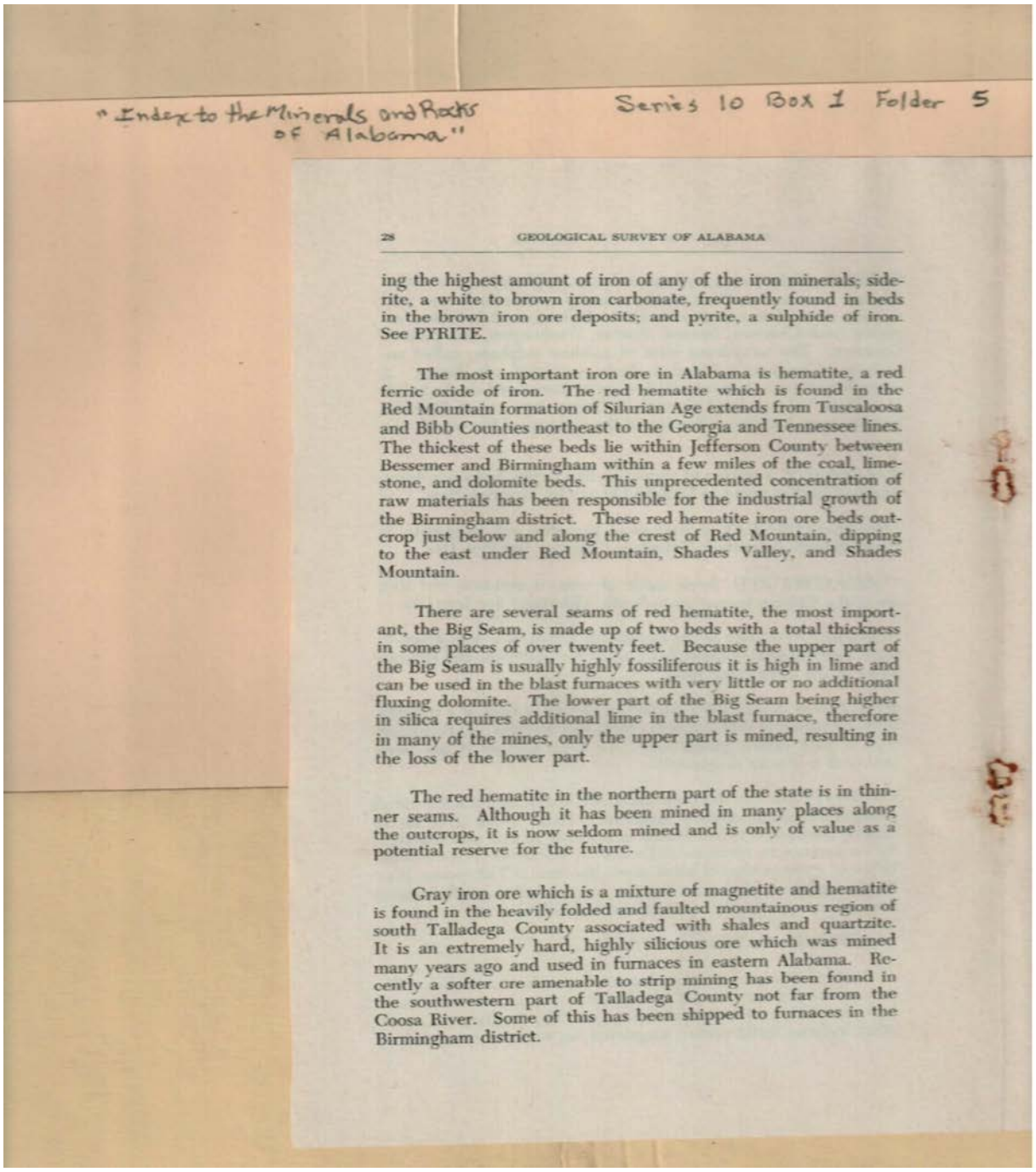

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ing the highest amount of iron of any of the iron minerals; siderite, a white to brown iron carbonate, frequently found in beds in the brown iron ore deposits; and pyrite, a sulphide of iron. See PYRITE.

The most important iron ore in Alabama is hematite, a red ferric oxide of iron. The red hematite which is found in the Red Mountain formation of Silurian Age extends from Tuscaloosa and Bibb Counties northeast to the Georgia and Tennessee lines. The thickest of these beds lie within Jefferson County between Bessemer and Birmingham within a few miles of the coal, limestone, and dolomite beds. This unprecedented concentration of raw materials has been responsible for the industrial growth of the Birmingham district. These red hematite iron ore beds outcrop just below and along the crest of Red Mountain, dipping to the east under Red Mountain, Shades Valley, and Shades Mountain.

There are several seams of red hematite, the most important, the Big Seam, is made up of two beds with a total thickness in some places of over twenty feet. Because the upper part of the Big Seam is usually highly fossiliferous it is high in lime and can be used in the blast furnaces with very little or no additional fluxing dolomite. The lower part of the Big Seam being higher in silica requires additional lime in the blast furnace, therefore in many of the mines, only the upper part is mined, resulting in the loss of the lower part.

The red hematite in the northern part of the state is in thinner seams. Although it has been mined in many places along the outcrops, it is now seldom mined and is only of value as a potential reserve for the future.

Gray iron ore which is a mixture of magnetite and hematite is found in the heavily folded and faulted mountainous region of south Talladega County associated with shales and quartzite. It is an extremely hard, highly silicious ore which was mined many years ago and used in furnaces in eastern Alabama. Recently a softer ore amenable to strip mining has been found in the southwestern part of Talladega County not far from the Coosa River. Some of this has been shipped to furnaces in the Birmingham district.

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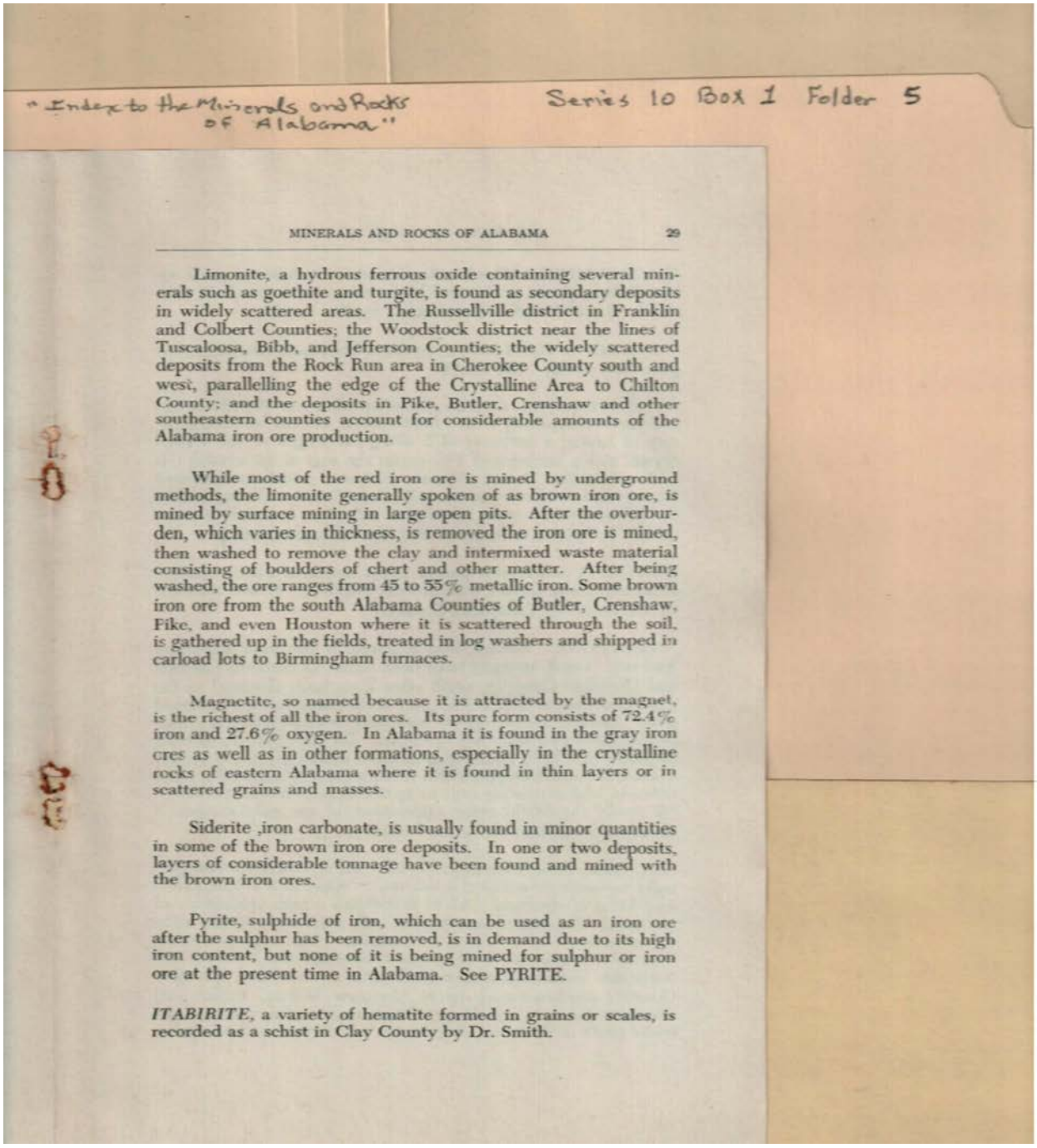

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Limonite, a hydrous ferrous oxide containing several minerals such as goethite and turgite, is found as secondary deposits in widely scattered areas. The Russellville district in Franklin and Colbert Counties; the Woodstock district near the lines of Tuscaloosa, Bibb, and Jefferson Counties; the widely scattered deposits from the Rock Run area in Cherokee County south and west, parallelling the edge of the Crystalline Area to Chilton County; and the deposits in Pike, Butler, Crenshaw and other southeastern counties account for considerable amounts of the Alabama iron ore production.

While most of the red iron ore is mined by underground methods, the limonite generally spoken of as brown iron ore, is mined by surface mining in large open pits. After the overburden, which varies in thickness, is removed the iron ore is mined, then washed to remove the clay and intermixed waste material consisting of boulders of chert and other matter. After being washed, the ore ranges from 45 to 55% metallic iron. Some brown iron ore from the south Alabama Counties of Butler, Crenshaw, Pike, and even Houston where it is scattered through the soil, is gathered up in the fields, treated in log washers and shipped in carload lots to Birmingham furnaces.

Magnetite, so named because it is attracted by the magnet, is the richest of all the iron ores. Its pure form consists of 72.4% iron and 27.6% oxygen. In Alabama it is found in the gray iron ores as well as in other formations, especially in the crystalline rocks of eastern Alabama where it is found in thin layers or in scattered grains and masses.

Siderite ,iron carbonate, is usually found in minor quantities in some of the brown iron ore deposits. In one or two deposits, layers of considerable tonnage have been found and mined with the brown iron ores.

Pyrite, sulphide of iron, which can be used as an iron ore after the sulphur has been removed, is in demand due to its high iron content, but none of it is being mined for sulphur or iron ore at the present time in Alabama. See PYRITE.

ITABIRITE, a variety of hematite formed in grains or scales, is recorded as a schist in Clay County by Dr. Smith.

Names:
Smith, Dr.

Types:
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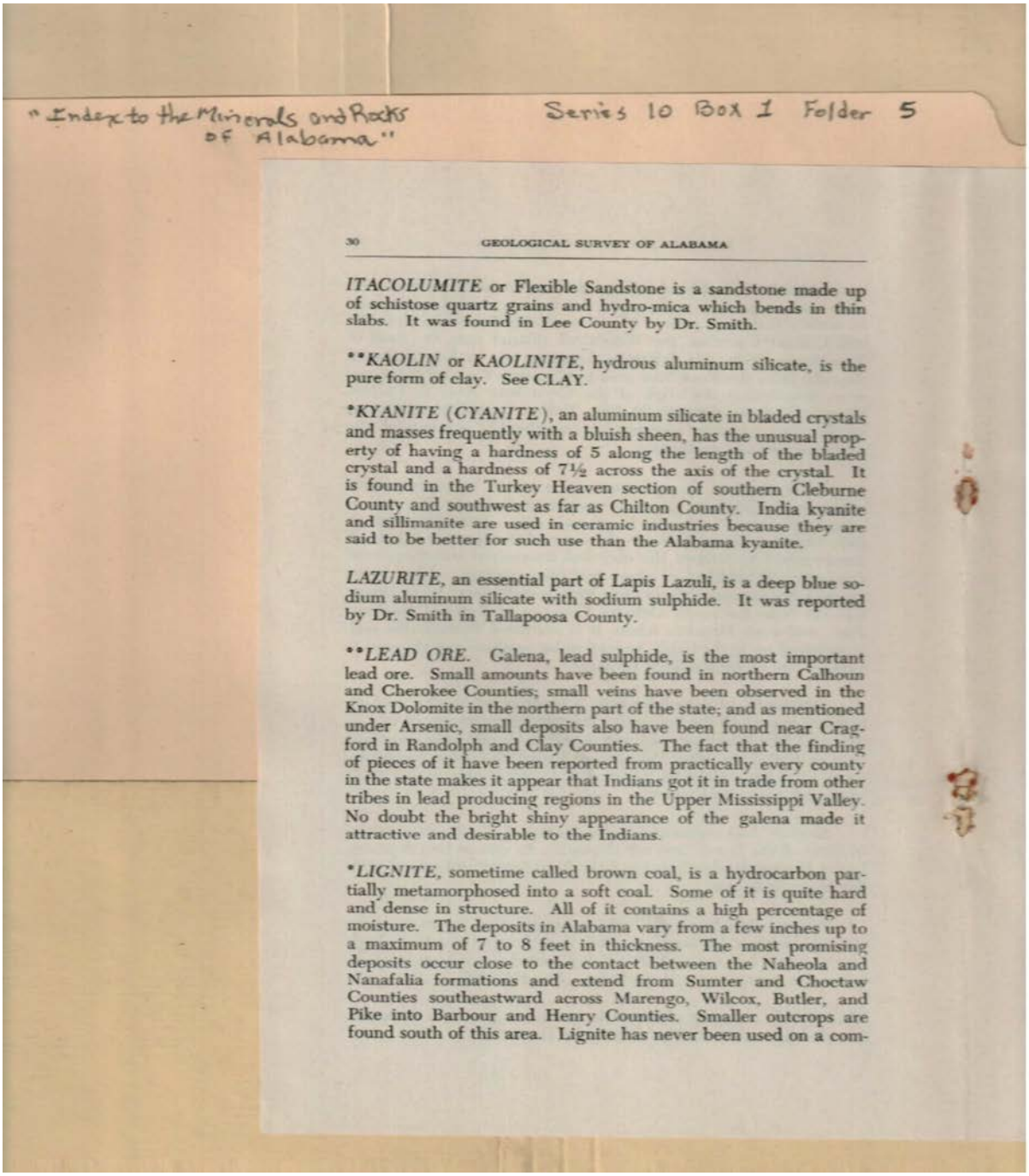

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ITACOLUMITE or Flexible Sandstone is a sandstone made up of schistose quartz grains and hydro-mica which bends in thin slabs. It was found in Lee County by Dr. Smith.

***KAOLIN* or *KAOLINITE*, hydrous aluminum silicate, is the pure form of clay. See CLAY.

**KYANITE* (*CYANITE*), an aluminum silicate in bladed crystals and masses frequently with a bluish sheen, has the unusual property of having a hardness of 5 along the length of the bladed crystal and a hardness of 7½ across the axis of the crystal. It is found in the Turkey Heaven section of southern Cleburne County and southwest as far as Chilton County. India kyanite and sillimanite are used in ceramic industries because they are said to be better for such use than the Alabama kyanite.

LAZURITE, an essential part of Lapis Lazuli, is a deep blue sodium aluminum silicate with sodium sulphide. It was reported by Dr. Smith in Tallapoosa County.

***LEAD ORE*. Galena, lead sulphide, is the most important lead ore. Small amounts have been found in northern Calhoun and Cherokee Counties; small veins have been observed in the Knox Dolomite in the northern part of the state; and as mentioned under Arsenic, small deposits also have been found near Cragford in Randolph and Clay Counties. The fact that the finding of pieces of it have been reported from practically every county in the state makes it appear that Indians got it in trade from other tribes in lead producing regions in the Upper Mississippi Valley. No doubt the bright shiny appearance of the galena made it attractive and desirable to the Indians.

**LIGNITE*, sometime called brown coal, is a hydrocarbon partially metamorphosed into a soft coal. Some of it is quite hard and dense in structure. All of it contains a high percentage of moisture. The deposits in Alabama vary from a few inches up to a maximum of 7 to 8 feet in thickness. The most promising deposits occur close to the contact between the Naheola and Nanafalia formations and extend from Sumter and Choctaw Counties southeastward across Marengo, Wilcox, Butler, and Pike into Barbour and Henry Counties. Smaller outcrops are found south of this area. Lignite has never been used on a com-

Names:
Smith, Dr.

Types:
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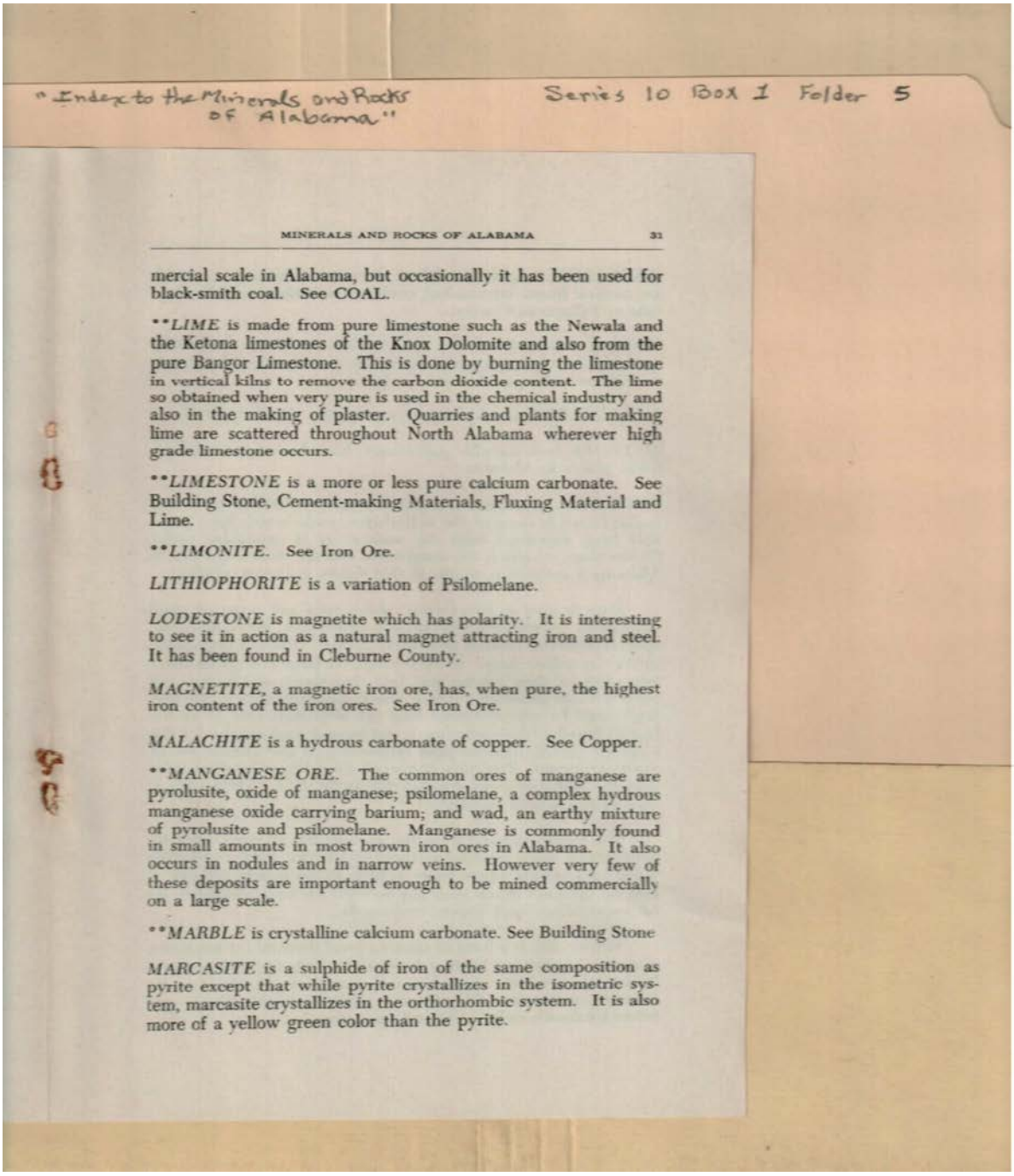

mercial scale in Alabama, but occasionally it has been used for black-smith coal. See COAL.

****LIME** is made from pure limestone such as the Newala and the Ketona limestones of the Knox Dolomite and also from the pure Bangor Limestone. This is done by burning the limestone in vertical kilns to remove the carbon dioxide content. The lime so obtained when very pure is used in the chemical industry and also in the making of plaster. Quarries and plants for making lime are scattered throughout North Alabama wherever high grade limestone occurs.

****LIMESTONE** is a more or less pure calcium carbonate. See Building Stone, Cement-making Materials, Fluxing Material and Lime.

****LIMONITE.** See Iron Ore.

LITHIOPHORITE is a variation of Psilomelane.

LODESTONE is magnetite which has polarity. It is interesting to see it in action as a natural magnet attracting iron and steel. It has been found in Cleburne County.

MAGNETITE, a magnetic iron ore, has, when pure, the highest iron content of the iron ores. See Iron Ore.

MALACHITE is a hydrous carbonate of copper. See Copper.

****MANGANESE ORE.** The common ores of manganese are pyrolusite, oxide of manganese; psilomelane, a complex hydrous manganese oxide carrying barium; and wad, an earthy mixture of pyrolusite and psilomelane. Manganese is commonly found in small amounts in most brown iron ores in Alabama. It also occurs in nodules and in narrow veins. However very few of these deposits are important enough to be mined commercially on a large scale.

****MARBLE** is crystalline calcium carbonate. See Building Stone

MARCASITE is a sulphide of iron of the same composition as pyrite except that while pyrite crystallizes in the isometric system, marcasite crystallizes in the orthorhombic system. It is also more of a yellow green color than the pyrite.

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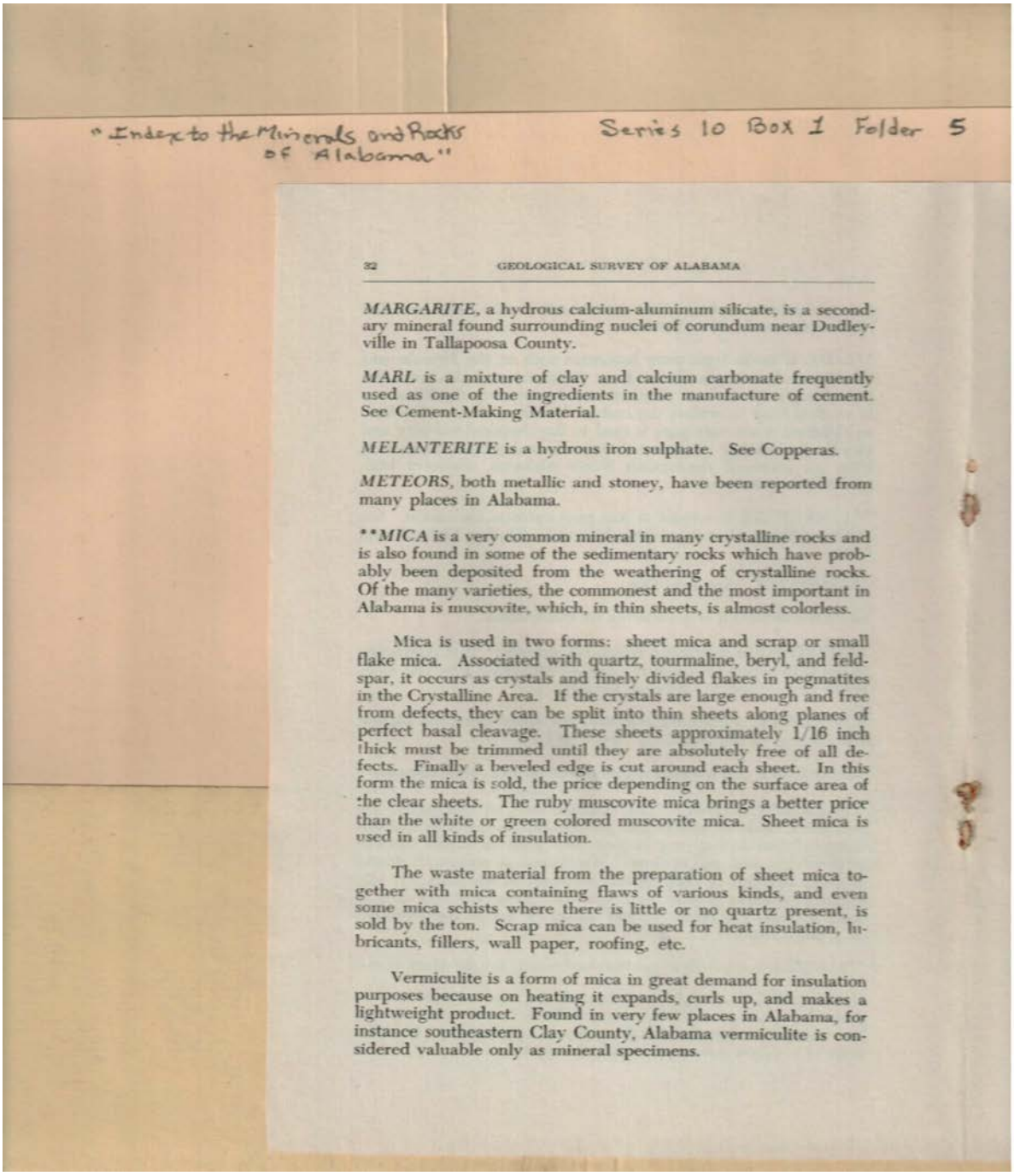

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MARGARITE, a hydrous calcium-aluminum silicate, is a secondary mineral found surrounding nuclei of corundum near Dudleyville in Tallapoosa County.

MARL is a mixture of clay and calcium carbonate frequently used as one of the ingredients in the manufacture of cement. See Cement-Making Material.

MELANTERITE is a hydrous iron sulphate. See Copperas.

METEORS, both metallic and stoney, have been reported from many places in Alabama.

***MICA* is a very common mineral in many crystalline rocks and is also found in some of the sedimentary rocks which have probably been deposited from the weathering of crystalline rocks. Of the many varieties, the commonest and the most important in Alabama is muscovite, which, in thin sheets, is almost colorless.

Mica is used in two forms: sheet mica and scrap or small flake mica. Associated with quartz, tourmaline, beryl, and feldspar, it occurs as crystals and finely divided flakes in pegmatites in the Crystalline Area. If the crystals are large enough and free from defects, they can be split into thin sheets along planes of perfect basal cleavage. These sheets approximately 1/16 inch thick must be trimmed until they are absolutely free of all defects. Finally a beveled edge is cut around each sheet. In this form the mica is sold, the price depending on the surface area of the clear sheets. The ruby muscovite mica brings a better price than the white or green colored muscovite mica. Sheet mica is used in all kinds of insulation.

The waste material from the preparation of sheet mica together with mica containing flaws of various kinds, and even some mica schists where there is little or no quartz present, is sold by the ton. Scrap mica can be used for heat insulation, lubricants, fillers, wall paper, roofing, etc.

Vermiculite is a form of mica in great demand for insulation purposes because on heating it expands, curls up, and makes a lightweight product. Found in very few places in Alabama, for instance southeastern Clay County, Alabama vermiculite is considered valuable only as mineral specimens.

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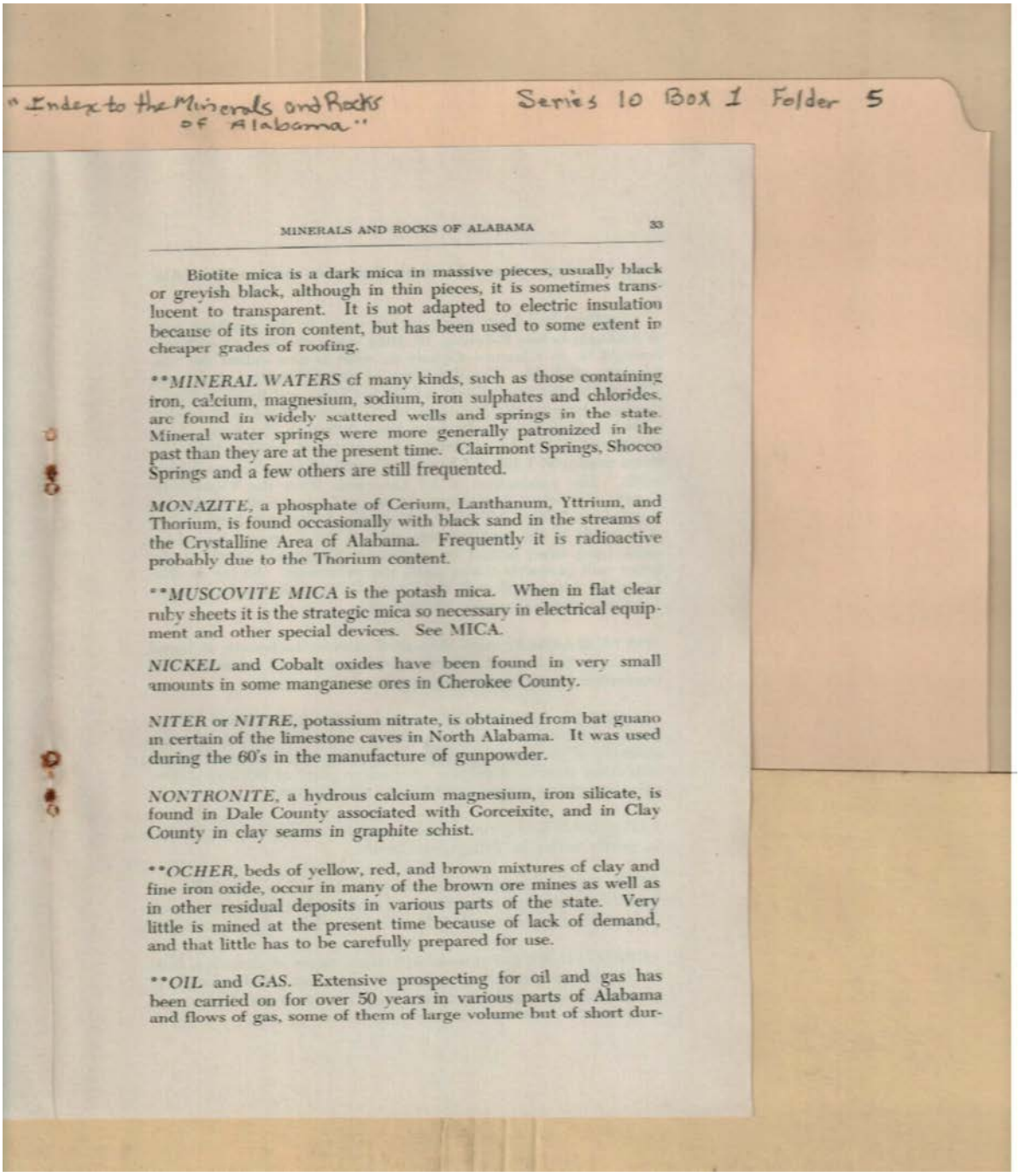

Biotite mica is a dark mica in massive pieces, usually black or greyish black, although in thin pieces, it is sometimes translucent to transparent. It is not adapted to electric insulation because of its iron content, but has been used to some extent in cheaper grades of roofing.

***MINERAL WATERS* of many kinds, such as those containing iron, calcium, magnesium, sodium, iron sulphates and chlorides, are found in widely scattered wells and springs in the state. Mineral water springs were more generally patronized in the past than they are at the present time. Clairmont Springs, Shocco Springs and a few others are still frequented.

MONAZITE, a phosphate of Cerium, Lanthanum, Yttrium, and Thorium, is found occasionally with black sand in the streams of the Crystalline Area of Alabama. Frequently it is radioactive probably due to the Thorium content.

***MUSCOVITE MICA* is the potash mica. When in flat clear ruby sheets it is the strategic mica so necessary in electrical equipment and other special devices. See MICA.

NICKEL and Cobalt oxides have been found in very small amounts in some manganese ores in Cherokee County.

NITER or *NITRE*, potassium nitrate, is obtained from bat guano in certain of the limestone caves in North Alabama. It was used during the 60's in the manufacture of gunpowder.

NONTRONITE, a hydrous calcium magnesium, iron silicate, is found in Dale County associated with Gorceixite, and in Clay County in clay seams in graphite schist.

***OCHER*, beds of yellow, red, and brown mixtures of clay and fine iron oxide, occur in many of the brown ore mines as well as in other residual deposits in various parts of the state. Very little is mined at the present time because of lack of demand, and that little has to be carefully prepared for use.

***OIL* and *GAS*. Extensive prospecting for oil and gas has been carried on for over 50 years in various parts of Alabama and flows of gas, some of them of large volume but of short dur-

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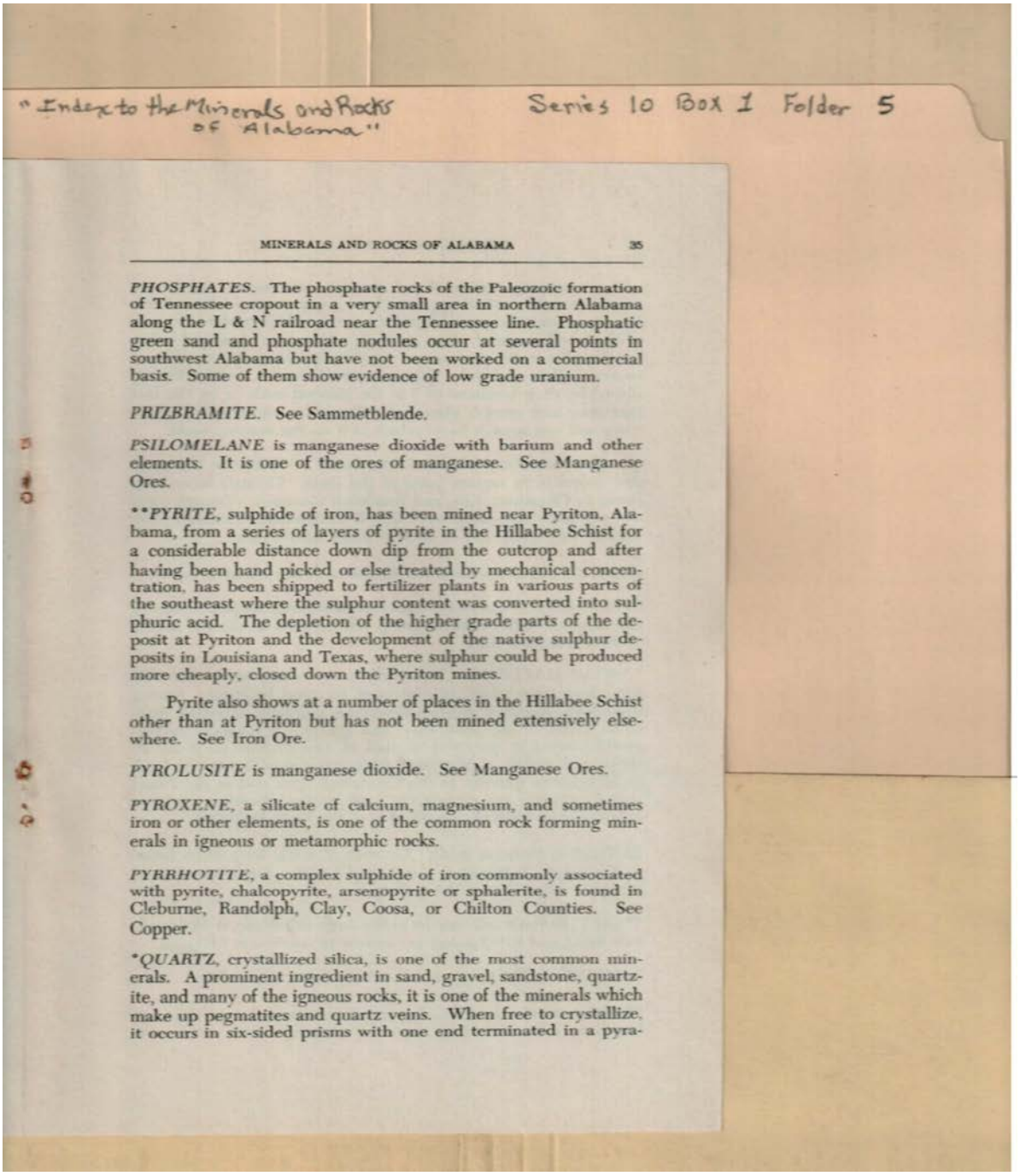

PHOSPHATES. The phosphate rocks of the Paleozoic formation of Tennessee cropout in a very small area in northern Alabama along the L & N railroad near the Tennessee line. Phosphatic green sand and phosphate nodules occur at several points in southwest Alabama but have not been worked on a commercial basis. Some of them show evidence of low grade uranium.

PRIZBRAMITE. See Sammetblende.

PSILOMELANE is manganese dioxide with barium and other elements. It is one of the ores of manganese. See Manganese Ores.

****PYRITE***, sulphide of iron, has been mined near Pyriton, Alabama, from a series of layers of pyrite in the Hillabee Schist for a considerable distance down dip from the outcrop and after having been hand picked or else treated by mechanical concentration, has been shipped to fertilizer plants in various parts of the southeast where the sulphur content was converted into sulphuric acid. The depletion of the higher grade parts of the deposit at Pyriton and the development of the native sulphur deposits in Louisiana and Texas, where sulphur could be produced more cheaply, closed down the Pyriton mines.

Pyrite also shows at a number of places in the Hillabee Schist other than at Pyriton but has not been mined extensively elsewhere. See Iron Ore.

PYROLUSITE is manganese dioxide. See Manganese Ores.

PYROXENE, a silicate of calcium, magnesium, and sometimes iron or other elements, is one of the common rock forming minerals in igneous or metamorphic rocks.

PYRRHOTITE, a complex sulphide of iron commonly associated with pyrite, chalcopyrite, arsenopyrite or sphalerite, is found in Cleburne, Randolph, Clay, Coosa, or Chilton Counties. See Copper.

QUARTZ, crystallized silica, is one of the most common minerals. A prominent ingredient in sand, gravel, sandstone, quartzite, and many of the igneous rocks, it is one of the minerals which make up pegmatites and quartz veins. When free to crystallize, it occurs in six-sided prisms with one end terminated in a pyra-

Names:
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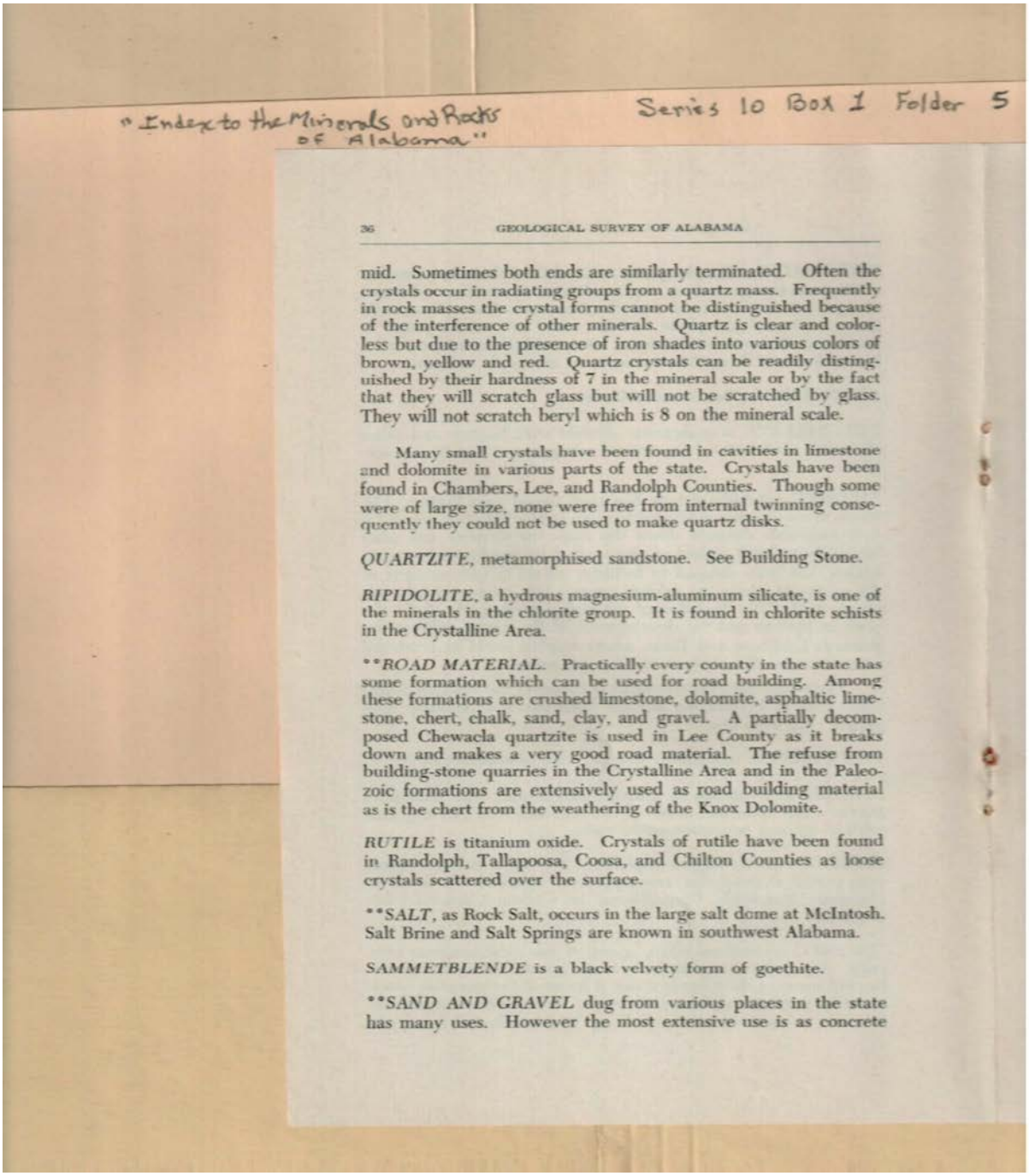

mid. Sometimes both ends are similarly terminated. Often the crystals occur in radiating groups from a quartz mass. Frequently in rock masses the crystal forms cannot be distinguished because of the interference of other minerals. Quartz is clear and colorless but due to the presence of iron shades into various colors of brown, yellow and red. Quartz crystals can be readily distinguished by their hardness of 7 in the mineral scale or by the fact that they will scratch glass but will not be scratched by glass. They will not scratch beryl which is 8 on the mineral scale.

Many small crystals have been found in cavities in limestone and dolomite in various parts of the state. Crystals have been found in Chambers, Lee, and Randolph Counties. Though some were of large size, none were free from internal twinning consequently they could not be used to make quartz disks.

QUARTZITE, metamorphised sandstone. See Building Stone.

RIPIDOLITE, a hydrous magnesium-aluminum silicate, is one of the minerals in the chlorite group. It is found in chlorite schists in the Crystalline Area.

***ROAD MATERIAL*. Practically every county in the state has some formation which can be used for road building. Among these formations are crushed limestone, dolomite, asphaltic limestone, chert, chalk, sand, clay, and gravel. A partially decomposed Chewacla quartzite is used in Lee County as it breaks down and makes a very good road material. The refuse from building-stone quarries in the Crystalline Area and in the Paleozoic formations are extensively used as road building material as is the chert from the weathering of the Knox Dolomite.

RUTILE is titanium oxide. Crystals of rutile have been found in Randolph, Tallapoosa, Coosa, and Chilton Counties as loose crystals scattered over the surface.

***SALT*, as Rock Salt, occurs in the large salt dome at McIntosh. Salt Brine and Salt Springs are known in southwest Alabama.

SAMMETBLENDE is a black velvety form of goethite.

***SAND AND GRAVEL* dug from various places in the state has many uses. However the most extensive use is as concrete

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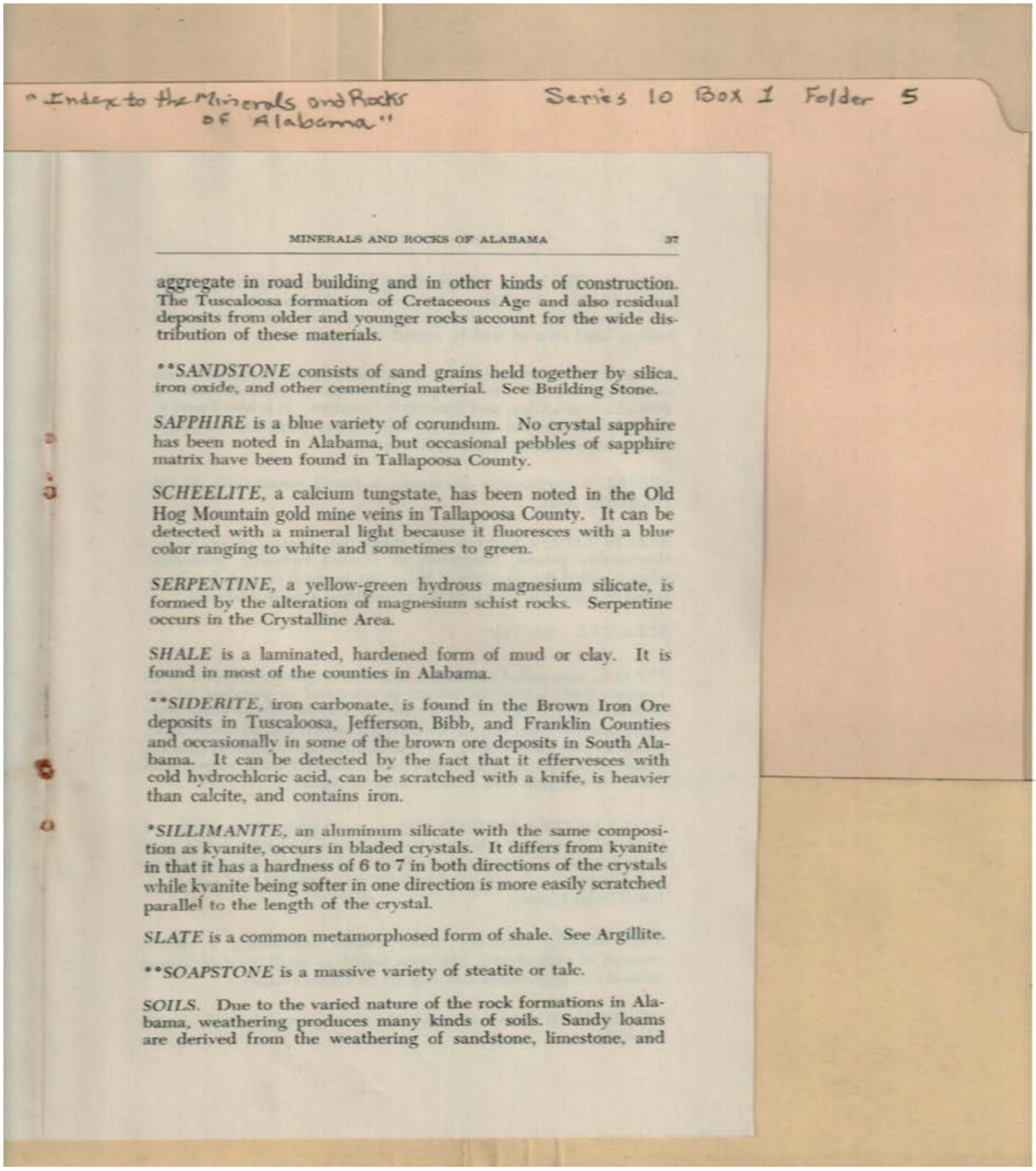

MINERALS AND ROCKS OF ALABAMA 37

aggregate in road building and in other kinds of construction. The Tuscaloosa formation of Cretaceous Age and also residual deposits from older and younger rocks account for the wide distribution of these materials.

****SANDSTONE** consists of sand grains held together by silica, iron oxide, and other cementing material. See Building Stone.

SAPPHIRE is a blue variety of corundum. No crystal sapphire has been noted in Alabama, but occasional pebbles of sapphire matrix have been found in Tallapoosa County.

SCHEELITE, a calcium tungstate, has been noted in the Old Hog Mountain gold mine veins in Tallapoosa County. It can be detected with a mineral light because it fluoresces with a blue color ranging to white and sometimes to green.

SERPENTINE, a yellow-green hydrous magnesium silicate, is formed by the alteration of magnesium schist rocks. Serpentine occurs in the Crystalline Area.

SHALE is a laminated, hardened form of mud or clay. It is found in most of the counties in Alabama.

****SIDERITE**, iron carbonate, is found in the Brown Iron Ore deposits in Tuscaloosa, Jefferson, Bibb, and Franklin Counties and occasionally in some of the brown ore deposits in South Alabama. It can be detected by the fact that it effervesces with cold hydrochloric acid, can be scratched with a knife, is heavier than calcite, and contains iron.

***SILLIMANITE**, an aluminum silicate with the same composition as kyanite, occurs in bladed crystals. It differs from kyanite in that it has a hardness of 6 to 7 in both directions of the crystals while kyanite being softer in one direction is more easily scratched parallel to the length of the crystal.

SLATE is a common metamorphosed form of shale. See Argillite.

****SOAPSTONE** is a massive variety of steatite or talc.

SOILS. Due to the varied nature of the rock formations in Alabama, weathering produces many kinds of soils. Sandy loams are derived from the weathering of sandstone, limestone, and

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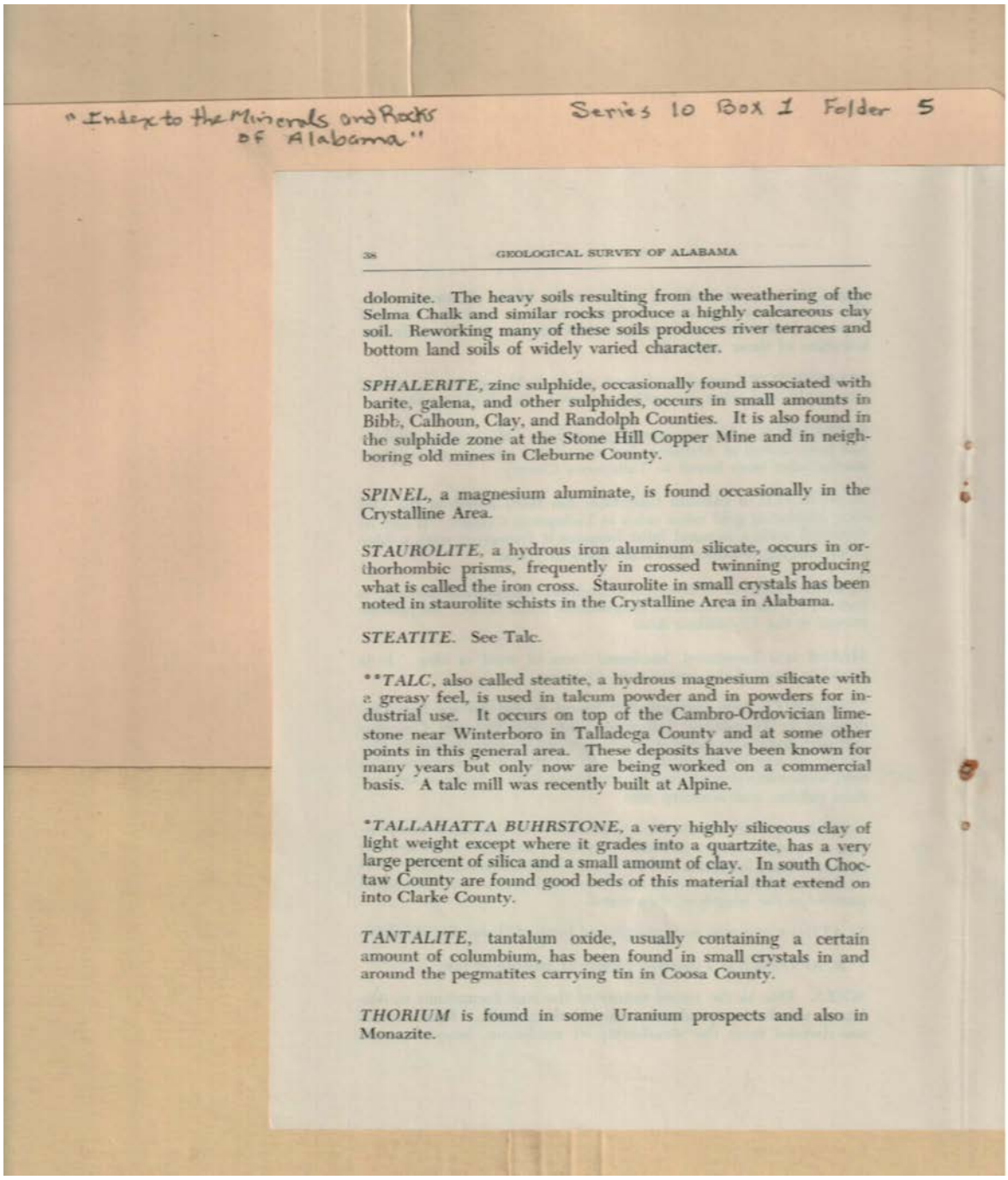

dolomite. The heavy soils resulting from the weathering of the Selma Chalk and similar rocks produce a highly calcareous clay soil. Reworking many of these soils produces river terraces and bottom land soils of widely varied character.

SPHALERITE, zinc sulphide, occasionally found associated with barite, galena, and other sulphides, occurs in small amounts in Bibb, Calhoun, Clay, and Randolph Counties. It is also found in the sulphide zone at the Stone Hill Copper Mine and in neighboring old mines in Cleburne County.

SPINEL, a magnesium aluminate, is found occasionally in the Crystalline Area.

STAUROLITE, a hydrous iron aluminum silicate, occurs in orthorhombic prisms, frequently in crossed twinning producing what is called the iron cross. Staurolite in small crystals has been noted in staurolite schists in the Crystalline Area in Alabama.

STEATITE. See Talc.

***TALC*, also called steatite, a hydrous magnesium silicate with a greasy feel, is used in talcum powder and in powders for industrial use. It occurs on top of the Cambro-Ordovician limestone near Winterboro in Talladega County and at some other points in this general area. These deposits have been known for many years but only now are being worked on a commercial basis. A talc mill was recently built at Alpine.

**TALLAHATTA BUHRSTONE*, a very highly siliceous clay of light weight except where it grades into a quartzite, has a very large percent of silica and a small amount of clay. In south Choctaw County are found good beds of this material that extend on into Clarke County.

TANTALITE, tantalum oxide, usually containing a certain amount of columbium, has been found in small crystals in and around the pegmatites carrying tin in Coosa County.

THORIUM is found in some Uranium prospects and also in Monazite.

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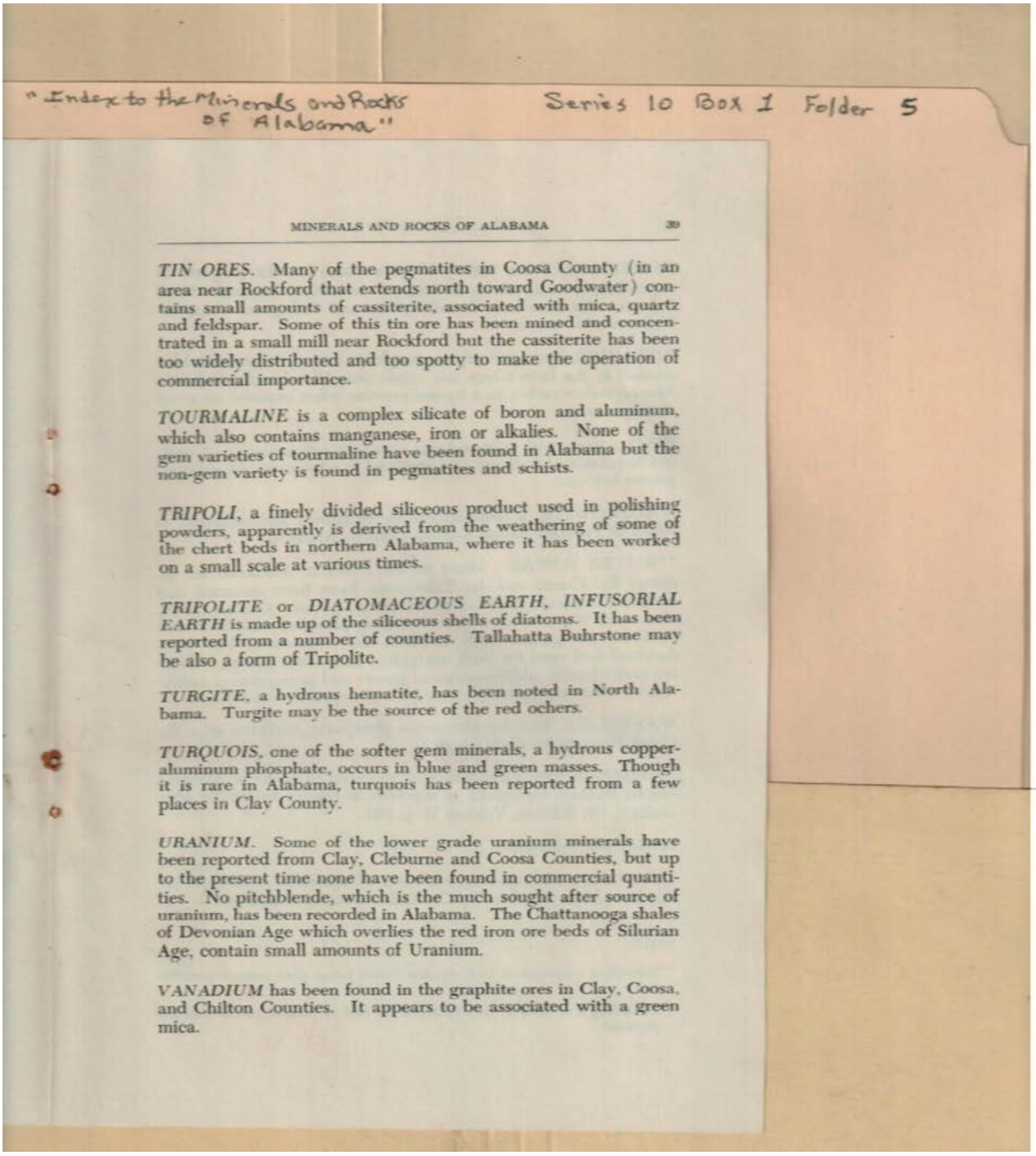

TIN ORES. Many of the pegmatites in Coosa County (in an area near Rockford that extends north toward Goodwater) contains small amounts of cassiterite, associated with mica, quartz and feldspar. Some of this tin ore has been mined and concentrated in a small mill near Rockford but the cassiterite has been too widely distributed and too spotty to make the operation of commercial importance.

TOURMALINE is a complex silicate of boron and aluminum, which also contains manganese, iron or alkalies. None of the gem varieties of tourmaline have been found in Alabama but the non-gem variety is found in pegmatites and schists.

TRIPOLI, a finely divided siliceous product used in polishing powders, apparently is derived from the weathering of some of the chert beds in northern Alabama, where it has been worked on a small scale at various times.

TRIPOLITE or *DIATOMACEOUS EARTH, INFUSORIAL EARTH* is made up of the siliceous shells of diatoms. It has been reported from a number of counties. Tallahatta Buhrstone may be also a form of Tripolite.

TURGITE, a hydrous hematite, has been noted in North Alabama. Turgite may be the source of the red ochers.

TURQUOIS, one of the softer gem minerals, a hydrous copper-aluminum phosphate, occurs in blue and green masses. Though it is rare in Alabama, turquois has been reported from a few places in Clay County.

URANIUM. Some of the lower grade uranium minerals have been reported from Clay, Cleburne and Coosa Counties, but up to the present time none have been found in commercial quantities. No pitchblende, which is the much sought after source of uranium, has been recorded in Alabama. The Chattanooga shales of Devonian Age which overlies the red iron ore beds of Silurian Age, contain small amounts of Uranium.

VANADIUM has been found in the graphite ores in Clay, Coosa, and Chilton Counties. It appears to be associated with a green mica.

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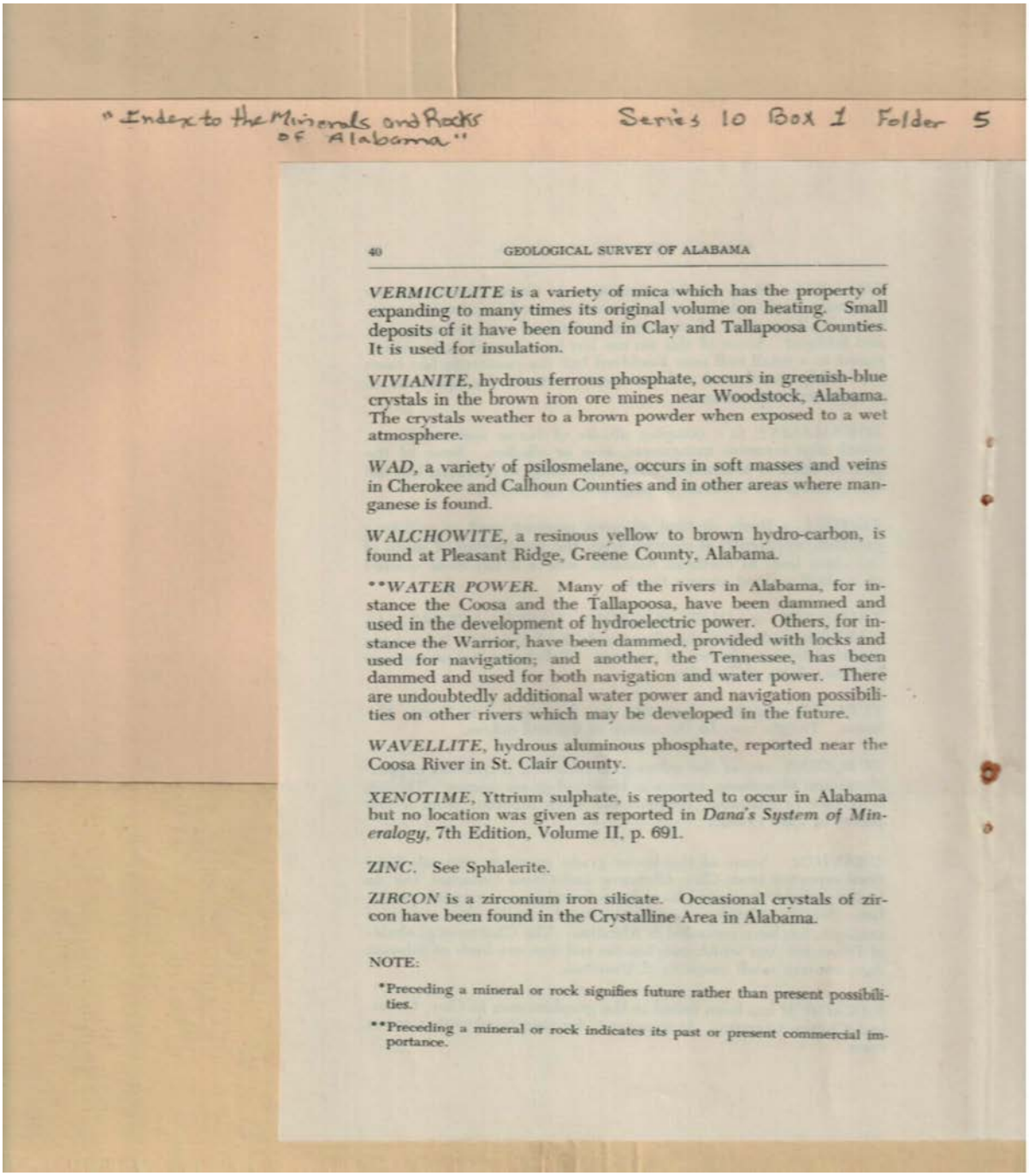

VERMICULITE is a variety of mica which has the property of expanding to many times its original volume on heating. Small deposits of it have been found in Clay and Tallapoosa Counties. It is used for insulation.

VIVIANITE, hydrous ferrous phosphate, occurs in greenish-blue crystals in the brown iron ore mines near Woodstock, Alabama. The crystals weather to a brown powder when exposed to a wet atmosphere.

WAD, a variety of psilosmelane, occurs in soft masses and veins in Cherokee and Calhoun Counties and in other areas where manganese is found.

WALCHOWITE, a resinous yellow to brown hydro-carbon, is found at Pleasant Ridge, Greene County, Alabama.

***WATER POWER*. Many of the rivers in Alabama, for instance the Coosa and the Tallapoosa, have been dammed and used in the development of hydroelectric power. Others, for instance the Warrior, have been dammed, provided with locks and used for navigation; and another, the Tennessee, has been dammed and used for both navigation and water power. There are undoubtedly additional water power and navigation possibilities on other rivers which may be developed in the future.

WAVELLITE, hydrous aluminous phosphate, reported near the Coosa River in St. Clair County.

XENOTIME, Yttrium sulphate, is reported to occur in Alabama but no location was given as reported in *Dana's System of Mineralogy*, 7th Edition, Volume II, p. 691.

ZINC. See Sphalerite.

ZIRCON is a zirconium iron silicate. Occasional crystals of zircon have been found in the Crystalline Area in Alabama.

NOTE:

*Preceding a mineral or rock signifies future rather than present possibilities.

**Preceding a mineral or rock indicates its past or present commercial importance.

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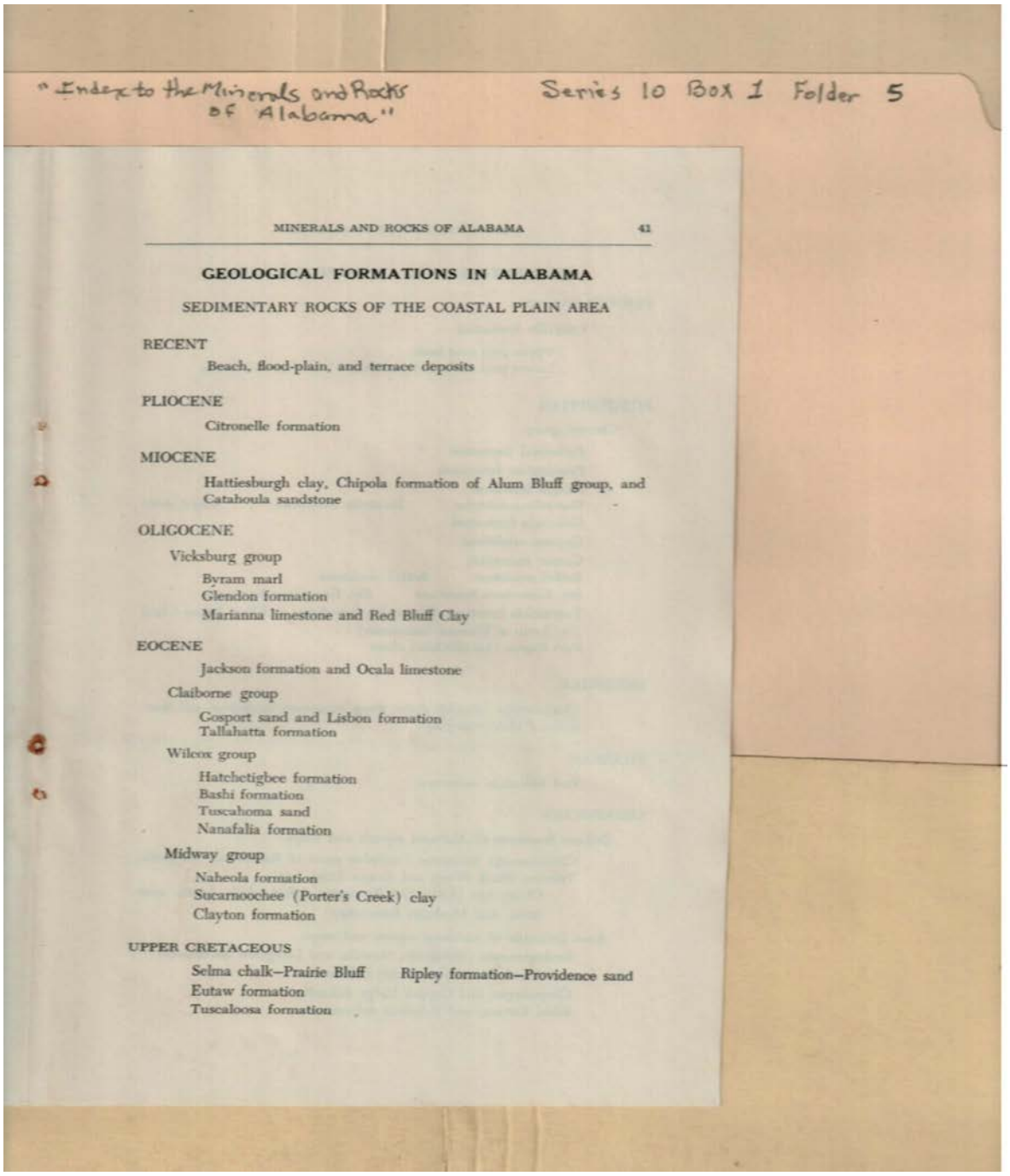

GEOLOGICAL FORMATIONS IN ALABAMA

SEDIMENTARY ROCKS OF THE COASTAL PLAIN AREA

RECENT
- Beach, flood-plain, and terrace deposits

PLIOCENE
- Citronelle formation

MIOCENE
- Hattiesburgh clay, Chipola formation of Alum Bluff group, and Cataboula sandstone

OLIGOCENE
- Vicksburg group
  - Byram marl
  - Glendon formation
  - Marianna limestone and Red Bluff Clay

EOCENE
- Jackson formation and Ocala limestone
- Claiborne group
  - Gosport sand and Lisbon formation
  - Tallahatta formation
- Wilcox group
  - Hatchetigbee formation
  - Bashi formation
  - Tuscahoma sand
  - Nanafalia formation
- Midway group
  - Naheola formation
  - Sucarnoochee (Porter's Creek) clay
  - Clayton formation

UPPER CRETACEOUS
- Selma chalk—Prairie Bluff
- Ripley formation—Providence sand
- Eutaw formation
- Tuscaloosa formation

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Geological Formations in
Alabama

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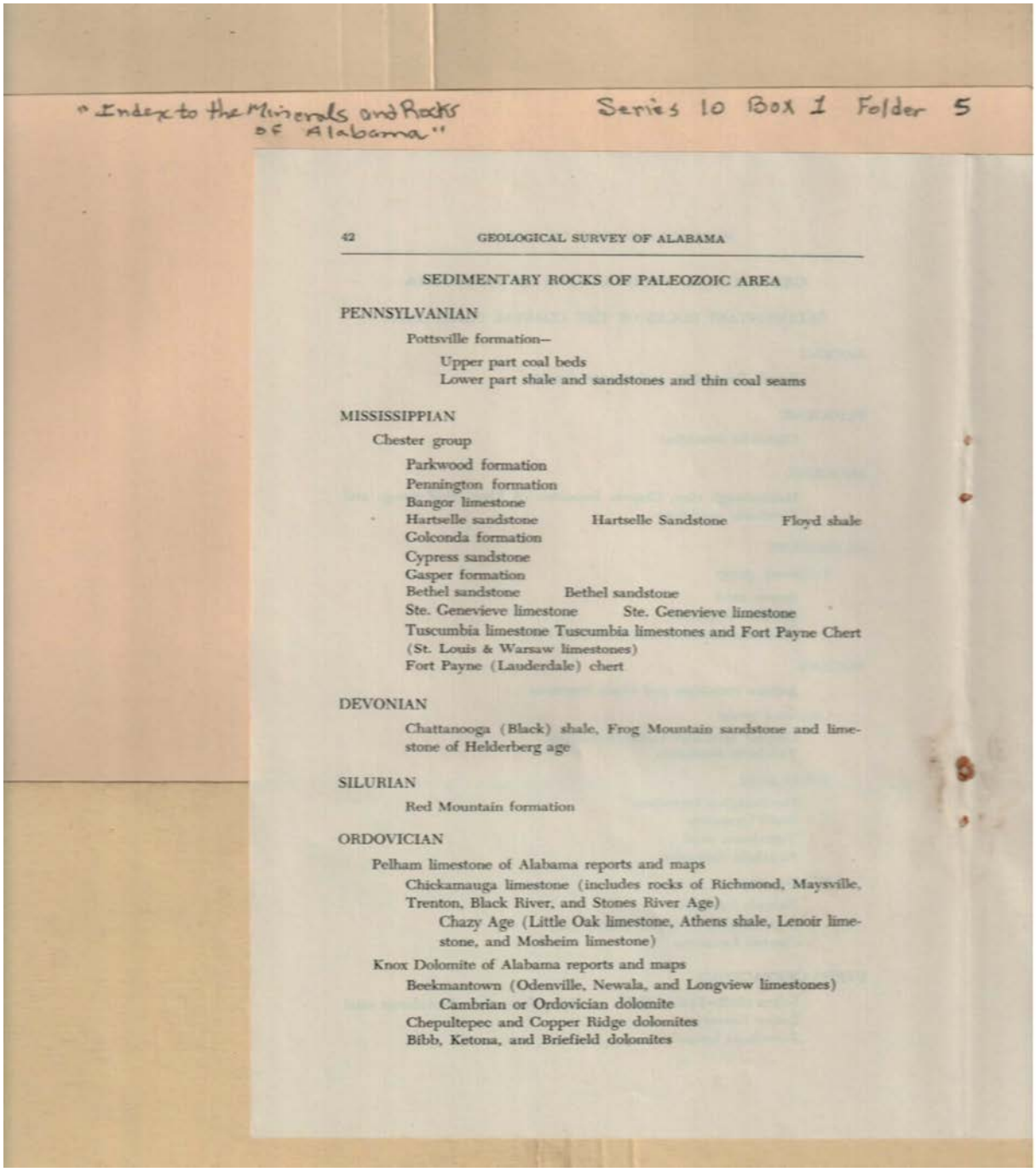

42 GEOLOGICAL SURVEY OF ALABAMA

SEDIMENTARY ROCKS OF PALEOZOIC AREA

PENNSYLVANIAN

Pottsville formation—
Upper part coal beds
Lower part shale and sandstones and thin coal seams

MISSISSIPPIAN

Chester group
Parkwood formation
Pennington formation
Bangor limestone
Hartselle sandstone Hartselle Sandstone Floyd shale
Golconda formation
Cypress sandstone
Gasper formation
Bethel sandstone Bethel sandstone
Ste. Genevieve limestone Ste. Genevieve limestone
Tuscumbia limestone Tuscumbia limestones and Fort Payne Chert
(St. Louis & Warsaw limestones)
Fort Payne (Lauderdale) chert

DEVONIAN

Chattanooga (Black) shale, Frog Mountain sandstone and limestone of Helderberg age

SILURIAN

Red Mountain formation

ORDOVICIAN

Pelham limestone of Alabama reports and maps
Chickamauga limestone (includes rocks of Richmond, Maysville, Trenton, Black River, and Stones River Age)
Chazy Age (Little Oak limestone, Athens shale, Lenoir limestone, and Mosheim limestone)
Knox Dolomite of Alabama reports and maps
Beekmantown (Odenville, Newala, and Longview limestones)
Cambrian or Ordovician dolomite
Chepultepec and Copper Ridge dolomites
Bibb, Ketona, and Briefield dolomites

Names:
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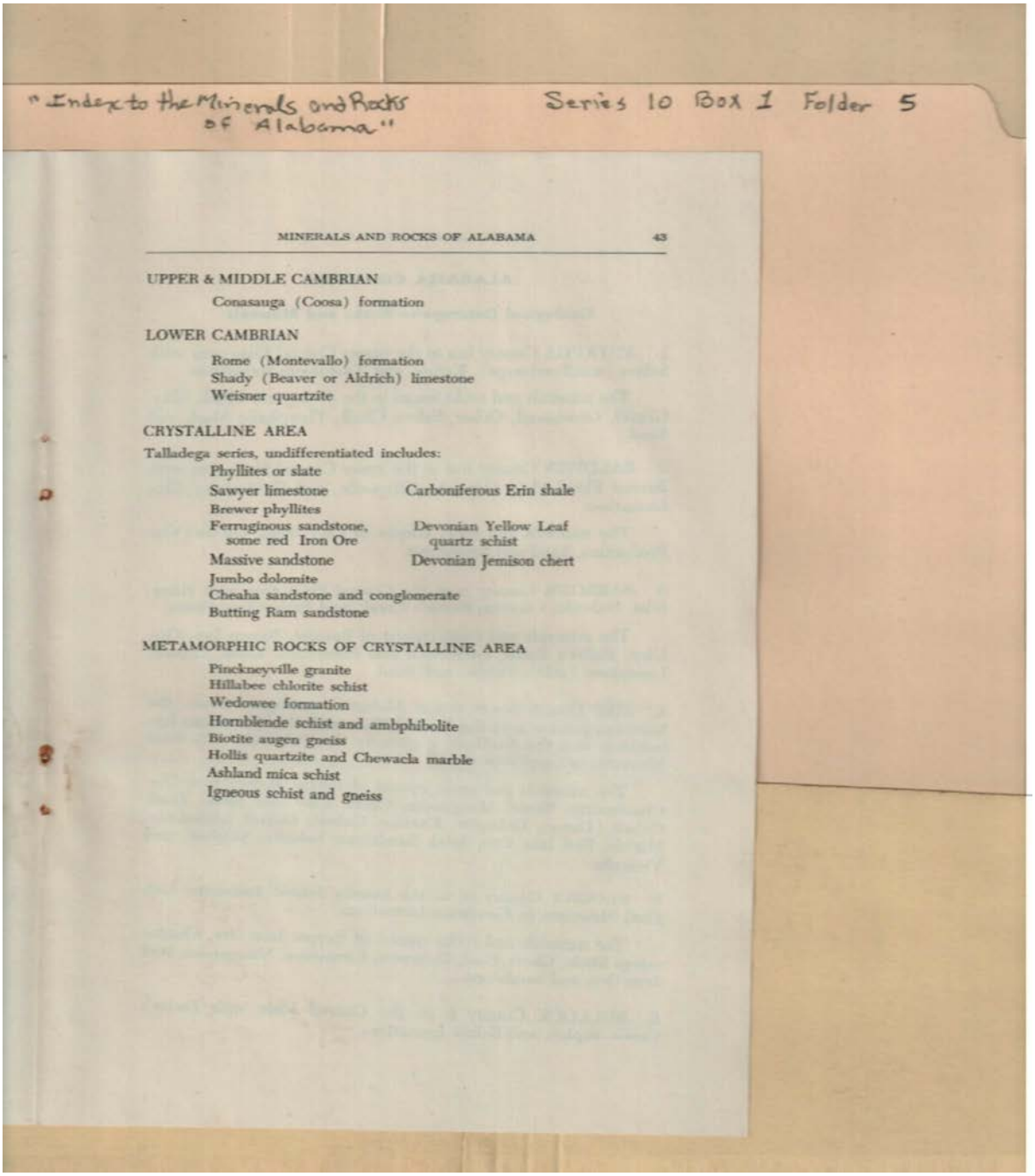

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UPPER & MIDDLE CAMBRIAN

Conasauga (Coosa) formation

LOWER CAMBRIAN

Rome (Montevallo) formation
Shady (Beaver or Aldrich) limestone
Weisner quartzite

CRYSTALLINE AREA

Talladega series, undifferentiated includes:

Phyllites or slate
Sawyer limestone — Carboniferous Erin shale
Brewer phyllites
Ferruginous sandstone, some red Iron Ore — Devonian Yellow Leaf quartz schist
Massive sandstone — Devonian Jemison chert
Jumbo dolomite
Cheaha sandstone and conglomerate
Butting Ram sandstone

METAMORPHIC ROCKS OF CRYSTALLINE AREA

Pinckneyville granite
Hillabee chlorite schist
Wedowee formation
Hornblende schist and ambphibolite
Biotite augen gneiss
Hollis quartzite and Chewacla marble
Ashland mica schist
Igneous schist and gneiss

Names:

Geological Formations in — Alabama

Types:

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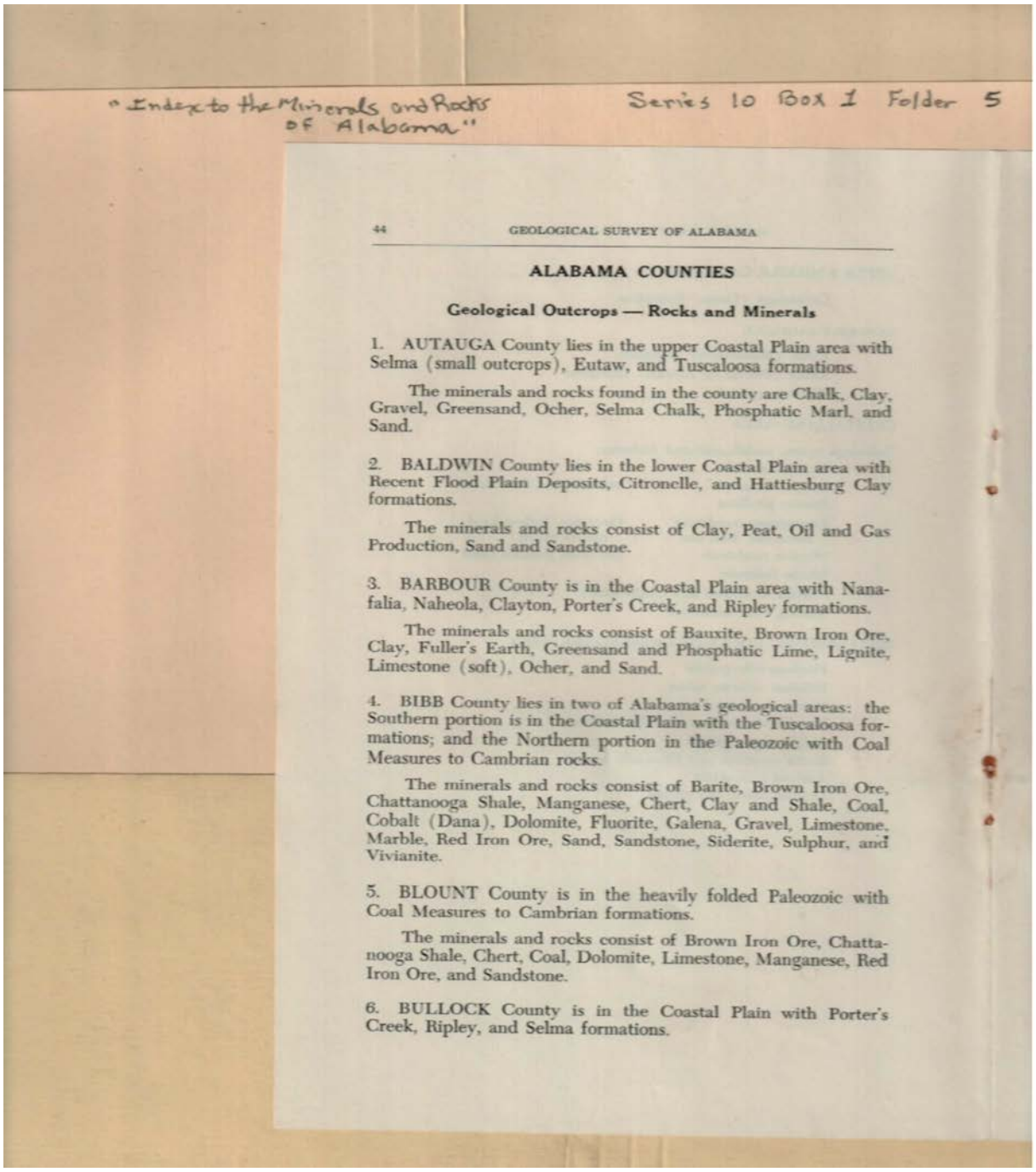

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ALABAMA COUNTIES

Geological Outcrops — Rocks and Minerals

1. AUTAUGA County lies in the upper Coastal Plain area with Selma (small outcrops), Eutaw, and Tuscaloosa formations.

The minerals and rocks found in the county are Chalk, Clay, Gravel, Greensand, Ocher, Selma Chalk, Phosphatic Marl, and Sand.

2. BALDWIN County lies in the lower Coastal Plain area with Recent Flood Plain Deposits, Citronelle, and Hattiesburg Clay formations.

The minerals and rocks consist of Clay, Peat, Oil and Gas Production, Sand and Sandstone.

3. BARBOUR County is in the Coastal Plain area with Nanafalia, Naheola, Clayton, Porter's Creek, and Ripley formations.

The minerals and rocks consist of Bauxite, Brown Iron Ore, Clay, Fuller's Earth, Greensand and Phosphatic Lime, Lignite, Limestone (soft), Ocher, and Sand.

4. BIBB County lies in two of Alabama's geological areas: the Southern portion is in the Coastal Plain with the Tuscaloosa formations; and the Northern portion in the Paleozoic with Coal Measures to Cambrian rocks.

The minerals and rocks consist of Barite, Brown Iron Ore, Chattanooga Shale, Manganese, Chert, Clay and Shale, Coal, Cobalt (Dana), Dolomite, Fluorite, Galena, Gravel, Limestone, Marble, Red Iron Ore, Sand, Sandstone, Siderite, Sulphur, and Vivianite.

5. BLOUNT County is in the heavily folded Paleozoic with Coal Measures to Cambrian formations.

The minerals and rocks consist of Brown Iron Ore, Chattanooga Shale, Chert, Coal, Dolomite, Limestone, Manganese, Red Iron Ore, and Sandstone.

6. BULLOCK County is in the Coastal Plain with Porter's Creek, Ripley, and Selma formations.

Names:
Geological Outcrops
in Counties

Types:
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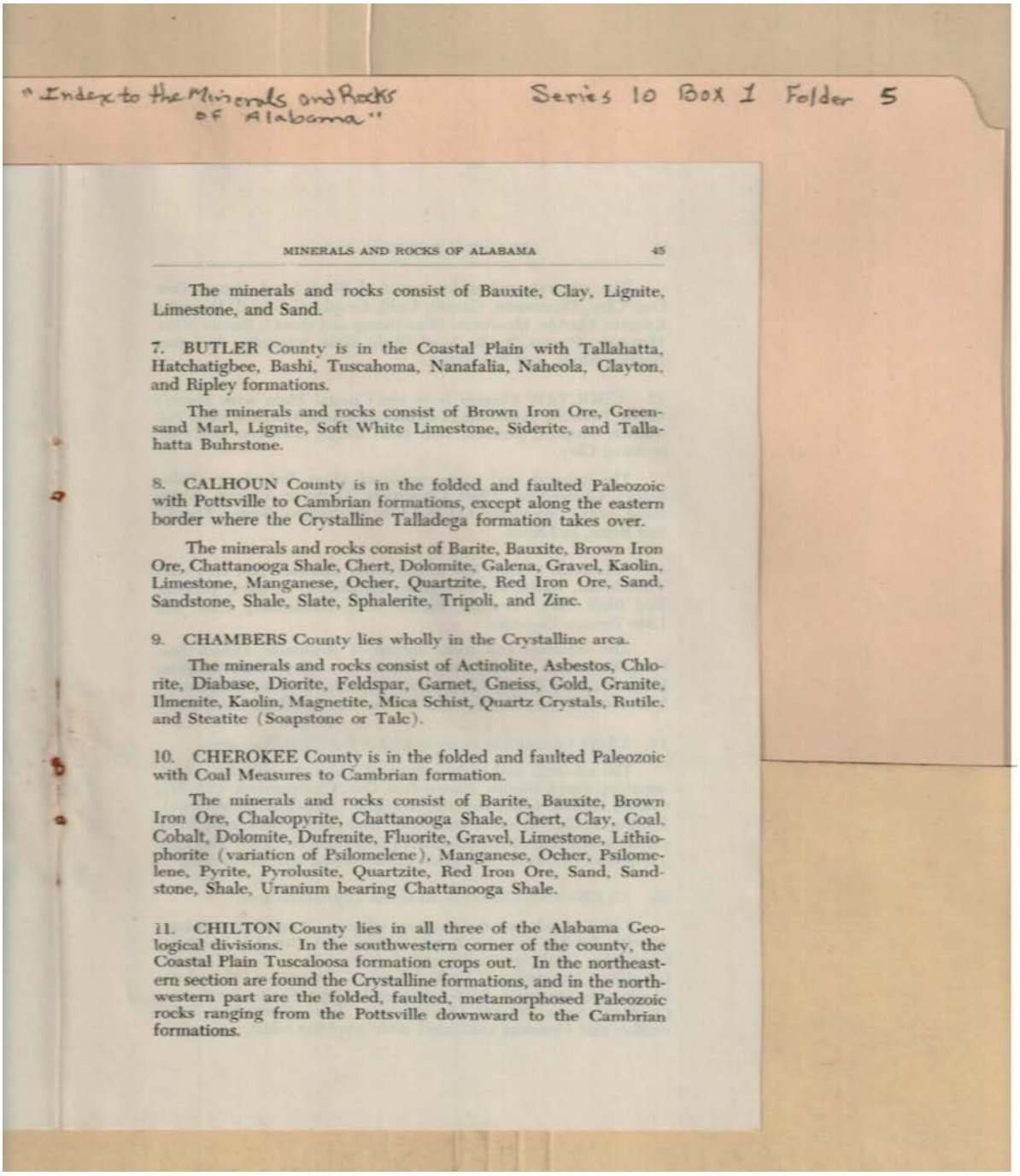

The minerals and rocks consist of Bauxite, Clay, Lignite, Limestone, and Sand.

7. BUTLER County is in the Coastal Plain with Tallahatta, Hatchatigbee, Bashi, Tuscahoma, Nanafalia, Naheola, Clayton, and Ripley formations.

The minerals and rocks consist of Brown Iron Ore, Greensand Marl, Lignite, Soft White Limestone, Siderite, and Tallahatta Buhrstone.

8. CALHOUN County is in the folded and faulted Paleozoic with Pottsville to Cambrian formations, except along the eastern border where the Crystalline Talladega formation takes over.

The minerals and rocks consist of Barite, Bauxite, Brown Iron Ore, Chattanooga Shale, Chert, Dolomite, Galena, Gravel, Kaolin, Limestone, Manganese, Ocher, Quartzite, Red Iron Ore, Sand, Sandstone, Shale, Slate, Sphalerite, Tripoli, and Zinc.

9. CHAMBERS County lies wholly in the Crystalline area.

The minerals and rocks consist of Actinolite, Asbestos, Chlorite, Diabase, Diorite, Feldspar, Garnet, Gneiss, Gold, Granite, Ilmenite, Kaolin, Magnetite, Mica Schist, Quartz Crystals, Rutile, and Steatite (Soapstone or Talc).

10. CHEROKEE County is in the folded and faulted Paleozoic with Coal Measures to Cambrian formation.

The minerals and rocks consist of Barite, Bauxite, Brown Iron Ore, Chalcopyrite, Chattanooga Shale, Chert, Clay, Coal, Cobalt, Dolomite, Dufrenite, Fluorite, Gravel, Limestone, Lithiophorite (variation of Psilomelene), Manganese, Ocher, Psilomelene, Pyrite, Pyrolusite, Quartzite, Red Iron Ore, Sand, Sandstone, Shale, Uranium bearing Chattanooga Shale.

11. CHILTON County lies in all three of the Alabama Geological divisions. In the southwestern corner of the county, the Coastal Plain Tuscaloosa formation crops out. In the northeastern section are found the Crystalline formations, and in the northwestern part are the folded, faulted, metamorphosed Paleozoic rocks ranging from the Pottsville downward to the Cambrian formations.

Names:
Geological Outcrops
in Counties

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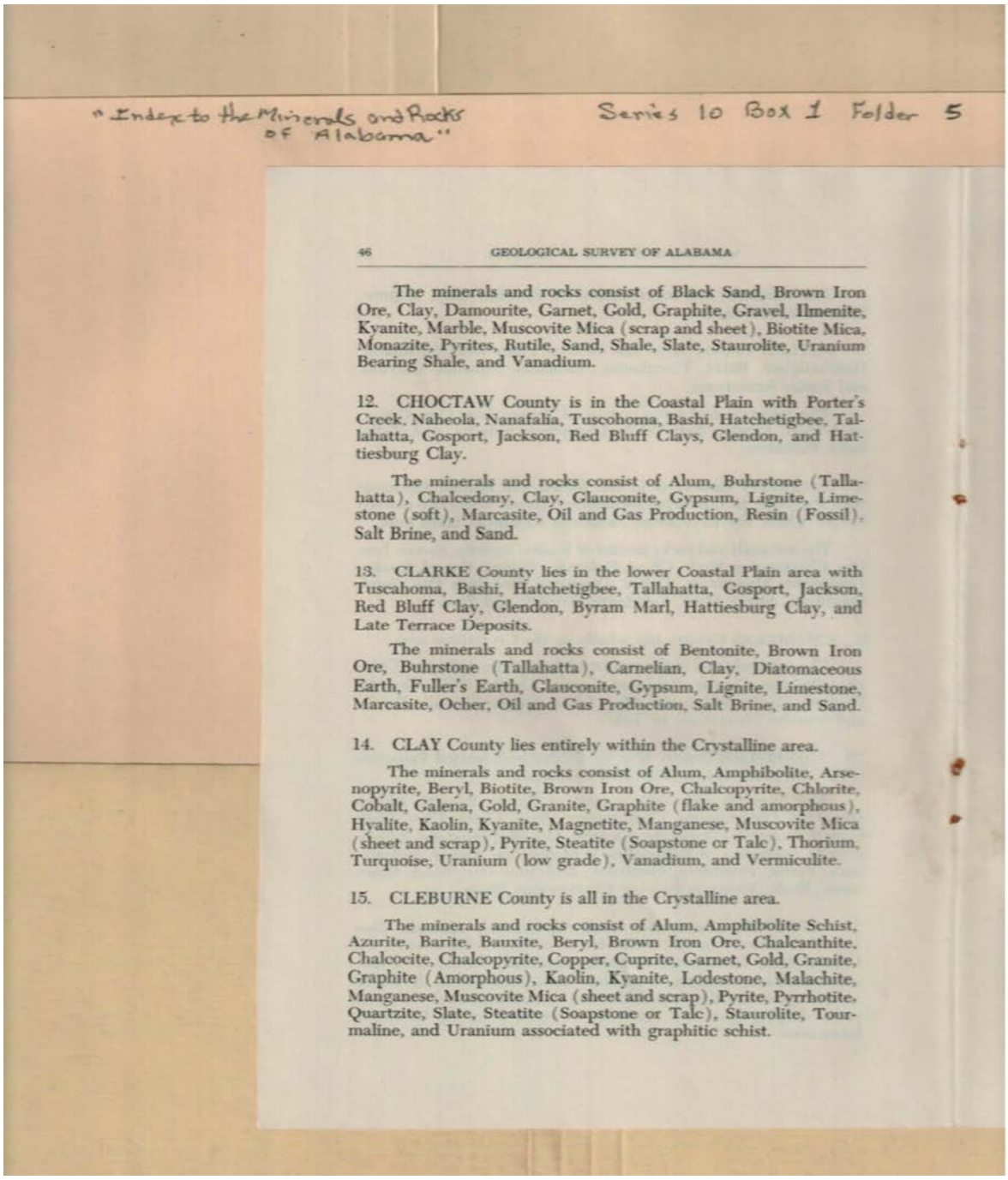


The minerals and rocks consist of Black Sand, Brown Iron Ore, Clay, Damourite, Garnet, Gold, Graphite, Gravel, Ilmenite, Kyanite, Marble, Muscovite Mica (scrap and sheet), Biotite Mica, Monazite, Pyrites, Rutile, Sand, Shale, Slate, Staurolite, Uranium Bearing Shale, and Vanadium.

12. CHOCTAW County is in the Coastal Plain with Porter's Creek, Naheola, Nanafalia, Tuscohoma, Bashi, Hatchetigbee, Tallahatta, Gosport, Jackson, Red Bluff Clays, Glendon, and Hattiesburg Clay.

The minerals and rocks consist of Alum, Buhrstone (Tallahatta), Chalcedony, Clay, Glauconite, Gypsum, Lignite, Limestone (soft), Marcasite, Oil and Gas Production, Resin (Fossil), Salt Brine, and Sand.

13. CLARKE County lies in the lower Coastal Plain area with Tuscahoma, Bashi, Hatchetigbee, Tallahatta, Gosport, Jackson, Red Bluff Clay, Glendon, Byram Marl, Hattiesburg Clay, and Late Terrace Deposits.

The minerals and rocks consist of Bentonite, Brown Iron Ore, Buhrstone (Tallahatta), Carnelian, Clay, Diatomaceous Earth, Fuller's Earth, Glauconite, Gypsum, Lignite, Limestone, Marcasite, Ocher, Oil and Gas Production, Salt Brine, and Sand.

14. CLAY County lies entirely within the Crystalline area.

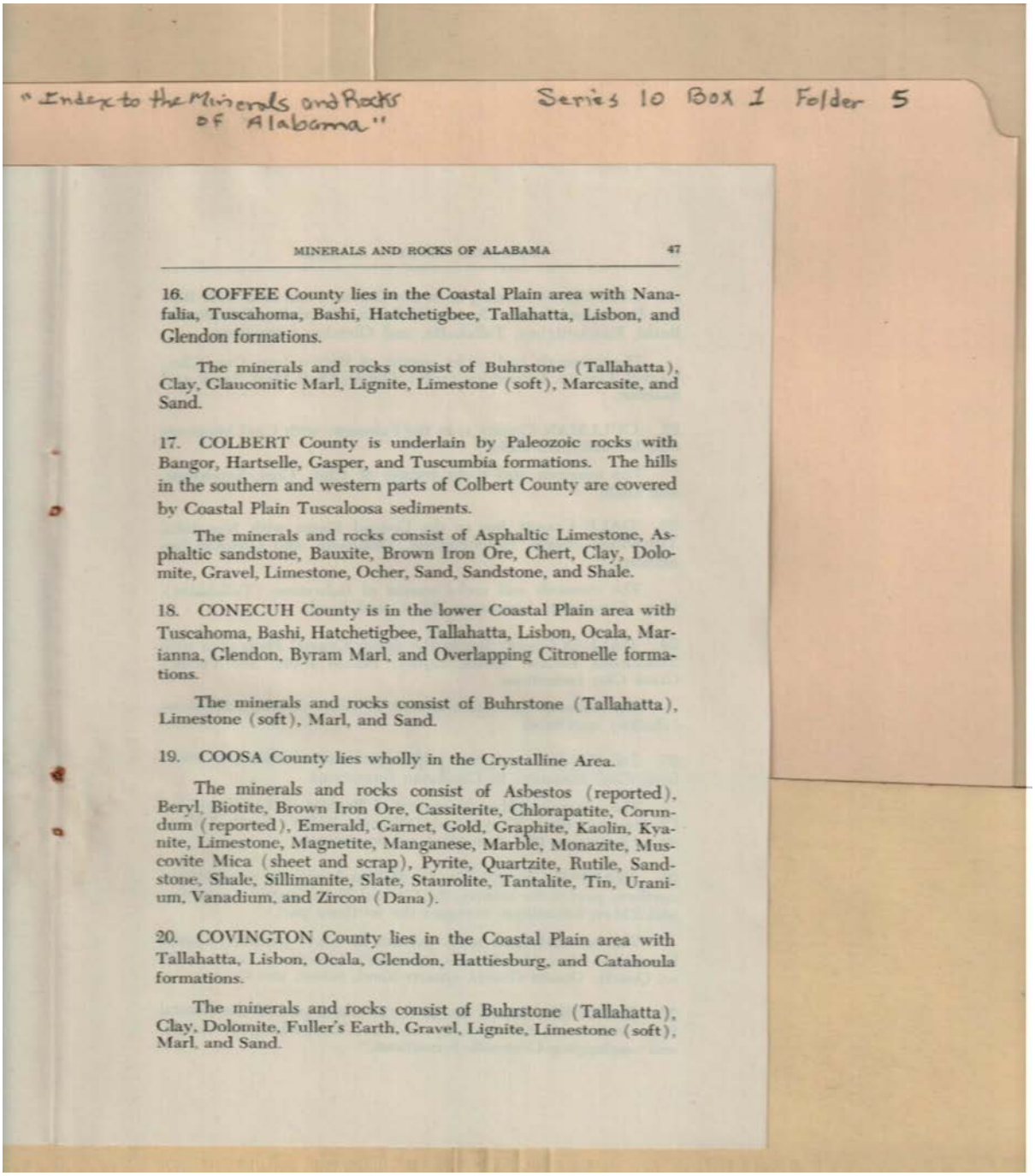
The minerals and rocks consist of Alum, Amphibolite, Arsenopyrite, Beryl, Biotite, Brown Iron Ore, Chalcopyrite, Chlorite, Cobalt, Galena, Gold, Granite, Graphite (flake and amorphous), Hyalite, Kaolin, Kyanite, Magnetite, Manganese, Muscovite Mica (sheet and scrap), Pyrite, Steatite (Soapstone or Talc), Thorium, Turquoise, Uranium (low grade), Vanadium, and Vermiculite.

15. CLEBURNE County is all in the Crystalline area.

The minerals and rocks consist of Alum, Amphibolite Schist, Azurite, Barite, Bauxite, Beryl, Brown Iron Ore, Chalcanthite, Chalcocite, Chalcopyrite, Copper, Cuprite, Garnet, Gold, Granite, Graphite (Amorphous), Kaolin, Kyanite, Lodestone, Malachite, Manganese, Muscovite Mica (sheet and scrap), Pyrite, Pyrrhotite, Quartzite, Slate, Steatite (Soapstone or Talc), Staurolite, Tourmaline, and Uranium associated with graphitic schist.

Names:
Geological Outcrops
in Counties

Types:
bulletin



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16. COFFEE County lies in the Coastal Plain area with Nanafalia, Tuscahoma, Bashi, Hatchetigbee, Tallahatta, Lisbon, and Glendon formations.

The minerals and rocks consist of Buhrstone (Tallahatta), Clay, Glauconitic Marl, Lignite, Limestone (soft), Marcasite, and Sand.

17. COLBERT County is underlain by Paleozoic rocks with Bangor, Hartselle, Gasper, and Tuscumbia formations. The hills in the southern and western parts of Colbert County are covered by Coastal Plain Tuscaloosa sediments.

The minerals and rocks consist of Asphaltic Limestone, Asphaltic sandstone, Bauxite, Brown Iron Ore, Chert, Clay, Dolomite, Gravel, Limestone, Ocher, Sand, Sandstone, and Shale.

18. CONECUH County is in the lower Coastal Plain area with Tuscahoma, Bashi, Hatchetigbee, Tallahatta, Lisbon, Ocala, Marianna, Glendon, Byram Marl, and Overlapping Citronelle formations.

The minerals and rocks consist of Buhrstone (Tallahatta), Limestone (soft), Marl, and Sand.

19. COOSA County lies wholly in the Crystalline Area.

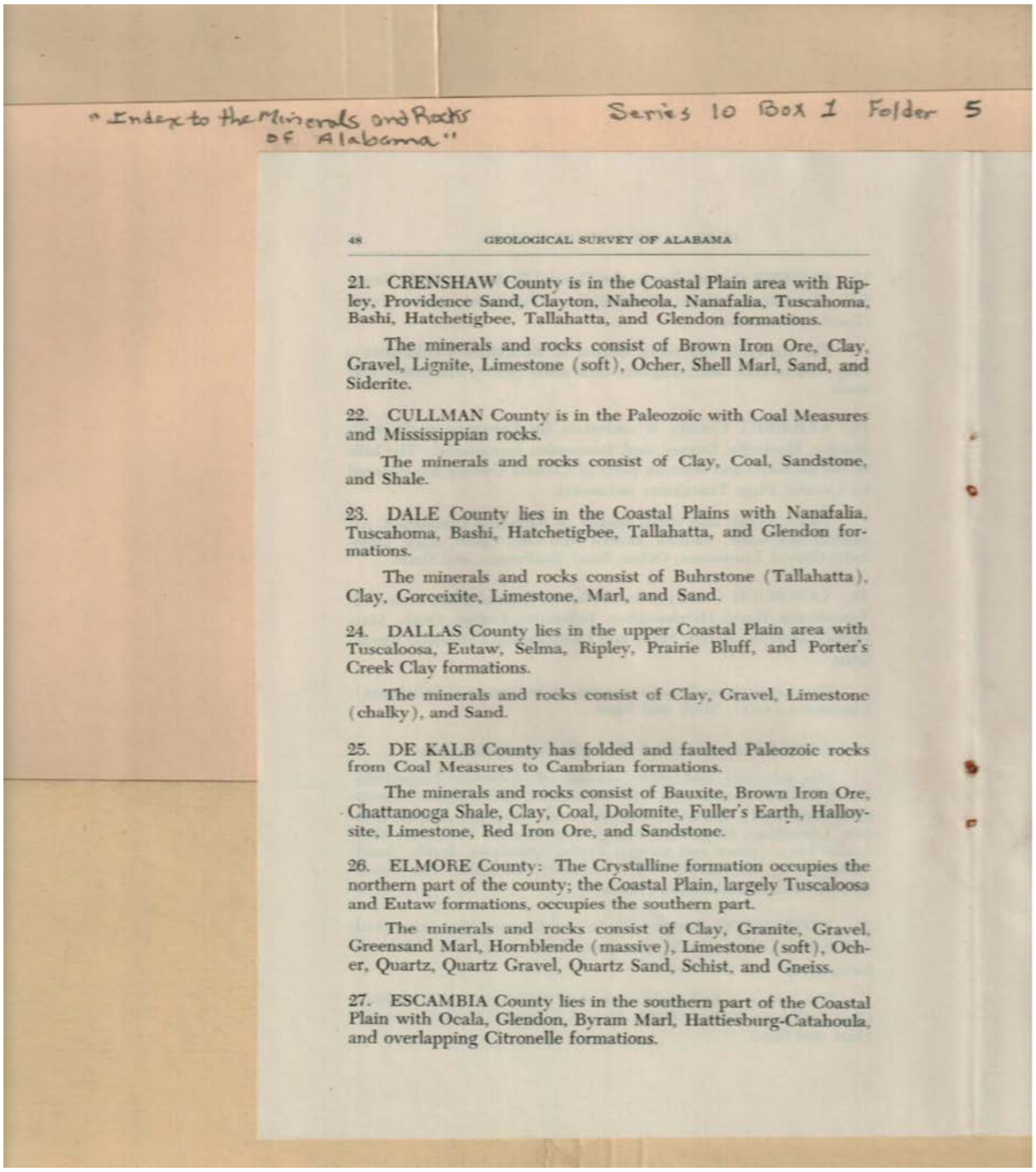
The minerals and rocks consist of Asbestos (reported), Beryl, Biotite, Brown Iron Ore, Cassiterite, Chlorapatite, Corundum (reported), Emerald, Garnet, Gold, Graphite, Kaolin, Kyanite, Limestone, Magnetite, Manganese, Marble, Monazite, Muscovite Mica (sheet and scrap), Pyrite, Quartzite, Rutile, Sandstone, Shale, Sillimanite, Slate, Staurolite, Tantalite, Tin, Uranium, Vanadium, and Zircon (Dana).

20. COVINGTON County lies in the Coastal Plain area with Tallahatta, Lisbon, Ocala, Glendon, Hattiesburg, and Catahoula formations.

The minerals and rocks consist of Buhrstone (Tallahatta), Clay, Dolomite, Fuller's Earth, Gravel, Lignite, Limestone (soft), Marl, and Sand.

Names:
Geological Outcrops
in Counties

Types:
bulletin



21. CRENSHAW County is in the Coastal Plain area with Ripley, Providence Sand, Clayton, Naheola, Nanafalia, Tuscahoma, Bashi, Hatchetigbee, Tallahatta, and Glendon formations.

The minerals and rocks consist of Brown Iron Ore, Clay, Gravel, Lignite, Limestone (soft), Ocher, Shell Marl, Sand, and Siderite.

22. CULLMAN County is in the Paleozoic with Coal Measures and Mississippian rocks.

The minerals and rocks consist of Clay, Coal, Sandstone, and Shale.

23. DALE County lies in the Coastal Plains with Nanafalia, Tuscahoma, Bashi, Hatchetigbee, Tallahatta, and Glendon formations.

The minerals and rocks consist of Buhrstone (Tallahatta), Clay, Gorceixite, Limestone, Marl, and Sand.

24. DALLAS County lies in the upper Coastal Plain area with Tuscaloosa, Eutaw, Selma, Ripley, Prairie Bluff, and Porter's Creek Clay formations.

The minerals and rocks consist of Clay, Gravel, Limestone (chalky), and Sand.

25. DE KALB County has folded and faulted Paleozoic rocks from Coal Measures to Cambrian formations.

The minerals and rocks consist of Bauxite, Brown Iron Ore, Chattanooga Shale, Clay, Coal, Dolomite, Fuller's Earth, Halloysite, Limestone, Red Iron Ore, and Sandstone.

26. ELMORE County: The Crystalline formation occupies the northern part of the county; the Coastal Plain, largely Tuscaloosa and Eutaw formations, occupies the southern part.

The minerals and rocks consist of Clay, Granite, Gravel, Greensand Marl, Hornblende (massive), Limestone (soft), Ocher, Quartz, Quartz Gravel, Quartz Sand, Schist, and Gneiss.

27. ESCAMBIA County lies in the southern part of the Coastal Plain with Ocala, Glendon, Byram Marl, Hattiesburg-Catahoula, and overlapping Citronelle formations.

Names:
Geological Outcrops
in Counties

Types:
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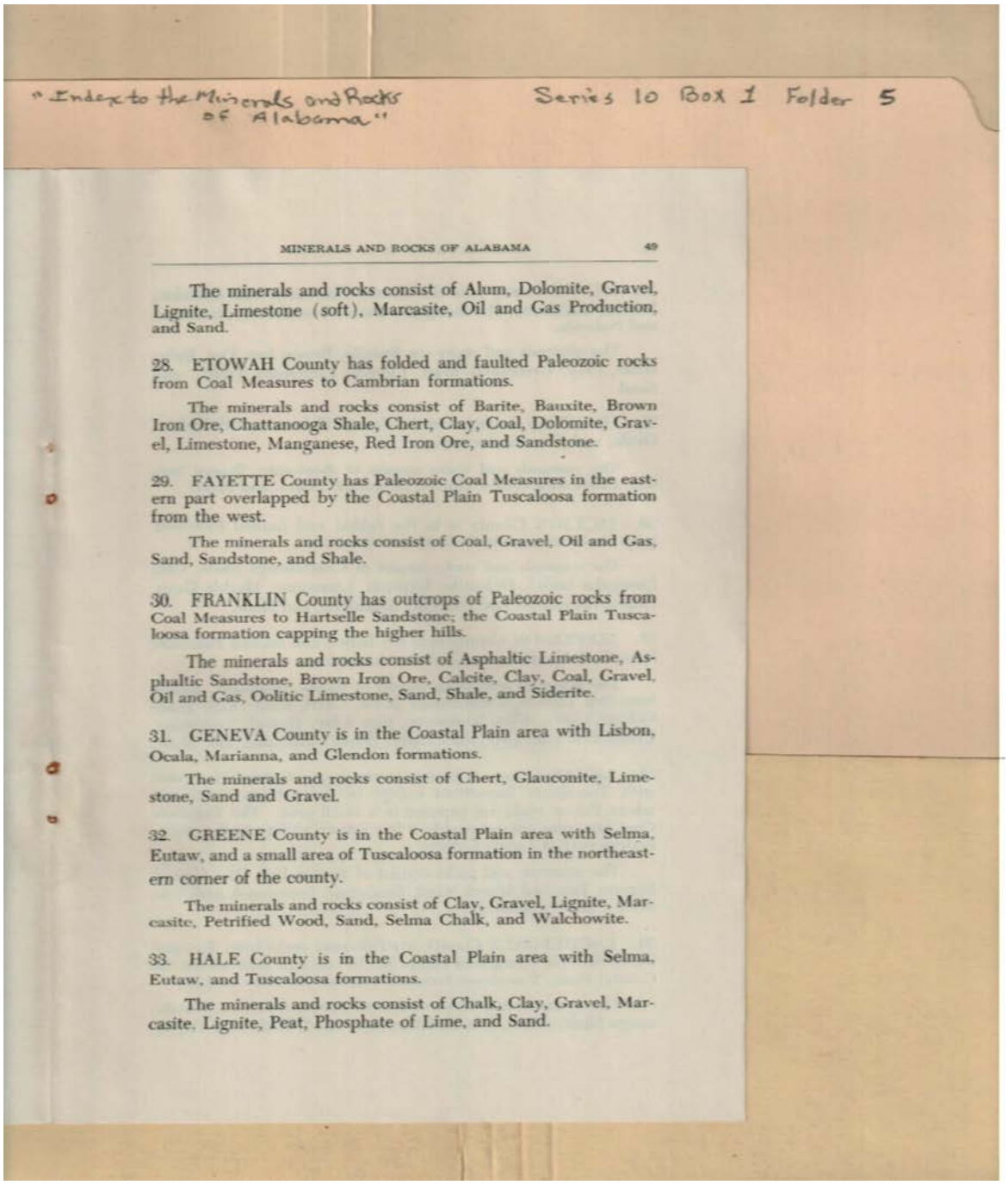

The minerals and rocks consist of Alum, Dolomite, Gravel, Lignite, Limestone (soft), Marcasite, Oil and Gas Production, and Sand.

28. ETOWAH County has folded and faulted Paleozoic rocks from Coal Measures to Cambrian formations.

The minerals and rocks consist of Barite, Bauxite, Brown Iron Ore, Chattanooga Shale, Chert, Clay, Coal, Dolomite, Gravel, Limestone, Manganese, Red Iron Ore, and Sandstone.

29. FAYETTE County has Paleozoic Coal Measures in the eastern part overlapped by the Coastal Plain Tuscaloosa formation from the west.

The minerals and rocks consist of Coal, Gravel, Oil and Gas, Sand, Sandstone, and Shale.

30. FRANKLIN County has outcrops of Paleozoic rocks from Coal Measures to Hartselle Sandstone; the Coastal Plain Tuscaloosa formation capping the higher hills.

The minerals and rocks consist of Asphaltic Limestone, Asphaltic Sandstone, Brown Iron Ore, Calcite, Clay, Coal, Gravel, Oil and Gas, Oolitic Limestone, Sand, Shale, and Siderite.

31. GENEVA County is in the Coastal Plain area with Lisbon, Ocala, Marianna, and Glendon formations.

The minerals and rocks consist of Chert, Glauconite, Limestone, Sand and Gravel.

32. GREENE County is in the Coastal Plain area with Selma, Eutaw, and a small area of Tuscaloosa formation in the northeastern corner of the county.

The minerals and rocks consist of Clay, Gravel, Lignite, Marcasite, Petrified Wood, Sand, Selma Chalk, and Walchowite.

33. HALE County is in the Coastal Plain area with Selma, Eutaw, and Tuscaloosa formations.

The minerals and rocks consist of Chalk, Clay, Gravel, Marcasite, Lignite, Peat, Phosphate of Lime, and Sand.

Names:
Geological Outcrops
in Counties

Types:
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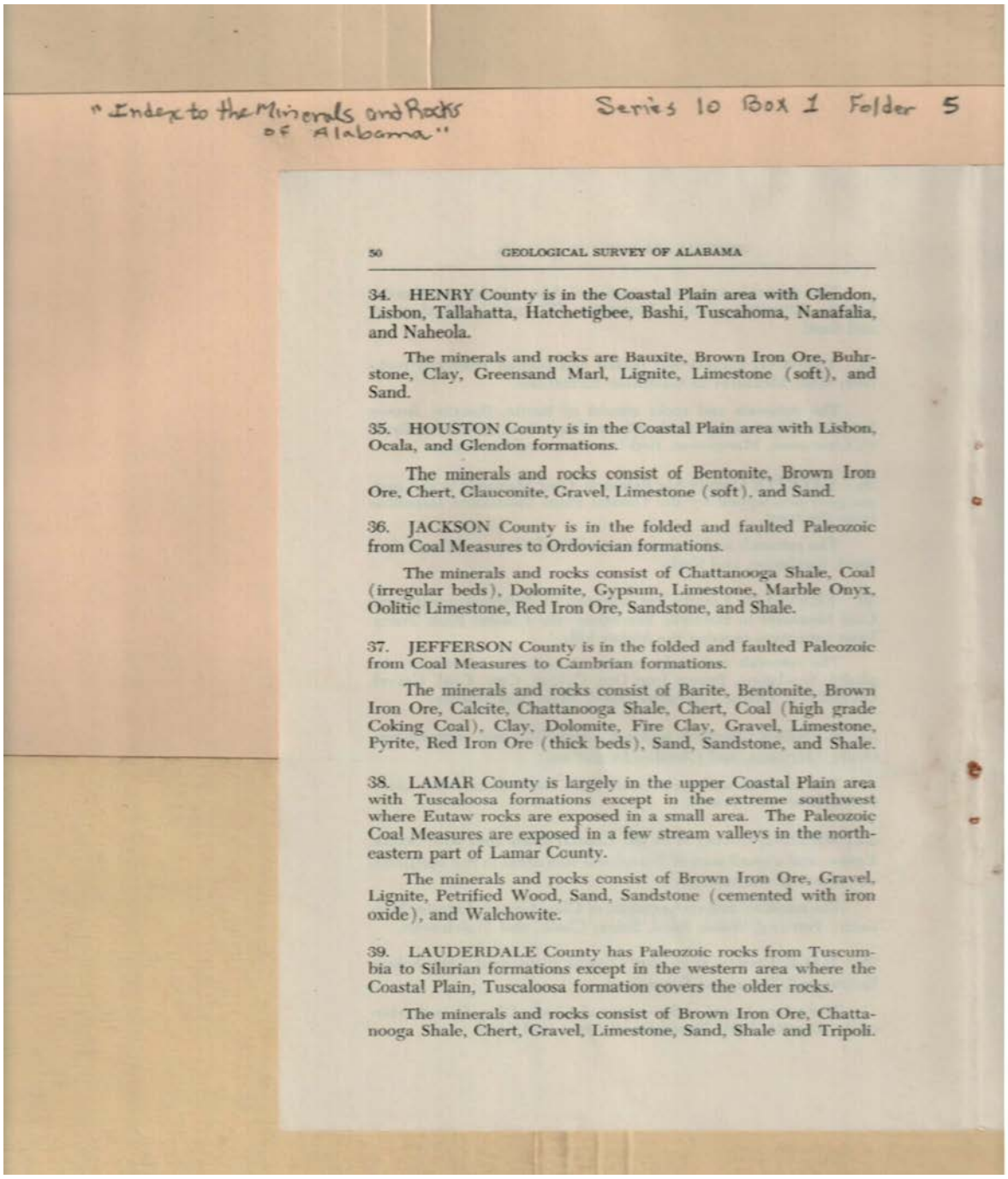

34. HENRY County is in the Coastal Plain area with Glendon, Lisbon, Tallahatta, Hatchetigbee, Bashi, Tuscahoma, Nanafalia, and Naheola.

The minerals and rocks are Bauxite, Brown Iron Ore, Buhrstone, Clay, Greensand Marl, Lignite, Limestone (soft), and Sand.

35. HOUSTON County is in the Coastal Plain area with Lisbon, Ocala, and Glendon formations.

The minerals and rocks consist of Bentonite, Brown Iron Ore, Chert, Glauconite, Gravel, Limestone (soft), and Sand.

36. JACKSON County is in the folded and faulted Paleozoic from Coal Measures to Ordovician formations.

The minerals and rocks consist of Chattanooga Shale, Coal (irregular beds), Dolomite, Gypsum, Limestone, Marble Onyx, Oolitic Limestone, Red Iron Ore, Sandstone, and Shale.

37. JEFFERSON County is in the folded and faulted Paleozoic from Coal Measures to Cambrian formations.

The minerals and rocks consist of Barite, Bentonite, Brown Iron Ore, Calcite, Chattanooga Shale, Chert, Coal (high grade Coking Coal), Clay, Dolomite, Fire Clay, Gravel, Limestone, Pyrite, Red Iron Ore (thick beds), Sand, Sandstone, and Shale.

38. LAMAR County is largely in the upper Coastal Plain area with Tuscaloosa formations except in the extreme southwest where Eutaw rocks are exposed in a small area. The Paleozoic Coal Measures are exposed in a few stream valleys in the northeastern part of Lamar County.

The minerals and rocks consist of Brown Iron Ore, Gravel, Lignite, Petrified Wood, Sand, Sandstone (cemented with iron oxide), and Walchowite.

39. LAUDERDALE County has Paleozoic rocks from Tuscumbia to Silurian formations except in the western area where the Coastal Plain, Tuscaloosa formation covers the older rocks.

The minerals and rocks consist of Brown Iron Ore, Chattanooga Shale, Chert, Gravel, Limestone, Sand, Shale and Tripoli.

Names:
Geological Outcrops
in Counties

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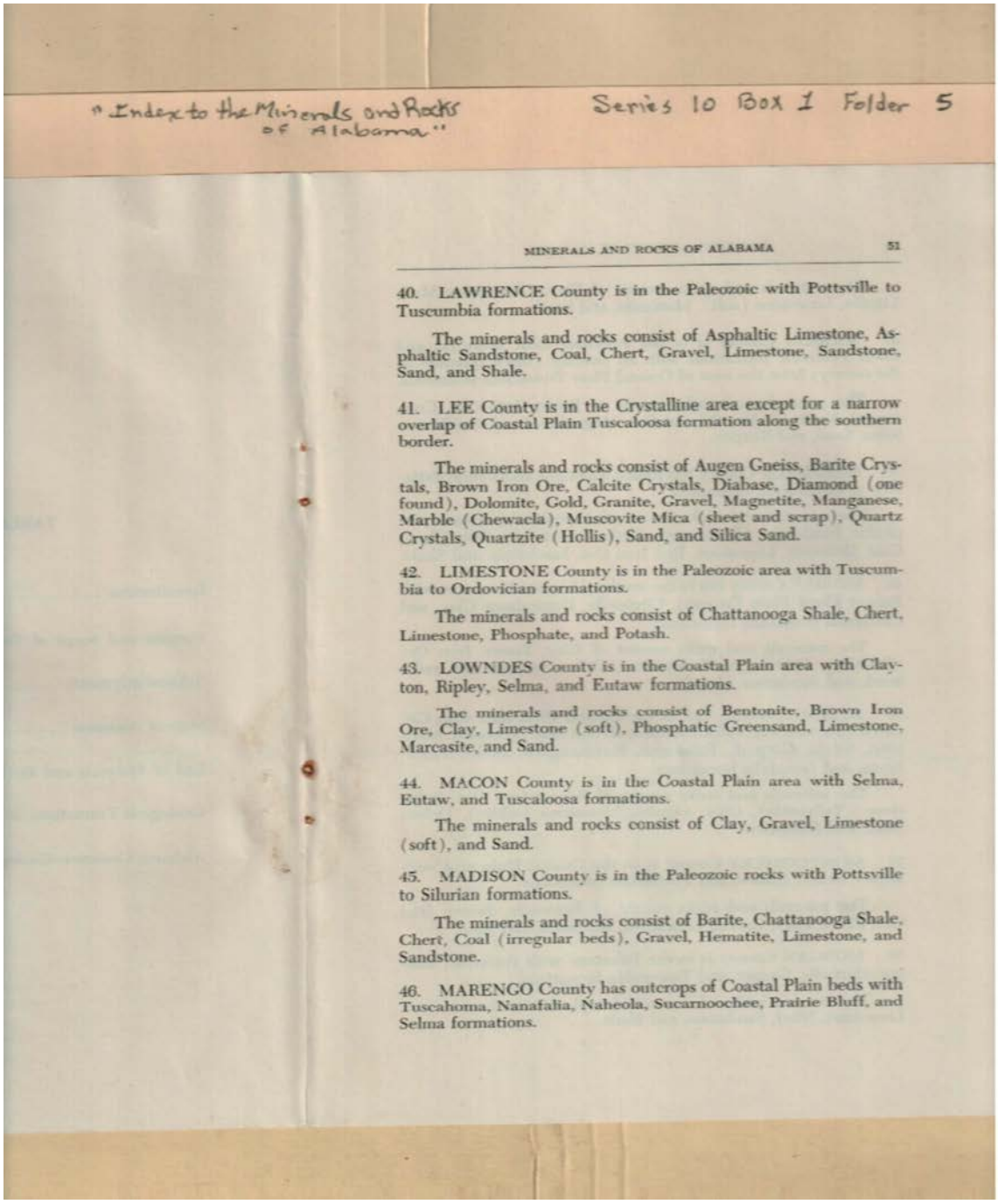

40. LAWRENCE County is in the Paleozoic with Pottsville to Tuscumbia formations.

The minerals and rocks consist of Asphaltic Limestone, Asphaltic Sandstone, Coal, Chert, Gravel, Limestone, Sandstone, Sand, and Shale.

41. LEE County is in the Crystalline area except for a narrow overlap of Coastal Plain Tuscaloosa formation along the southern border.

The minerals and rocks consist of Augen Gneiss, Barite Crystals, Brown Iron Ore, Calcite Crystals, Diabase, Diamond (one found), Dolomite, Gold, Granite, Gravel, Magnetite, Manganese, Marble (Chewacla), Muscovite Mica (sheet and scrap), Quartz Crystals, Quartzite (Hollis), Sand, and Silica Sand.

42. LIMESTONE County is in the Paleozoic area with Tuscumbia to Ordovician formations.

The minerals and rocks consist of Chattanooga Shale, Chert, Limestone, Phosphate, and Potash.

43. LOWNDES County is in the Coastal Plain area with Clayton, Ripley, Selma, and Eutaw formations.

The minerals and rocks consist of Bentonite, Brown Iron Ore, Clay, Limestone (soft), Phosphatic Greensand, Limestone, Marcasite, and Sand.

44. MACON County is in the Coastal Plain area with Selma, Eutaw, and Tuscaloosa formations.

The minerals and rocks consist of Clay, Gravel, Limestone (soft), and Sand.

45. MADISON County is in the Paleozoic rocks with Pottsville to Silurian formations.

The minerals and rocks consist of Barite, Chattanooga Shale, Chert, Coal (irregular beds), Gravel, Hematite, Limestone, and Sandstone.

46. MARENGO County has outcrops of Coastal Plain beds with Tuscahoma, Nanafalia, Naheola, Sucarnoochee, Prairie Bluff, and Selma formations.

Names:
Geological Outcrops
in Counties

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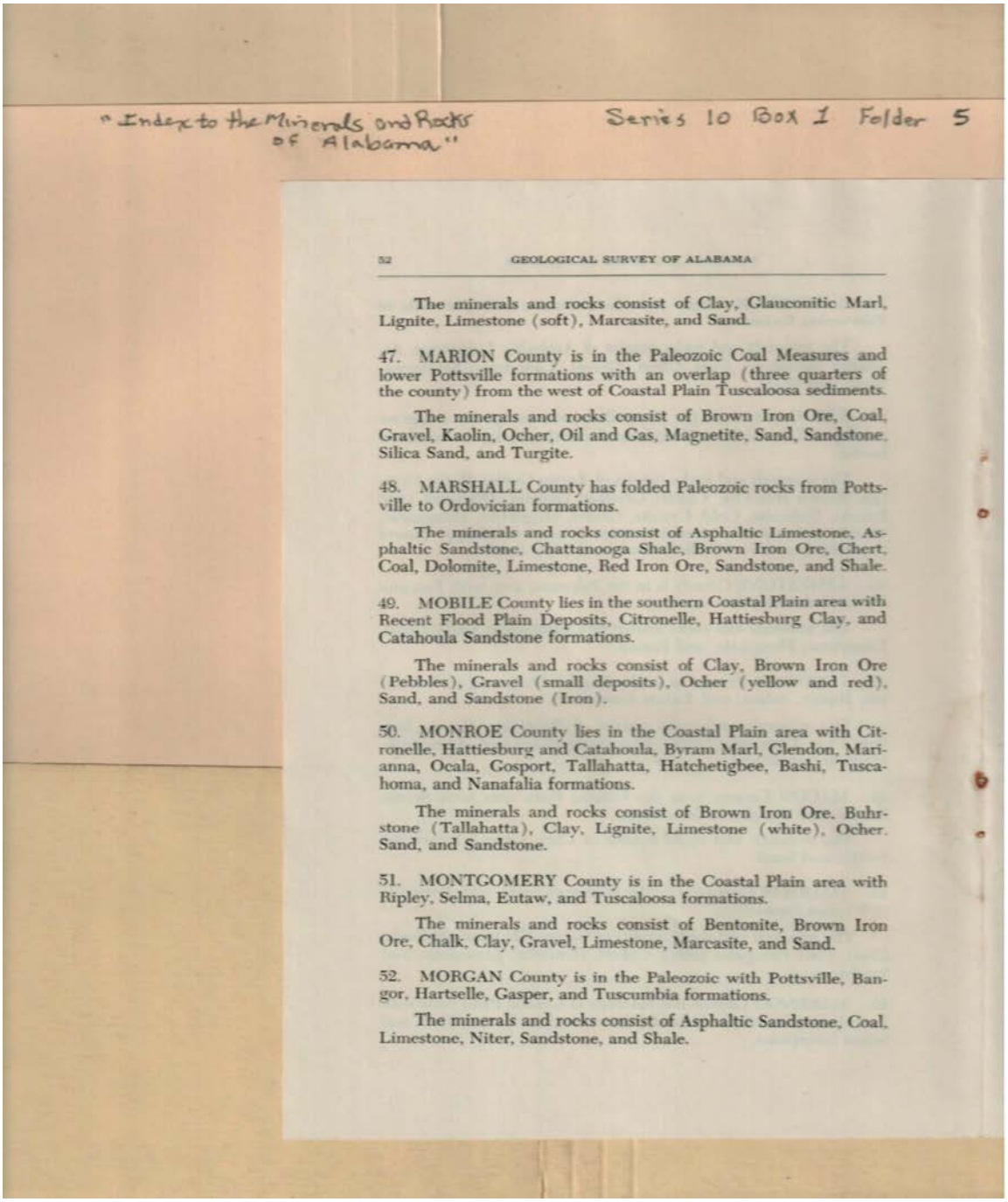

The minerals and rocks consist of Clay, Glauconitic Marl, Lignite, Limestone (soft), Marcasite, and Sand.

47. MARION County is in the Paleozoic Coal Measures and lower Pottsville formations with an overlap (three quarters of the county) from the west of Coastal Plain Tuscaloosa sediments.

The minerals and rocks consist of Brown Iron Ore, Coal, Gravel, Kaolin, Ocher, Oil and Gas, Magnetite, Sand, Sandstone, Silica Sand, and Turgite.

48. MARSHALL County has folded Paleozoic rocks from Pottsville to Ordovician formations.

The minerals and rocks consist of Asphaltic Limestone, Asphaltic Sandstone, Chattanooga Shale, Brown Iron Ore, Chert, Coal, Dolomite, Limestone, Red Iron Ore, Sandstone, and Shale.

49. MOBILE County lies in the southern Coastal Plain area with Recent Flood Plain Deposits, Citronelle, Hattiesburg Clay, and Catahoula Sandstone formations.

The minerals and rocks consist of Clay, Brown Iron Ore (Pebbles), Gravel (small deposits), Ocher (yellow and red), Sand, and Sandstone (Iron).

50. MONROE County lies in the Coastal Plain area with Citronelle, Hattiesburg and Catahoula, Byram Marl, Glendon, Marianna, Ocala, Gosport, Tallahatta, Hatchetigbee, Bashi, Tuscahoma, and Nanafalia formations.

The minerals and rocks consist of Brown Iron Ore, Buhrstone (Tallahatta), Clay, Lignite, Limestone (white), Ocher, Sand, and Sandstone.

51. MONTGOMERY County is in the Coastal Plain area with Ripley, Selma, Eutaw, and Tuscaloosa formations.

The minerals and rocks consist of Bentonite, Brown Iron Ore, Chalk, Clay, Gravel, Limestone, Marcasite, and Sand.

52. MORGAN County is in the Paleozoic with Pottsville, Bangor, Hartselle, Gasper, and Tuscumbia formations.

The minerals and rocks consist of Asphaltic Sandstone, Coal, Limestone, Niter, Sandstone, and Shale.

Names:
Geological Outcrops
in Counties

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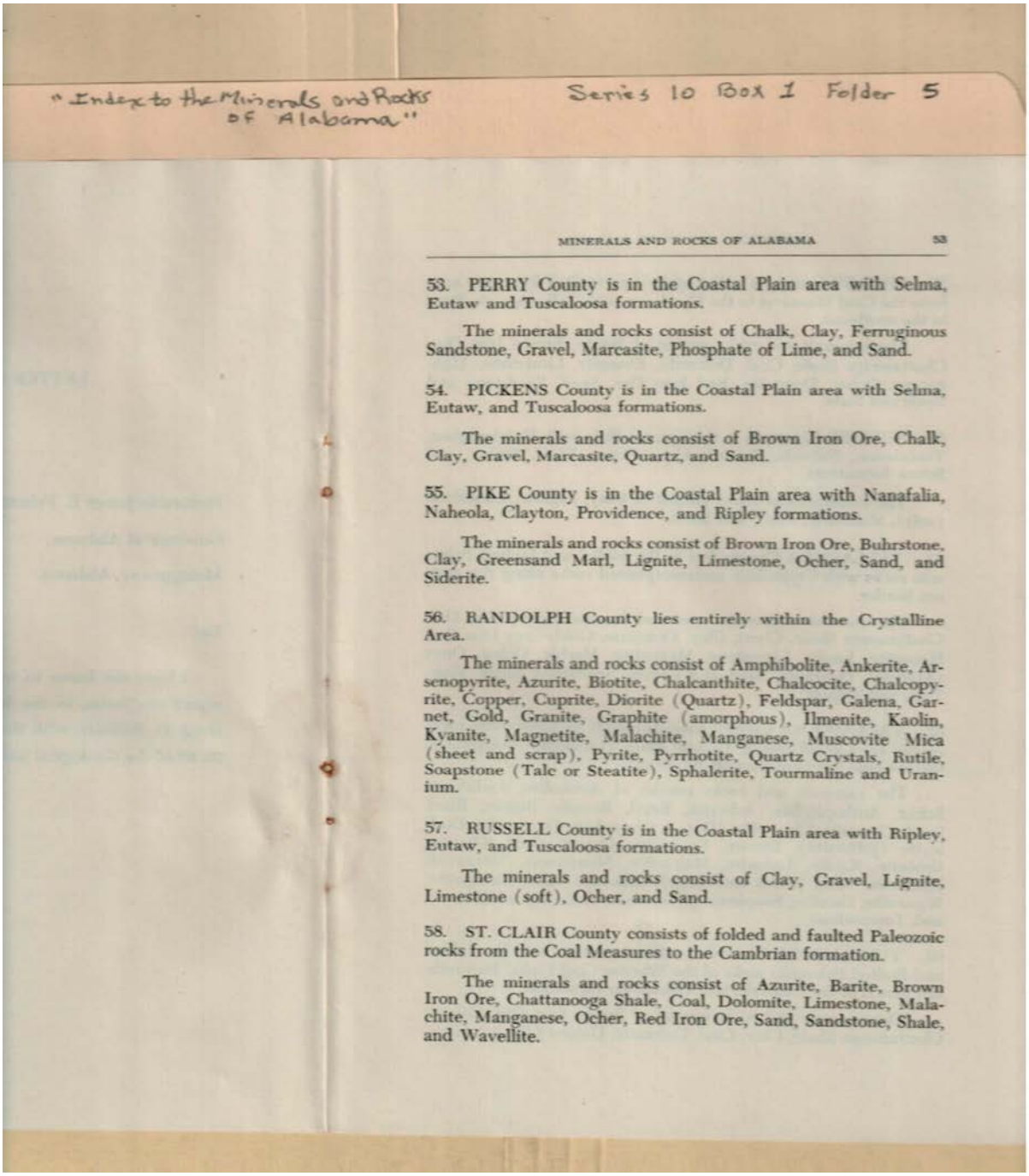

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53. PERRY County is in the Coastal Plain area with Selma, Eutaw and Tuscaloosa formations.

The minerals and rocks consist of Chalk, Clay, Ferruginous Sandstone, Gravel, Marcasite, Phosphate of Lime, and Sand.

54. PICKENS County is in the Coastal Plain area with Selma, Eutaw, and Tuscaloosa formations.

The minerals and rocks consist of Brown Iron Ore, Chalk, Clay, Gravel, Marcasite, Quartz, and Sand.

55. PIKE County is in the Coastal Plain area with Nanafalia, Naheola, Clayton, Providence, and Ripley formations.

The minerals and rocks consist of Brown Iron Ore, Buhrstone, Clay, Greensand Marl, Lignite, Limestone, Ocher, Sand, and Siderite.

56. RANDOLPH County lies entirely within the Crystalline Area.

The minerals and rocks consist of Amphibolite, Ankerite, Arsenopyrite, Azurite, Biotite, Chalcanthite, Chalcocite, Chalcopyrite, Copper, Cuprite, Diorite (Quartz), Feldspar, Galena, Garnet, Gold, Granite, Graphite (amorphous), Ilmenite, Kaolin, Kyanite, Magnetite, Malachite, Manganese, Muscovite Mica (sheet and scrap), Pyrite, Pyrrhotite, Quartz Crystals, Rutile, Soapstone (Talc or Steatite), Sphalerite, Tourmaline and Uranium.

57. RUSSELL County is in the Coastal Plain area with Ripley, Eutaw, and Tuscaloosa formations.

The minerals and rocks consist of Clay, Gravel, Lignite, Limestone (soft), Ocher, and Sand.

58. ST. CLAIR County consists of folded and faulted Paleozoic rocks from the Coal Measures to the Cambrian formation.

The minerals and rocks consist of Azurite, Barite, Brown Iron Ore, Chattanooga Shale, Coal, Dolomite, Limestone, Malachite, Manganese, Ocher, Red Iron Ore, Sand, Sandstone, Shale, and Wavellite.

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Geological Outcrops
in Counties

Types:
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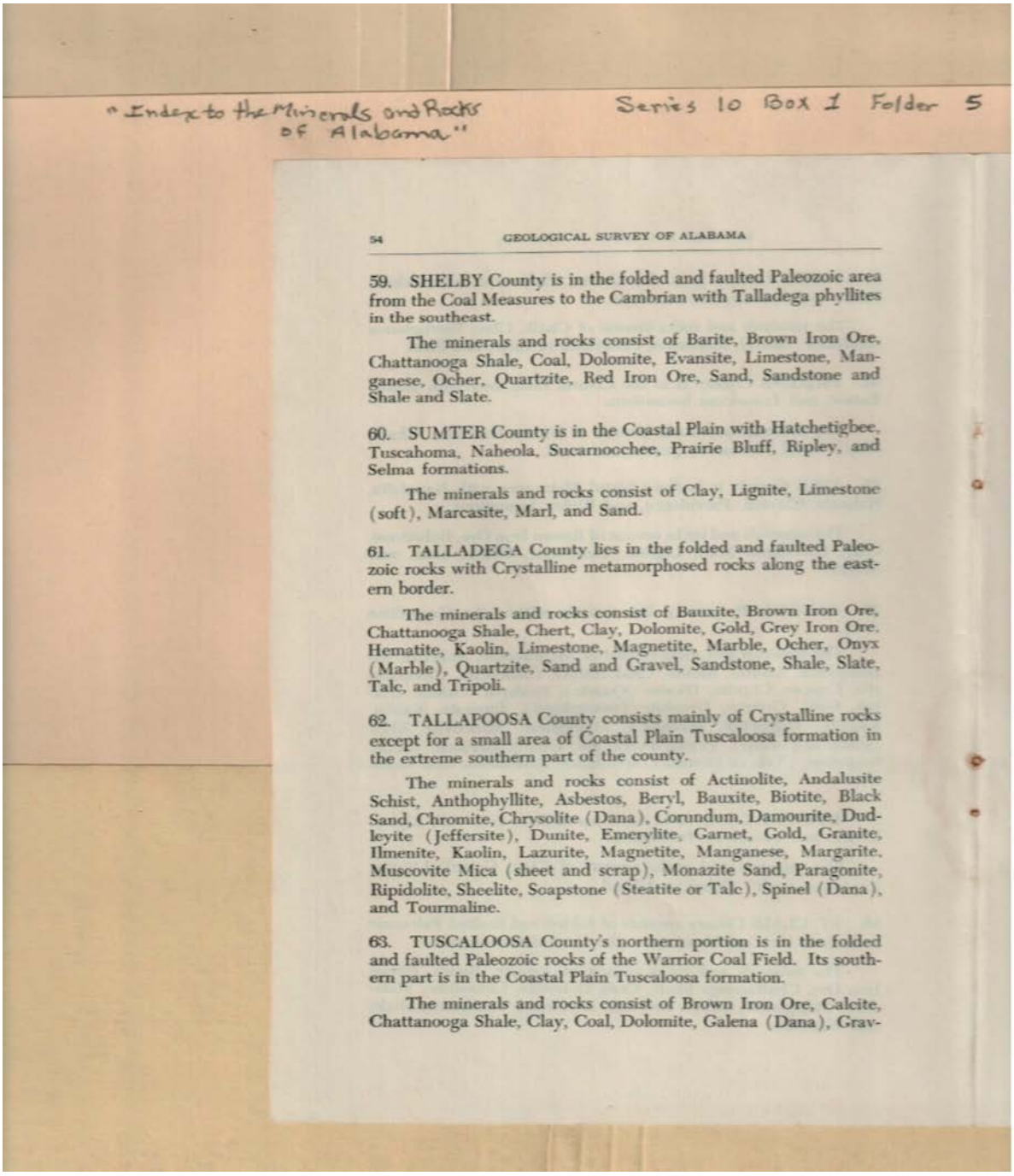

59. SHELBY County is in the folded and faulted Paleozoic area from the Coal Measures to the Cambrian with Talladega phyllites in the southeast.

The minerals and rocks consist of Barite, Brown Iron Ore, Chattanooga Shale, Coal, Dolomite, Evansite, Limestone, Manganese, Ocher, Quartzite, Red Iron Ore, Sand, Sandstone and Shale and Slate.

60. SUMTER County is in the Coastal Plain with Hatchetigbee, Tuscahoma, Naheola, Sucarnoochee, Prairie Bluff, Ripley, and Selma formations.

The minerals and rocks consist of Clay, Lignite, Limestone (soft), Marcasite, Marl, and Sand.

61. TALLADEGA County lies in the folded and faulted Paleozoic rocks with Crystalline metamorphosed rocks along the eastern border.

The minerals and rocks consist of Bauxite, Brown Iron Ore, Chattanooga Shale, Chert, Clay, Dolomite, Gold, Grey Iron Ore, Hematite, Kaolin, Limestone, Magnetite, Marble, Ocher, Onyx (Marble), Quartzite, Sand and Gravel, Sandstone, Shale, Slate, Talc, and Tripoli.

62. TALLAPOOSA County consists mainly of Crystalline rocks except for a small area of Coastal Plain Tuscaloosa formation in the extreme southern part of the county.

The minerals and rocks consist of Actinolite, Andalusite Schist, Anthophyllite, Asbestos, Beryl, Bauxite, Biotite, Black Sand, Chromite, Chrysolite (Dana), Corundum, Damourite, Dudleyite (Jeffersite), Dunite, Emerylite, Garnet, Gold, Granite, Ilmenite, Kaolin, Lazurite, Magnetite, Manganese, Margarite, Muscovite Mica (sheet and scrap), Monazite Sand, Paragonite, Ripidolite, Sheelite, Soapstone (Steatite or Talc), Spinel (Dana), and Tourmaline.

63. TUSCALOOSA County's northern portion is in the folded and faulted Paleozoic rocks of the Warrior Coal Field. Its southern part is in the Coastal Plain Tuscaloosa formation.

The minerals and rocks consist of Brown Iron Ore, Calcite, Chattanooga Shale, Clay, Coal, Dolomite, Galena (Dana), Grav-

Names:
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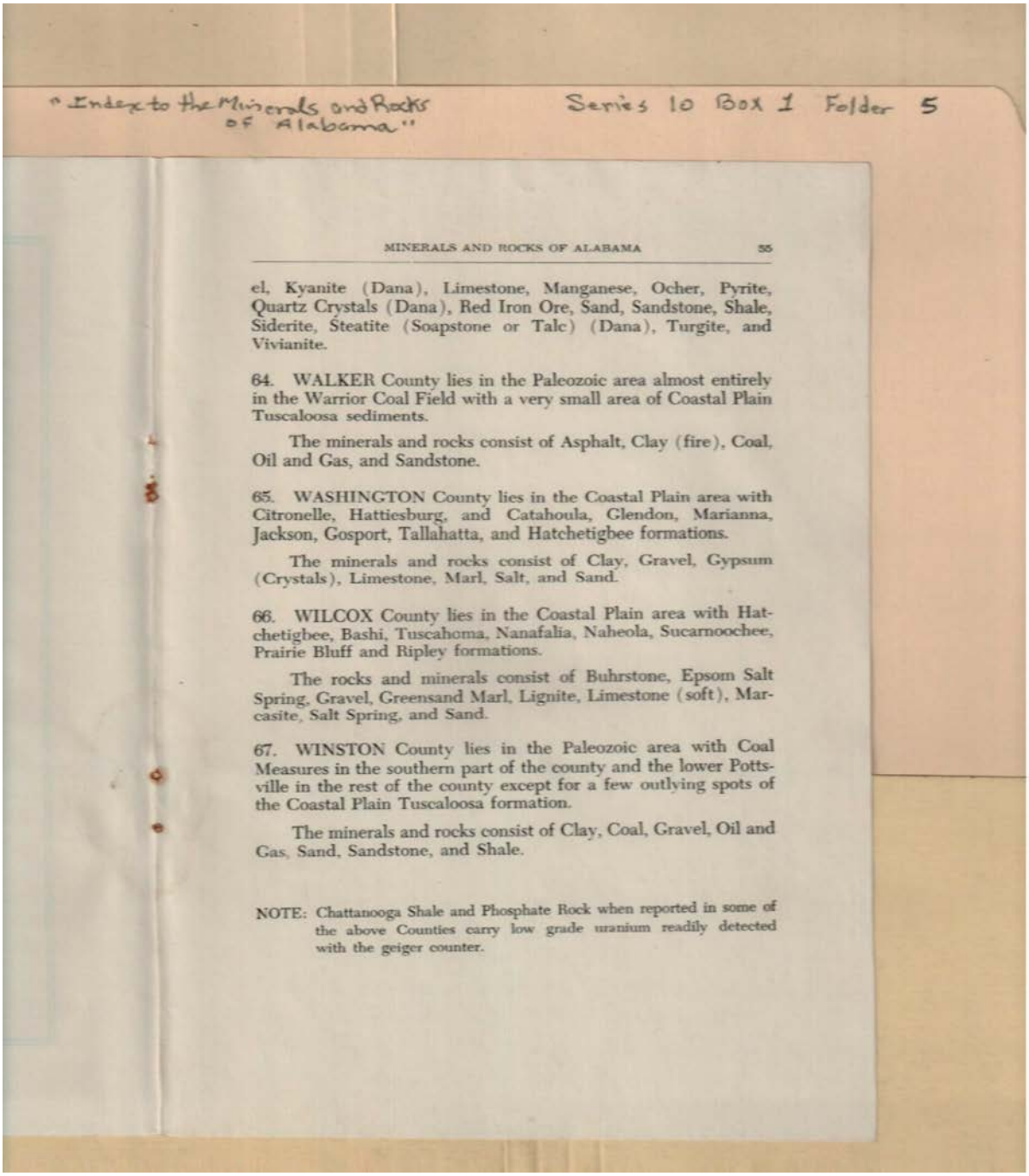

el, Kyanite (Dana), Limestone, Manganese, Ocher, Pyrite, Quartz Crystals (Dana), Red Iron Ore, Sand, Sandstone, Shale, Siderite, Steatite (Soapstone or Talc) (Dana), Turgite, and Vivianite.

64. WALKER County lies in the Paleozoic area almost entirely in the Warrior Coal Field with a very small area of Coastal Plain Tuscaloosa sediments.

The minerals and rocks consist of Asphalt, Clay (fire), Coal, Oil and Gas, and Sandstone.

65. WASHINGTON County lies in the Coastal Plain area with Citronelle, Hattiesburg, and Catahoula, Glendon, Marianna, Jackson, Gosport, Tallahatta, and Hatchetigbee formations.

The minerals and rocks consist of Clay, Gravel, Gypsum (Crystals), Limestone, Marl, Salt, and Sand.

66. WILCOX County lies in the Coastal Plain area with Hatchetigbee, Bashi, Tuscahoma, Nanafalia, Naheola, Sucarnoochee, Prairie Bluff and Ripley formations.

The rocks and minerals consist of Buhrstone, Epsom Salt Spring, Gravel, Greensand Marl, Lignite, Limestone (soft), Marcasite, Salt Spring, and Sand.

67. WINSTON County lies in the Paleozoic area with Coal Measures in the southern part of the county and the lower Pottsville in the rest of the county except for a few outlying spots of the Coastal Plain Tuscaloosa formation.

The minerals and rocks consist of Clay, Coal, Gravel, Oil and Gas, Sand, Sandstone, and Shale.

NOTE: Chattanooga Shale and Phosphate Rock when reported in some of the above Counties carry low grade uranium readily detected with the geiger counter.

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in Counties

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bulletin

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Frances Cabaniss Roberts Collection

Preferred Citation: Frances Cabaniss Roberts Collection, Archives and Special Collections, M. Louis Salmon Library, University of Alabama in Huntsville, Huntsville, AL.

Collection Scope and Content: The Collection of 114 Linear ft. includes a total of 156 Archival Boxes. The Frances Cabaniss Roberts collection covers the historical records of the Cabaniss Roberts family. This collection contains extensive correspondence records of the Cabaniss Roberts family circa 1830 to 1930.

Archives/Special Collections Access Restrictions: None

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