

# 210 a  
Ekblaw

see RE 129  
or Jour. Geol. vol. 56, no. 1  
1948

State of Illinois  
Department of Registration and Education  
Geological Survey Division  
Urbana

MINERAL RESOURCE  
RECORDS DIVISION  
Ekblaw, G. E.  
Ms. 210 a copy 2  
ILLINOIS STATE  
GEOLOGICAL SURVEY

PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

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1945

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## Chicago Lake Plain

### Location and Extent

Underlies Chicago and its environs. Nearly 50 miles long and 13 miles wide maximum.

### Topography and Drainage

1. Almost flat.
2. Streams few and of low gradient.
3. Natural surface drainage; poor; originally swampy.

### Geology

1. An old glacial lake plain of Wisconsin age with several low beach ridges.
2. Much of the lake plain is underlain by silt or silty clay overlying Silurian dolomite; the beach ridges are composed mainly of sand; in a few tracts the Silurian dolomite occurs at or near the surface.
3. The glacial deposits, most of which are Wisconsin in age, and include the old lake sediments which are thin, range in thickness from 0 to 150 feet and the Silurian dolomite extends down to depths ranging from 130 to 450 feet.
4. Permeability of soil and subsoil is rapid (State Soil Survey classification).

### Geological Resources

1. Extensive deposits of nonrefractory clay for common brick.
2. Large quantities of dolomite for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, metallurgical dolomite, etc.
3. Sand and fine-grained gravel in limited quantities.

4. Deposits of peat and muck.

5. Ground water in the glacial deposits and in the Silurian dolomite is dependent on local rainfall and surface waters. Below the Silurian dolomite there are important aquifers but their water content is derived principally from rainfall in Wisconsin where these lower formations come to the surface.

### Kankakee Plain

#### Location and Extent

1. Includes most of Grundy, Kankakee, and Iroquois and parts of adjacent counties. Approximately 80 miles long and 55 miles wide maximum (in Illinois).

#### Topography and Drainage

1. Relatively level or gently undulatory with occasional hill or ridge, usually low but some up to 100 feet high.

2. Relatively complete system of stream drainage, but drainage lines are mostly shallow and with low gradients; some artificial drainage ditches. From Kankakee to Ritchie Kankakee River is in narrow rock-walled valley as much as 100 feet deep.

3. Natural surface drainage poor; much of area originally was swampy.

#### Geology

1. Most of area was once covered by glacial waters, separated by glacial ridges.

2. The old lake area is underlain by clay, silt, and sand; dunes and ridges of sand are prevalent, especially in Kankakee Valley.

3. Bedrock is at or near the surface in all of the area except in Iroquois County; in Kankakee County the surficial bedrock is Silurian dolomite, 100 to more feet thick; in the rest of the area it consists of shale, sandstone, limestone, coal,

and underclay belonging to the Pennsylvanian ("Coal Measures") system, of dolomite belonging to the Joliet, Kankakee, and Edgewood formations of the Silurian system, and of shale, dolomite, and limestone belonging to the Maquoketa formation and of dolomite belonging to the Galena formation of the Ordovician system.

4. The glacial deposits, most of which are Wisconsin in age, range in thickness from 0 to 300 feet.

5. Permeability of soil and subsoil is generally rapid or moderate, but in some small areas it is variable to slow, especially on sloping ground (State Soil Survey classification).

#### Geological Resources

1. Large quantities of dolomite for agstone, concrete aggregate, railroad ballast, road metal, building stone, lime, metallurgical dolomite, etc.

2. Large quantities of sand and gravel, especially along Kankakee, Des Plaines, and Illinois rivers.

3. Deposits of natural-bonded molding-sand.

4. Extensive deposits of coal in Grundy, Livingston, southwestern Will, and western Kankakee counties; formerly mined underground but now producing principally from strip-mines in places.

5. Shale and clay, for structural clay products, refractories, bonding clays, and other special uses.

6. Groundwater in the glacial deposits and in the surficial bedrock aquifers, principally dolomites, is dependent on local rainfall and surface waters; in deeper aquifers it is not, being derived from the rainfall in distant areas where the formations are exposed.

## Bloomington Ridged Plain

### Location and Extent

A roughly semicircular area comprising most of the northeastern third of the state, bordered in part on the east by the Chicago Lake Plaine and the Kankakee Plain. Extends west to Peoria and south to Shelbyville. Approximately 220 miles long and 135 miles wide maximum (in Illinois).

### Topography and Drainage

1. The area is comprised of a number of more or less concentric knolly morainic ridges with intervening swell-and-swale or level plains.
2. Relatively complete system of stream drainage in most of the area but lakes, marshes, bogs, and undrained depressions are abundant in the north part, less common elsewhere. The principal streams are graded and have floodplains bordered by sand and gravel terraces. Illinois River has a broad, flat-bottomed valley with steep walls, with gradient lower below Hennepin than above, but its smaller tributaries generally have deep, relatively narrow, steep-walled valleys and relatively steep gradients.
3. Natural surface drainage is generally good, except in lake region in north part of area and local undrained depressions elsewhere.

### Geology

1. Area is generally underlain by glacial deposits, the youngest of which are Wisconsin in age and all of which consist of stony, pebbly, silty clay, silt, sand, and gravel with a maximum thickness of about 550 feet. Bedrock is exposed or lies near the surface generally only along principal stream valleys. Surficial mantle of loess ranges from 0 to 12 feet in thickness, being absent or scanty in the extreme northeastern part.

2. Exposed bedrock along and north of Upper Illinois Valley consists principally of the Port Byron, Racine, Waukesha, Joliet, Kankakee, and Edgewood dolomite formations, belonging to the Silurian system and the Maquoketa shale and dolomite, the Galena, Platteville, and Shakopee dolomites, and the Glenwood, St. Peter, and New Richmond sandstones belonging to the Ordovician system, with an aggregate thickness of about 2400 feet. South and in a small area north of Illinois Valley the uppermost bedrock consists principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system, with a maximum thickness of 1600 feet.

3. Permeability of soil and subsoil is generally moderate but in some local areas it is rapid and in others it is variable on level ground and slow on sloping ground (State Soil Survey classification).

#### Geological Resources

1. Large and extensive deposits of dolomite and limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, metallurgical dolomite, Portland and hydraulic cements, etc.

2. Large and extensive deposits of sand and gravel.

3. Large deposits of silica sand (sandstone) for glass, steel molding-sand, abrasives, sodium silicate, ground silica, etc.

4. Shale and clay for structural clay products, refractories, bonding clay, and other special uses.

5. Deposits of natural-bonded molding-sand.

6. Deposits of peat, muck, and marl.

7. Several extensive coal-beds of minable thickness, producing from both underground and strip mines.

8. Small amounts of oil and gas are obtained from the bedrock formations in the south part of the area; small amounts of gas are also obtained from the glacial deposits throughout the area.

9. Groundwater in the glacial deposits and in the surficial bedrock aquifers, principally dolomites, is dependent on local rainfall and surface waters; in the deeper fresh-water aquifers it is mostly not, being derived mainly from rainfall in distant areas where the formations are exposed. In the south part of the area the groundwater in most of the bedrock aquifers is highly mineralized.

### Green River Lowland

#### Location and Extent

A small area lying principally along Green River in northwestern Illinois. About 80 miles long and 30 miles wide maximum.

#### Topography and Drainage

1. Generally relatively level and low-lying with dunes and sand ridges promiscuously distributed.
2. Streams few and generally of low gradient; many artificial drainage ditches.
3. Natural surface drainage mostly poor; originally mostly swampy.

#### Geology

1. Mostly a glacial outwash plain of Wisconsin age, with old dunes and sand ridges.
2. Surficial materials almost entirely sand and pebbly sand, except some peaty deposits in bogs; in a few tracts along Rock and Green rivers Silurian and Ordovician

dolomites are at or near the surface, and in a limited area in Henry and Bureau counties south of Green River strata belonging to the Pennsylvanian ("Coal Measures") system are also near the surface.

3. Glacial deposits, the youngest of which are Wisconsin in age, are 0 to 300 feet thick; Silurian dolomite extends down to depths of as much as 160 feet.

4. Permeability of soil and subsoil is mostly rapid, locally moderate (State Soil Survey classification).

### Geological Resources

1. Extensive deposits of sand and fine-grained gravel.

2. Deposits of natural-bonded molding-sand.

3. Limited deposits of dolomite for agstone, concrete aggregate, railroad ballast, road metal, building stone, etc.

4. Limited deposits of peat and muck.

5. Limited deposits of shale and clay for structural clay products.

6. Coal beds of limited extent, producing mainly from strip mines.

7. Groundwater in the glacial deposits and in the surficial bedrock aquifers, principally dolomites, is dependent on local rainfall and surface waters; in the deeper aquifers it is not, being derived from the rainfall in distant areas where the formations are exposed.

### Rock River Hill Country

#### Location and extent

Comprises most of northwestern Illinois, exclusive of the Dubuque Hill Country



in northwest corner. Approximately 65 miles north-south and 90 miles east-west maximum (in Illinois).

### Topography and Drainage

1. Generally moderately rugged; some upland tracts more or less undulatory.

Meradosia Valley transects southwestern extension.

2. Well developed drainage systems; principal streams generally flow in broad, flat-bottomed, terraced valleys with relatively steep walls, the most notable exceptions being the constricted portion of Rock River Valley from below Rockford to below Dixon: minor stream valleys are generally narrow and V-shaped.

3. Surface drainage generally rapid; some underground drainage locally, where dolomite bedrock near the surface is creviced; sinkholes occur locally.

### Geology

1. Bedrock generally at or near surface, mantled by glacial drift.

2. Glacial drift consists of stony clay, clayey silt, and gravel, generally less than 30 feet thick but as much as 300 feet thick in buried pre-glacial valleys; surficial mantle of loess 0 to more than 25 feet, thickest near Mississippi River. Most of the area is underlain by drift of Illinoian age, but the drift in some of the eastern portion and most of the loess are of Wisconsin age.

3. Exposed bedrock consists of relatively thick dolomite, sandstone, and shale formations in continuous succession from the Franconia formation of the Cambrian system up to the Port Byron formation of the Silurian system, with some scattered deposits of sandstone belonging to the Pennsylvanian system; aggregate thickness about 2800 feet.

4. 4. Permeability of soil and subsoil rapid or moderate (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of dolomite and limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, metallurgical dolomite, Portland cement, etc.
2. Large and extensive deposits of sand and gravel.
3. Large deposits of silica sand (sandstone) for glass, steel molding-sand, ground silica, abrasives, etc.
4. Clay and shale for structural clay products.
5. Deposits of natural-bonded molding-sand.
6. Deposits of peat and muck.
7. Groundwater in the glacial deposits and in the surficial bedrock aquifers is dependent on local rainfall and surface waters; in the deeper aquifers it is not, being derived principally from the rainfall in distant areas where the formations are exposed.

### Dubuque Hill Country

#### Location and Extent

A small area in northwest corner of State, about 50 miles long and 25 miles wide maximum (in Illinois)

#### Topography and Drainage

1. Generally rugged; local relief commonly 300-400 feet; high divides and deep

valleys alternating; some rock prominences cap the divides. Includes the highest point in the State, Charles Mound, 1241 feet above sea-level.

2. Well developed dendritic drainage systems; most stream valleys narrow and V-shaped; Mississippi River Valley broad, flat-bottomed, terraced, with precipitous walls.

3. Natural surface drainage rapid; considerable underground drainage, causing underground channels, numerous springs, small caves, and sinkholes. Flash floods common in the hill country.

### Geology

1. A non-glaciated or lightly glaciated area of bedrock, mantled by loess.

2. Exposed bedrock comprises Port Byron, Racine, Waukesha, Joliet, Kankakee, and Edgewood dolomite formations belonging to the Silurian system and the Maquoketa shale and the Galena dolomite formations belonging to the Ordovician system; aggregate thickness about 1000 feet.

3. Loess mantle, of Wisconsin age, ranges in thickness from 10 to more than 25 feet, thickest along the Mississippi River valley. The latter valley is filled with silt sand, and gravel outwash as much as 250 feet thick, the upper portion of which is Wisconsin in age. Many of the smaller valleys contain rubble from bedrock formations.

4. Permeability of soil and subsoil rapid to moderate (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of dolomite and limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, metallurgical dolomite, etc.

2. Deposits of sand and fine-grained gravel.
3. Clay and shale for structural molding sand.
4. Deposits of natural-bonded molding sand.
5. Zinc and lead ore, and pyrites for sulfuric acid.

6. Groundwater in surficial deposits and in the surficial bedrock aquifers is dependent on local rainfall and surface waters; in the deeper aquifers it is not, being derived principally from the rainfall in distant areas where the formations are exposed.

### Galesburg Upland Plain

#### Location and Extent

Includes nearly all of western Illinois south of Rock Island and west of Illinois River. Approximately 150 miles long and 100 miles wide maximum (in Illinois).

#### Topography and Drainage

1. Generally a level or gently undulatory upland plain, with a few low ridges; stream valleys incised in plain to depths of 200 feet. As compared with the Springfield-Salem Plain, to the southeast, this area is higher and has better developed drainage, deeper valleys, and higher gradient streams.

2. Drainage systems well developed. Principal streams have broad, flat-bottomed, terraced valleys with steep walls and low gradients; in places notably constricted, Minor streams have narrow V-shaped valleys and steep gradients.

3. Natural surface drainage good, except on some parts of broad flat uplands. Some valleys occasionally have flash floods.

## Geology

1. Area is underlain by glacial drift, consisting principally of stony clay with considerable gravel locally, mantled by loess; principal valleys are partly filled with glacial outwash, consisting of silt, sand, and gravel; also recent rubble along some stream beds.

2. Bedrock is exposed along most of the smaller valleys and along the sides of the major valleys. Consists of limestone and shale formations of considerable thickness belonging to the Lower Mississippian series with some Silurian dolomite and Devonian limestone in Rock Island region, all overlain by thin shale, sandstone, limestone, coal, and underlay formations belonging to the Pennsylvanian ("Coal Measures") system, except in the western part of the area.

3. Glacial deposits are 0 to 250 feet thick; thickness of loess ranges from 5 to more than 25 feet; aggregate thickness of exposed bedrock formations about 1100 feet. Over most of the area the uppermost drift is of Illinoian age and most of the loess deposits and most of the valley train gravels are of Wisconsin age.

4. Permeability of soil and subsoil is generally moderate, but in the valley-bottoms along Mississippi and Illinois rivers it is rapid and in the southwest part of the area it is slow on level ground (State Soil Survey classification).

## Geological Resources

1. Large deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, rock wool, whiting, etc.

2. Large deposits of sand and gravel.

3. Clay and shale for structural clay products, refractories, foundry clay, pottery, and other special uses.

4. Deposits of natural-bonded molding-sand.

5. Several extensive coal-beds of variable thickness, producing from both underground and strip mines.

6. Commercial quantities of oil and gas have been produced from the bedrock formations in limited areas.

7. Groundwater in the glacial deposits and in the surficial bedrock aquifers, principally limestones, is dependent on local rainfall and surface waters; in the deeper fresh-water aquifers it is not, being derived from the rainfall in distant areas where the formations are exposed. The groundwater in the deeper bedrock aquifers is highly mineralized, becoming increasingly so from north to south.

### Calhoun County Hill Country

#### Location and Extent

Includes Calhoun, most of Pike, and parts of adjacent counties in southwestern Illinois. Approximately 80 miles long and 20 miles wide.

#### Topography and Drainage

1. Generally rugged; dominantly alternating ridges and valleys; crossed by the broad trough of Illinois River.

2. Well developed drainage systems; most minor streams have narrow V-shaped valleys and steep gradients; valleys of Mississippi and Illinois rivers are broad, flat-bottomed, and terraced, with precipitous walls, and the rivers have very low gradients.

3. Natural surface drainage good; some underground channels and some local sinkholes.

## Geology

1. Mostly a non-glaciated or old glaciated area, mantled by loess.
2. Exposed bedrock consists principally of limestone, dolomite, sandstone, and shale formations ranging in age from the St. Peter sandstone of the Ordovician system to the Warsaw-Salem formation of the Lower Mississippian series; in south end of Calhoun County, south of the Cap-au-Gres flexure, there are thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system. Aggregate thickness of exposed bedrock formations is about 1800 feet.
3. Loess mantle, mostly of Wisconsin age, ranges from 12 to 25 feet in thickness; Mississippi and Illinois river valleys are filled with silt, sand, and gravel outwash about 150 feet thick; the upper part of which is Wisconsin in age.
4. Permeability of soil and subsoil rapid to moderate (State Soil Survey Classification).

## Geological Resources

1. Large deposits of limestone and dolomite for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, etc.
2. Deposits of sand and gravel.
3. Silica sand (sandstone).
4. Shale and clay for structural clay products, refractories, foundry clay, etc.
5. Coal-beds of variable thickness occur only in the south end of Calhoun County
6. Commercial quantities of oil and gas have been produced from the bedrock formations in limited areas.

7. Groundwater in surficial deposits and in the surficial bedrock aquifers is dependent on local rainfall and surface waters; in the deeper aquifers it is highly mineralized.

### Springfield-Salem Plain

#### Location and Extent

Includes most of south-central Illinois lying between Illinois River on the west, Wabash River on the east, Peoria on the north, and Nashville on the south. Approximately 165 miles both north-south and east-west.

#### Topography and Drainage

1. Generally a level plain with a few ridges and hills, usually low but some as much as 100 feet high. Stream valleys incised in plain; large tracts of undissected or little dissected plain lie between the principal valleys. For comparison with Galesburg, Upland Plain see note thereunder.

2. Drainage systems generally well developed. Principal streams have low gradients and broad, flat-bottomed, terraced valleys with steep walls; intermediate streams have relatively wide V-shaped valleys and moderate gradients; headwater portions of streams have broad shallow valleys and low gradients.

3. Natural surface drainage generally good, but slow on broader upland tracts.

#### Geology

1. Principally a glacial drift plain; bedrock is exposed only along streams and in walls of valleys.

2. Glacial drift is mostly of Illinoian age and consists principally of till (stony clay) with some hills or ridges more or less gravelly; most of the larger stream



valleys are partially filled with silt, sand, and gravel outwash mostly of Wisconsin age; large area of sand of Wisconsin age in Mason and Tazewell counties; entire area mantled with loess, mostly of Wisconsin age.

3 Surficial bedrock consists generally of thin shale, sandstone, limestone, coal, and underclay formations belonging to Pennsylvanian ("Coal Measures") system; thick limestone formations belonging to the Lower Mississippian series are exposed along Illinois River and tributary streams in southwest edge of area.

4. Glacial deposits are as much as 300 feet thick in places; thickness of loess ranges from 2 to more than 25 feet, being thickest near Illinois, Mississippi, and Wabash rivers. Aggregate thickness of exposed bedrock formations is about 2700 feet.

5. Permeability is rapid along Illinois Valley, moderate in rest of north part of area, and moderate on sloping ground and slow or very slow on level ground in south part of area where a "hard-pan" constitutes the subsoil (State Soil Survey classification).

#### Geological Resources

1. Large deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, whiting etc.,

2. Large deposits of sand and gravel.

3. Shale and clay for structural clay products, refractories, foundry clay, pottery, etc.

4. Deposits of natural-bonded molding-sand.

5. Deposits of peat.

6. Extensive coal-beds of variable thickness, producing important amounts of coal mainly from underground mines.

7. Large quantities of oil and gas have been produced from the bedrock formations at many places; small amounts of gas are also obtained from the glacial deposits in most of the area.

8. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Kaskaskia Ridges

#### Location and Extent

An irregular area in the middle of the Springfield-Salem Plain; comprises most of Bond and parts of adjacent counties. About 60 miles long and 25 miles wide maximum.

#### Topography and Drainage

1. An irregular assemblage of morainic ridges and hills with small intervening plains, some of which are old lake beds.

2. Drainage systems generally well developed; stream gradients vary from moderate to low.

3. Natural surface drainage good except in local plains areas.

#### Geology

1. Surficial materials are dominantly sandy and gravelly glacial drift, with numerous ridges and hills of gravel, all mantled by loess.

2. Bedrock is exposed only along some of larger streams; consists of thin limestone, shale, and sandstone formations belonging to Pennsylvanian ("Coal Measures") system; other formations of Pennsylvanian system underlie the glacial drift.

3. Glacial drift, mostly of Illinoian age, is generally about 100 feet thick in the hills; loess mantle, mostly of Wisconsin age, is approximately 5 feet thick; maximum total thickness of Pennsylvanian system is about 1300 feet.

4. Permeability of soil and subsoil is very slow on level ground and moderate on sloping ground (State Soil Survey classification).

#### Geological Resources

1. Small deposits of limestone for agstone, concrete aggregate, road metal, etc.

2. Deposits of sand and gravel.

3. Clay and shale for structural clay products.

4. Deposits of natural-bonded molding-sand.

5. Numerous extensive coal-beds of variable thickness underlie the area and have been locally producing from underground mines.

6. Considerable amounts of oil and gas have been produced from the bedrock formations at some places.

7. Groundwater in the glacial drift and in the surficial bedrock is dependent on local rainfall and surface waters. Groundwater in all the bedrock formations, except in some that lie immediately under the glacial drift, is highly mineralized.

#### Mt. Vernon Hill Country

##### Location and Extent

A large triangular area in southern Illinois, extending from Waterloo east to Wabash River below Palestine and from Newton south to the Illinois Ozarks. About 150 miles east-west and 80 miles north-south.

### Topography and Drainage

1. Generally moderately rugged; a few "prairies" or nearly level upland tracts; broad, almost flat, swampy lowlands along the principal river valleys. Primarily preglacial topography mantled and modified by glacial drift.
2. Drainage systems generally well developed. Most streams have broad, flat-bottomed, sometimes terraced valleys and low gradients.
3. Natural surface drainage good on slopes, poor in valley-bottoms; many artificial drainage ditches and much artificial improvement of natural stream channels in valley-bottoms.

### Geology

1. Bedrock generally at or near surface on the divides, larger valleys have deep alluvial fills. Hills are mantled by glacial drift.
2. Surficial bedrock consists principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system, maximum aggregate thickness about 2600 feet; in west end of area the surficial bedrock consists of thicker limestone, shale, and sandstone formations belonging to the Chester (Upper Mississippian) series, with a total thickness of about 400 feet.
3. Glacial drift is mostly of Illinoian age and consists principally of till (pebbly clay) with a little gravel; Wabash, Embarrass, and Kaskaskia valleys are partly filled with outwash of Wisconsin age consisting of silt, sand, and gravel and with recent alluvium; other large valleys are partly filled with slack-water silts; maximum total thickness about 150 feet. Loess, mostly of Wisconsin age, is generally less than 5 feet thick, but near Mississippi and Wabash rivers it thickens to 10 feet.
4. Permeability of soil and subsoil is moderate in valley-bottoms along Wabash River and its tributaries and on sloping ground but elsewhere it is very slow (State

Soil Survey classification).

### Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal, etc.
2. Sand and gravel in limited deposits.
3. Shale and clay for structural clay products.
4. Extensive coal-beds of variable thickness, producing important amounts of coal from both underground and strip mines.
5. Large quantities of oil and gas are produced from the bedrock formations at many places.
6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Illinois Ozarks

#### Location and Extent

Consists of a belt 20 to 40 miles wide across southern Illinois and a strip 10 to 20 miles wide extending northwest along Mississippi River nearly to St. Louis.

#### Topography and Drainage

1. Generally more or less rugged; alternating ridges and valleys with local relief up to 600 feet; numerous precipitous cliffs and steep rock ridges.
2. Well developed drainage systems; most streams have narrow V-shaped valleys and steep gradients; large rivers have broad, flat-bottomed valleys with precipitous walls and have low gradients.

3. Natural surface drainage rapid; considerable underground drainage, causing numerous underground channels, caves, sinkholes, and large springs.

### Geology

1. Non-glaciated except along north border where thin glacial drift, of Illinoian age, occurs at some places; mantled by loess.

2. Bedrock consists principally of thick limestone, sandstone, and shale formations ranging in age from the Kimmswick formation of the Ordovician system through the Chester (Upper Mississippian) series, with an aggregate thickness of about 6000 feet, and thin sandstone, shale, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system, with maximum thickness of about 1000 feet. Clay, sand, and gravel formations of the Cretaceous and Tertiary systems occur locally in the southern part.

3. Valleys of Mississippi and Ohio rivers are filled with silt, sand, and gravel outwash, mostly of Wisconsin age, to a depth about 150 feet; the loess mantle, also mostly of Wisconsin age, is generally 8 to 12 feet in thickness, except in the west part where it thickens to more than 25 feet and along the north border where it thins rapidly to 2 feet or less.

4. Permeability of soil and subsoil is slow on level ground and moderate on sloping ground (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, flux, lime, and other special uses.

2. Sand and gravel dredged from Mississippi and Ohio rivers.

3. Large deposits of sandstone for building stone, riprap, etc.
4. Tripoli ("amorphous" silica), ganister, novaculite, and novaculite gravel.
5. Shale and clay for structural clay products and other uses; limited deposits of kaolin for refractories, crucibles, bonding-clay, pottery, and other special uses.
6. Deposits of natural-bonded molding-sand.
7. Fluorspar and zinc and lead ore in Hardin and Pope counties.
8. Limited coal-beds at some places along north border have been locally mined.
9. Small amounts of oil and gas have been produced from the bedrock formations at some places.
10. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized; saline springs near Shawneetown were source of important local salt industry in primitive and pioneer times.

### Cairo Lowlands

#### Location and Extent

A belt 6 to 12 miles wide across the southern tip of the State.

#### Topography and Drainage

1. Generally low-lying river bottoms, with a single belt of low rounded ridges and hills along the northeast border and extending westward between Cache and Ohio rivers.

2. Drainage systems well developed, but all streams except small headwaters in hills have low gradients.

3. Natural surface drainage mostly slow.

### Geology

1. River valleys are filled to a depth of 150 feet with glacial outwash, mostly of Wisconsin age, and consisting of silt, sand, and gravel.

2. Hills are composed of clay, sand, and gravel formations belonging to the Cretaceous and Tertiary systems and having a total thickness of about 825 feet; limestone belonging to the Mississippian system crops out at a few places along the principal streams.

3. Hills are mantled with loess mostly of Wisconsin age and 12 to 25 feet thick.

4. Permeability of soil and subsoil is slow on level ground and moderate on sloping ground (State Soil Survey classification).

### Geological Resources

1. Small deposits of limestone.

2. Sand and gravel.

3. Natural-bonded molding-sand.

4. Clay for structural clay products, pottery, refractories, and other special uses; Fuller's earth.

5. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.



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GEOLOGICAL SURVEY

SUMMARY OF  
TOPOGRAPHY, GEOLOGY AND MINERAL RESOURCES  
OF THE DRAINAGE BASINS OF ILLINOIS

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1945

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## Cache River Basin

### Topography and Drainage

1. Lower part of main stream lies in Cairo Lowlands, headwaters and principal tributaries lie in Illinois Ozarks.

2. Generally rugged in Illinois Ozarks; alternating ridges and valleys with local relief up to 350 feet; numerous precipitous cliffs and steep rock ridges. Generally low-lying river-bottoms in Cairo Lowlands, with a belt of low rounded ridges and hills along the southeast border of the basin; local relief up to 150 feet.

3. Well developed drainage systems; lower part of Cache River has broad, flat-bottomed valley through which it meanders with a very low gradient; upper part of river and principal tributaries have low gradients and flat-bottomed valleys with steep walls; small streams in Illinois Ozarks and in Cairo hills have narrow V-shaped valleys and steep gradients.

4. Natural surface drainage good, numerous artificial drainage ditches and other improvements of natural streams in lowlands along lower part of Cache River. Run-off mostly rapid in Illinois Ozarks, mostly slow in Cairo Lowlands. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, sinkholes, and springs.

### Geology

1. A non-glaciated area mantled by loess

2. Bedrock in Illinois Ozarks consists principally of thick limestone, sandstone, and shale formations belonging to the Devonian and Mississippian system; massive cliff-forming sandstone along north border. Hills in Cairo Lowlands are composed of clay, sand, and gravel formations belonging to the

Cretaceous and Tertiary systems.

3. Cache Valley is filled with silt, sand, and gravel outwash of glacial age and with recent alluvium, to a depth of about 150 feet. The valleys of minor streams, especially in the Illinois Ozarks, contain much rubble gravel, especially chert rubble, derived from the bedrock formations. The loess mantle on the uplands is generally 12 to 15 feet thick.

4. Permeability of soil and subsoil is slow on level ground and moderate on sloping ground (State Soil Survey classification).

#### Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, etc.

2. Large deposits of sandstone for building stone, riprap, etc.

3. Tripoli ("amorphous" silica), ganister, novaculite, and novaculite gravel.

4. Local deposits of sand and gravel.

5. Natural-bonded molding-sand.

6. Shale and clay for structural clay products and other uses.

7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

Ohio River, Basin I

Extent

Comprises area drained by streams directly tributary to Ohio River between Cache and Saline ~~Rivers~~; largest tributary stream is Bay Creek.

Topography and Drainage

1. Comprised of parts of Cairo Lowlands and Illinois Ozarks.
2. Generally more or less rugged; alternating ridges and valleys with local relief up to 500 feet; numerous precipitous cliffs and steep rock ridges.
3. Well developed drainage systems; most streams have narrow V-shaped valleys and steep gradients; lower part of Bay Creek has broad, flat-bottomed valley through which it meanders with a very low gradient and in which there are numerous artificial drainage ditches and other improvements of natural drainage.
4. Natural surface drainage good. Run-off mostly rapid, slow in lower Bay Creek valley. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, caves, sinkholes, and large springs.

Geology

1. A non-glaciated area mantled by loess.
2. Bedrock consists of (a) thick limestone, sandstone, and shale formations belonging to the Devonian and Mississippian systems, (b) sandstone, shale, limestone, coal, and underclay formations belonging to the Pennsylvanian ("coal measures") system, (c) clay, sand, and gravel formations

belonging to the Cretaceous and Tertiary systems.

3. Valleys of Ohio River and lower Bay Creek are filled with silt, sand, and gravel outwash of glacial age and with recent alluvium to a depth of about 150 feet; valleys of the minor streams, especially in the Illinois Ozarks, contain much rubble gravel, especially chert rubble, derived from the bedrock formations; the loess mantle is 6 to 20 feet thick, thinnest in the northwest part.

4. Permeability of soil and subsoil is slow on level ground and moderate on sloping ground (State Soil Survey classification).

#### Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, etc.
2. Large deposits of sandstone for building stone, riprap, etc.
3. Sand and gravel dredged from Ohio River
4. Natural-bonded molding-sand.
5. Shale and clay for structural clay products and other uses.
6. Fluorspar and zinc and lead ore in Hardin and Pope Counties.
7. Limited coal-beds at some places have been locally mined.
8. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

Saline River Basin

Topography and Drainage

1. Lies mostly in Mt. Vernon Hill Country; south border lies in Illinois Ozarks.

2. Generally moderately rugged, more so in Illinois Ozarks; broad, almost flat, swampy lowlands along the principal river valleys. Primarily preglacial topography, mantled and modified by glacial drift. Maximum local relief about 400 feet.

3. Drainage system generally well developed. Principal streams have broad, flat-bottomed, sometimes terraced valleys and low gradients; smaller streams in Illinois Ozarks have narrow V-shaped valleys and steep gradients; smaller streams elsewhere have relatively wide V-shaped valleys and moderate gradients.

4. Natural surface drainage good on slopes, poor in valley-bottoms; many artificial drainage ditches and much artificial improvement of natural stream channels in valley-bottoms. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, caves, and large springs and some sinkholes.

Geology

1. Bedrock generally at or near surface on the Uplands; larger valleys have deep alluvial fills. Hills in Mt. Vernon Hill Country are mantled by glacial drift. Loess mantles all uplands.

2. Surficial bedrock consists principally of thin sandstone, shale, limestone, coal, and underclay formations belonging to the Pennsylvanian

("Coal Measures") system; in Illinois Ozarks these overlie thicker limestone, sandstone, and shale formations belonging to the Mississippian system.

3. Glacial drift consists principally of till (pebbly clay) with a little gravel; principal valleys are partly filled with slack-water silts with a maximum thickness of about 150 feet. Rubble gravel derived from the bedrock formations occurs in the smaller valleys, especially in Illinois Ozarks. Loess is 3 to 6 feet thick.

4. Permeability of soil and subsoil is moderate on sloping ground and moderate to very slow on level ground (State Soil Survey classification).

#### Geological Resources

1. Deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone etc.

2. Large deposits of sandstone for building stone, riprap, etc.

3. Small local deposits of sand and gravel.

4. Natural-bonded molding-sand:

5. Shale and clay for structural clay products and other uses.

6. Extensive coal-beds of variable thickness, producing important amounts of coal from both underground and strip mines.

7. Large quantities of oil and gas are produced from the bedrock formations at many places.

8. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized; saline springs near Shawneetown were source of impor-

tant local salt industry in primitive and pioneer times.

Ohio-Wabash Rivers, Basin II

Extent

Comprises small area drained by streams directly tributary to Ohio and Wabash Rivers between Saline and Little Wabash Rivers.

Topography and Drainage

1. Comprised of parts of Mt. Vernon Hill Country and Illinois Ozarks.
2. Generally a relatively level lowland with three small moderately rugged hill areas rising more or less abruptly from it in the south part. Maximum local relief about 300 feet.
3. Drainage systems in Illinois Ozarks relatively well developed and most streams have moderate gradients; in Mt. Vernon Hill Country drainage lines are mostly shallow, poorly established, and with low gradients. Oxbow lakes and swamps are numerous.
4. Natural surface drainage mostly poor, except in hill areas where it is good; many artificial drainage ditches and other improvements. Run-off rapid in hills, slow elsewhere.

Geology

1. Mostly a glacial outwash valley-train which is now the floodplain of Wabash and Ohio rivers. Maximum thickness of deposit about 150 feet.
2. Hill areas are composed principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system, which also underlie the rest of the area. Hill



3. Rubble derived from the bedrock occurs in the upper parts of the valleys; alluvium in the lower parts of the valleys in the hill areas. Little erosion or deposition in principal lowland area. Hill areas are mantled by loess generally 6-8 feet thick.

4. Permeability of soil and subsoil is moderate (State Soil Survey classification).

#### Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal etc.
2. Sand and gravel dredged from Ohio and Wabash Rivers.
3. Natural-bonded molding-sand.
4. Shale and clay for structural clay products and other uses.
5. Extensive coal beds of variable thickness underlie the area.
6. Oil and gas are produced from the bedrock formations at some places.
7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

#### Little Wabash River Basin

#### Extent

Includes Skillet Fork basin.

### Topography and Drainage

1. Main stream rises in Bloomington Ridged Plain, upper part of basin lies in Springfield-Salem Plain, and lower part lies in Mt. Vernon Hill Country.
2. Upper part of basin generally a nearly level plain in which stream valleys are incised; lower part generally moderately rugged, with a few "prairies" or nearly level upland tracts and broad, almost flat, swampy lowlands along the principal river valleys. Maximum local relief about 180 feet.
3. Drainage systems generally well developed. Principal streams have broad, flat-bottomed, terraced valleys and low gradients; smaller streams have V-shaped valleys and moderate gradients.
4. Natural surface drainage generally good except in lowlands along principal streams, where there are numerous artificial drainage ditches and other improvements of natural drainage. Run-off generally rapid in hilly areas, slow in lowlands and on upland plains.

### Geology

1. Upper part of basin principally a glacial drift plain, with bedrock exposed only along some streams and in walls of some valleys; in lower part of basin bedrock is generally at or near the surface, mantled with glacial drift. Larger valleys have deep alluvial fills.
2. Glacial drift consists principally of till (pebbly clay) with a little gravel; larger valleys in Mt. Vernon Hill Country are partly filled with slack-water silts to a depth of as much as 150 feet; rock rubble occurs in some of the headwater valleys in the Mt. Vernon Hill Country; silt and sand alluvium constitutes valley-bottoms and low terraces along larger streams. Uplands are mantled with loess, generally 2 to 4 feet thick.

3. Surficial bedrock consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system.

4. Permeability of soil and subsoil moderate in lowlands and on sloping ground, very slow on level uplands (State Soil Survey classification).

#### Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal etc.

2. Sand and gravel in limited deposits.

3. Shale and clay for structural clay products.

4. Extensive coal beds of variable thickness underlie the area.

5. Large quantities of oil and gas are produced from the bedrock formations at many places; small quantities of gas are also obtained locally from the glacial drift.

6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

#### Wabash River, Basin III

##### Extent

Comprises area drained by streams directly tributary to Wabash River between Little Wabash and Embarrass rivers; largest tributary stream is Bonpas Creek.

### Topography and Drainage

1. Lies in Mt. Vernon Hill Country.
2. Generally moderately rugged; broad, almost flat lowlands along the principal river valleys. Primarily preglacial topography mantled and modified by glacial drift. Maximum local relief about 150 feet.
3. Drainage systems generally well developed. Principal streams have broad, flat-bottomed, sometimes terraced valleys and low gradients; smaller streams have relatively wide V-shaped valleys and moderate gradients.
4. Natural surface drainage generally good. Numerous artificial drainage ditches in lowlands along principal streams. Run-off generally rapid, somewhat slower in lowlands.

### Geology

1. Bedrock generally at or near the surface in the uplands, mantled by glacial drift; larger valleys have deep alluvial fills.
2. Glacial drift consists principally of till (pebbly clay) with a little gravel; Wabash Valley partly filled with silt, sand, and gravel outwash of glacial age and with recent alluvium; other large valleys are partly filled with slack-water silts; maximum total thickness of about 150 feet. Loess is 2 to 8 feet thick, thickest along Wabash Valley.
3. Surficial bedrock consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvania ("Coal Measures") system.
4. Permeability of soil and subsoil moderate in lowlands and on sloping ground, very slow on level uplands (State Soil Survey classification).

## Geological Resources

1. Small local deposits of limestone for agstene, concrete aggregate, road metal, etc.
2. Sand and gravel dredged from Wabash River; extensive deposits in Wabash lowland; small local deposits elsewhere.
3. Natural-bonded molding-sand.
4. Shale and clay for structural clay products.
5. Extensive coal beds of variable thickness underlie the area.
6. Large quantities of oil and gas are produced from the bedrock formations at many places.
7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

## Embarrass River Basin

### Topography and Drainage

1. North part of basin lies in Bloomington Ridged Plain, middle part in Springfield-Salem Plain, and south part in Mt. Vernon Hill Country.
2. Generally an undulatory plain in north and middle parts, with four morainic ridges crossing it in the north part and scattered ridges and hills in the middle part; stream valleys incised in plain. South part generally moderately rugged, with broad lowlands along the principal streams; primarily preglacial topography mantled and modified by glacial drift. Maximum local relief about 200 feet.

3. Drainage system generally well developed. Principal streams have low gradients and broad, flat-bottomed, terraced valleys with steep walls; intermediate streams have relatively wide V-shaped valleys and moderate gradients; headwater portions of streams have broad shallow valleys and low gradients; small streams directly tributary to principal streams have short, deep, narrow valleys and steep gradients.

4. Natural surface drainage generally good. Numerous artificial drainage ditches in north part of basin and in lowlands along Embarr<sup>r</sup>ass River in south part. Run-off generally slow to moderate, except on slopes along stream valleys, where it is rapid.

#### Geology

1. Area is generally underlain by glacial drift mantled by loess. Bedrock is exposed only along principal stream valleys in north and middle parts, but lies at or near surface in hilly areas in south part.

2. Glacial drift consists of till (pebbly and stony clay), sand, and gravel, mantled by loess 2 to 8 feet thick, thickest nearest Wabash River and in north end of basin; larger stream valleys are partially filled with silt, sand, and gravel outwash of glacial age and with recent alluvium.

3. Surficial bedrock consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system.

4. Permeability of soil and subsoil moderate except on level uplands in Springfield-Salem Plain and Mt. Vernon Hill/<sup>Country</sup> where it is very slow (State Soil Survey classification).

## Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal, etc.
2. Sand and gravel in limited deposits.
3. Shale and clay for structural clay products.
4. Extensive coal beds of variable thickness underlie the area.
5. Large quantities of oil and gas are produced from the bedrock formations at many places; small quantities of gas are also obtained locally from the glacial drift.
6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

## Wabash River, Basin IV

### Extent

Comprises area drained by streams directly tributary to Wabash River between Embarrass and Vermilion rivers.

### Topography and Drainage

1. North part of basin lies in Bloomington Ridged Plain, middle part in Springfield-Salem Plain, and south part in Mt. Vernon Hill Country.
2. Generally an undulatory plain in north and middle parts, with four morainic ridges crossing it in the north part and scattered ridges and hills in the middle part; stream valleys incised in plain. South part generally

moderately rugged, with broad lowlands along Wabash River; primarily preglacial topography mantled and modified by glacial drift. Maximum local relief about 100 feet.

3. Drainage systems generally well developed. In middle and south parts principal streams have low gradients and broad, flat-bottomed, terraced valleys with steep walls; tributaries generally are short and have deep narrow valleys and steep gradients; In north part streams generally have broad shallow valleys and low gradients.

4. Natural surface drainage generally good. Some artificial drainage ditches in north part, several in lowlands along Wabash River in south part. Run-off slow in north part and in Wabash Lowlands, generally rapid elsewhere.

### Geology

1. Area is generally underlain by glacial drift, mantled by loess. Bedrock lies at or near surface in much of area.

2. Glacial drift consists of till (pebbly and stony clay), sand, and gravel, mantled by loess 2 to 8 feet thick, thickest nearest Wabash River; larger stream valleys are partially filled with silt, sand, and gravel outwash of glacial age and with recent alluvium.

3. Surficial bedrock consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system.

4. Permeability of soil and subsoil moderate except on level uplands in Springfield-Salem Plain and Mt. Vernon Hill Country where it is very slow (State Soil Survey Classification).



## Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal, etc.
2. Extensive deposits of sand and gravel along Wabash Valley; limited deposits elsewhere.
3. Shale and clay for structural clay products.
4. Extensive coal beds of variable thickness underlie the area.
5. Small quantities of oil and gas have been produced from the bedrock formations at some places; small quantities of gas are also obtained locally from the glacial drift.
6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

## Vermillion River Basin

### Topography and Drainage

1. Lies almost entirely in Bloomington Ridged Plain, with one bit of Kankakee Plain.
2. Comprised of a number of more or less concentric knolly morainic ridges with intervening more or less undulatory plains in which stream valleys are incised. Maximum local relief about 150 feet.
3. Drainage system relatively complete, but originally there were a large number of ponds, marshes, and undrained depressions. Principal streams are graded and flow in flat-bottomed valleys with steep walls, along which small tributaries have deep narrow valleys and steep gradients; other streams

have broad shallow valleys and low to moderate gradient.

4. Natural surface drainage poor to good. Most streams have been dredged, cleared, and straightened; numerous artificial drainage ditches and subsurface drains. Run-off rapid on morainic ridges and along principal valleys; slow to moderately rapid elsewhere.

### Geology

1. Area is generally underlain by glacial drift, covered by a thin mantle of loess. Bedrock is exposed only along valleys in southeast part of basin.

2. Glacial drift consists of till (pebbly and stony clay), sand, and gravel; most of the larger valleys are partially filled with silt, sand, and gravel outwash of glacial age.

3. Surficial bedrock consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system.

4. Permeability of soil and subsoil moderate in south part of basin; in north part it is variable on level ground, slow on sloping ground (State Soil Survey classification)

### Geological Resources

1. Limited deposits of limestone for agstone, concrete aggregate, road metal, etc.

2. Moderately extensive deposits of sand and gravel along principal streams; limited deposits elsewhere.

3. Clay and shale for structural clay products.
4. Extensive coal-beds of variable thickness, producing important amounts of coal from both underground and strip mines in southeast part of basin.
5. Small amounts of gas are obtained locally from the glacial drift.
6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Mississippi River, Basin I

#### Extent

Comprises area drained by streams directly tributary to Mississippi River between Ohio and Big Muddy rivers; largest tributary stream is Clear Creek.

#### Topography and Drainage

1. Lies mainly in Illinois Ozarks; south end lies in Cairo Lowlands.
2. Generally rugged in Illinois Ozarks; alternating ridges and valleys with local relief up to 630 feet; numerous precipitous cliffs and steep rock ridges. Low-lying bottomland along Mississippi River.
3. Well developed drainage system. Mississippi River has low gradient and broad, flat-bottomed valley with steep, locally precipitous walls; small streams in Illinois Ozarks have narrow V-shaped valleys and steep gradients.
4. Natural surface drainage generally good; numerous artificial drainage ditches and other improvements of natural streams in lowlands along Mississippi River. Run-off rapid in uplands, slow in lowlands. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, caves, sinkholes, and large springs.

## Geology

1. A non-glaciated area mantled by loess.
2. Bedrock consists principally of thick limestone, sandstone, and shale formations.
3. Mississippi Valley is filled with silt, sand, and gravel outwash of glacial age and with recent alluvium, to a depth of about 150 feet. Valleys of streams in Illinois Ozarks contain much rubble gravel, especially chert rubble, derived from bedrock formations. The loess mantle on the uplands is 15 to 25 feet thick.
4. Permeability of soil and subsoil is slow on level ground and moderate on sloping ground (State Soil Survey classification).

## Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, flux, lime, and other special uses.
2. Sandstone for building stone, riprap, etc.
3. Sand and gravel dredged from Mississippi River.
4. Tropolite ("amorphous" silica), ganister, novaculite, and novaculite gravel.
5. Shale and clay for structural clay products and other uses; limited deposits of kaolin for refractories, crucibles, bonding-clay, pottery, and other special uses.
6. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried <sup>bedrock</sup> aquifers ~~in~~

it is highly mineralized.

## Big Muddy River Basin

### Topography and Drainage

1. Lies mostly in Mt. Vernon Hill Country, partly in Illinois Ozarks.
2. Generally more or less rugged, except in northwest part where there are some "prairies" or nearly level upland tracts; broad, almost flat, swampy lowlands along principal rivers. Primarily preglacial topography mantled and modified by glacial drift. Maximum local relief about 450 feet.
3. Well developed drainage system. Principal streams have broad, flat-bottomed, terraced valleys through which they meander widely, with very low gradients; smaller streams have wide V-shaped valleys and moderate gradients in "prairie" country and narrow V-shaped valleys and steep gradients in rugged country.
4. Natural surface drainage good on slopes, poor in valley-bottoms; many artificial drainage ditches and <sup>other</sup> improvements of natural stream courses in valley-bottoms. Run-off rapid in rugged country, slow on "prairies" and in lowlands along principal streams. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, caves, sinkholes, and large springs.

### Geology

1. Bedrock generally at or near surface in uplands, mantled by glacial drift and loess; larger valleys have deep alluvial fills.
2. Surficial bedrock in Mt. Vernon Hill Country consists principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system; in Illinois Ozarks it con-

sists principally of thicker limestone, shale, and sandstone formations belonging to the Mississippian, Devonian, and Silurian systems.

3. Glacial drift consists principally of till (pebbly clay) with a little gravel; lower part of Big Muddy Valley (in Mississippi valley-bottoms) is filled with silt, sand, and gravel outwash of glacial age and with recent alluvium, to a depth of about 150 feet; other principal valleys are partly filled with slack-water silts; the valleys of the minor streams, especially in the Illinois Ozarks, contain much rubble gravel derived from the bedrock formations. The loess mantle on the uplands ranges from 2 to more than 25 feet in thickness, thickest near Mississippi Valley.

4. Permeability of soil and subsoil is moderate on sloping ground, slow on level ground in Illinois Ozarks, and very slow on level ground in Mt. Vernon Hill Country (State Soil Survey classification).

#### Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, flux, lime, and other special uses.

2. Large deposits of sandstone for building stone, riprap, etc.

3. Small local deposits of sand and gravel.

4. Shale and clay for structural clay products.

5. Extensive coal-beds of variable thickness, producing important amounts of coal from both underground and strip mines.

6. Large quantities of oil and gas are produced from the bedrock formations at many places.

7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Mississippi River, Basin II

#### Extent

Comprises area drained by streams directly tributary to Mississippi River between Big Muddy and Kaskaskia Rivers; largest tributary stream is Marys River.

#### Topography and Drainage

1. Comprised of small parts of Illinois Ozarks and of Mt. Vernon Hill Country.
2. Generally more or less rugged, with local relief up to 425 feet; low-lying bottom-land along Mississippi River.
3. Well developed drainage systems. Mississippi River and lower part of Marys River have low gradients and broad, flat-bottomed valleys with steep walls; other streams have narrow V-shaped valleys and steep gradients in Illinois Ozarks, wider V-shaped valleys and moderate gradients in Mt. Vernon Hill Country.
4. Natural surface drainage generally good; numerous artificial drainage ditches and other improvements of natural streams in lowlands along Mississippi River. Run-off rapid in uplands, slow in lowlands. Considerable underground drainage in Illinois Ozarks, causing numerous underground channels, caves, sinkholes, and large springs.

## Geology

1. Bedrock generally at or near surface, mantled by glacial drift and loess.
2. Surficial bedrock in Mt. Vernon Hill Country consists principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system; in Illinois Ozarks it consists principally of thicker limestone, shale, and sandstone formations belonging to the Chester (upper Mississippian) series.
3. Glacial drift consists principally of till (pebbly clay) with a little gravel. Mississippi Valley is filled with silt, sand, and gravel outwash of glacial age and with recent alluvium, to a depth of about 150 feet; other stream valleys contain much rubble gravel derived from the bedrock formations. The loess mantle on the uplands ranges from 4 to 25 feet in thickness, thickest near Mississippi Valley.
4. Permeability of soil and subsoil is moderate on sloping ground, slow on level ground in Illinois Ozarks, and very slow on level ground in Mt. Vernon Hill Country (State Soil Survey classification).

## Geological Resources

1. Limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, etc.
2. Sandstone for building stone, riprap, etc.
3. Sand and gravel dredged from Mississippi River.
4. Shale and clay for structural clay products



5. Extensive coal-beds of variable thickness, producing important amounts of coal from both underground and strip mines.

6. Oil and gas is produced from the bedrock formations at some places.

7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Kaskaskia River Basin

#### Extent

Includes Shoal Creek basin.

#### Topography and Drainage

1. Comprised of parts of Bloomington Ridged Plain, Springfield-Salem Plain, and Mt. Vernon Hill Country, almost all of Kaskaskia Ridges, and a small part of Illinois Ozarks.

2. Generally a more or less undulatory plain with numerous knolly morainic ridges, local relief up to 200 feet. Stream valleys incised in plain; large areas of little dissected plain lie between principal valleys.

3. Drainage systems generally well developed. Principal streams have low gradients and broad, flat-bottomed, terraced valleys with steep walls; intermediate streams have relatively wide V-shaped valleys and moderate gradients; headwater portions of streams have broad shallow valleys and low gradients.

4. Natural surface drainage generally good, but slow on broader upland tracts; many artificial drainage ditches and subsurface drains in

upper part of basin. Run-off generally slow, except in lower end of basin.

### Geology

1. Principally a glacial drift plain; bedrock generally exposed only along streams and valley-walls.
2. Glacial drift consists principally of till (stony clay) with some hills or ridges more or less gravelly, all mantled with loess; Kaskaskia Valley partly filled with silt, sand, and gravel outwash of glacial age; other principal valleys partly filled with slack-water silts and alluvium. The loess mantle ranges from 2 to 25 feet in thickness, thickest near Mississippi Valley.
3. Surficial bedrock consists principally of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system; in southwest end of basin there are thicker limestones, sandstone, and shale formations belonging to the Mississippian system.
4. Permeability of soil and subsoil is moderate in Bloomington Ridged Plain and in Kaskaskia lowlands; in the rest of the basin it is moderate on sloping ground and slow or very slow on level ground (State Soil Survey classification).

### Geological Resources

1. Limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, etc.
2. Sandstone for building stone, riprap, etc.
3. Large deposits of sand and gravel.
4. Deposits of natural-bonded molding sand.

5. Shale and clay for structural clay products.
6. Extensive coal-beds of variable thickness, producing important amounts of coal mainly from underground mines.
7. Large quantities of oil and gas are produced from the bedrock formations at many places; small amounts of gas are also obtained locally from the glacial deposits.
8. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

### Mississippi River, Basin III

#### Extent

Comprises area drained by streams directly tributary to Mississippi River between Kaskaskia and Illinois rivers; largest tributary stream is Cahokia Creek.

#### Topography and Drainage

1. Lies mainly in Springfield-Salem plain but includes a part of Illinois Ozarks and bits of Mt. Vernon Hill Country and Calhoun County Hill Country.
2. Principally an upland plain in which stream valleys are incised. Generally moderately rugged, with local relief up to 360 feet; some gently undulatory interfluvial tracts in northeast part; low-lying bottomland along Mississippi River.

3. Well developed drainage systems. Mississippi River and principal tributaries have low gradients and broad, flat-bottomed valleys with steep or precipitous walls; smaller streams have wide V-shaped valleys and moderate gradients in Springfield-Salem Plain, narrow V-shaped valleys and steep gradients in rest of basin. Sinkholes are abundant in uplands in Illinois Ozarks and also in and around Alton.

4. Natural surface drainage generally good; numerous artificial drainage ditches and other improvements of natural streams in lowlands along Mississippi River. Run-off rapid in uplands, slow in lowlands. Considerable underground drainage in Illinois Ozarks and around Alton, causing numerous underground channels, caves, sinkholes, and large springs.

#### Geology

1. Principally a glacial drift plain; bedrock generally exposed only along streams and valley-walls.

2. Glacial drift consists principally of till (pebbly clay) with a little gravel; Mississippi Valley is filled with silt, sand, and gravel outwash of glacial age and with recent alluvium, to a depth of about 150 feet. Loess mantle on uplands ranges from 4 to more than 25 feet in thickness, thickest near Mississippi Valley.

3. Surficial bedrock in northeast part of basin consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system; elsewhere it consists of thick limestone formations.

4. Permeability of soil and subsoil is moderate on sloping ground and slow to very slow on level ground (State Soil Survey classification).

## Geological Resources

1. Large deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, flux, lime, whiting, etc.
2. Sand and gravel dredged from Mississippi River.
3. Shale and clay for structural clay products, refractories, foundry clay, pottery, etc.
4. Deposits of natural-bonded molding-sand.
5. Extensive coal-beds of variable thickness, producing important amounts of coal mainly from underground mines.
6. Oil and gas is produced from the bedrock formations in some places.
7. Groundwater in glacial deposits and in surficial bedrock formations is dependent on local rainfall and surface waters; in buried bedrock aquifers it is highly mineralized.

## Illinois River Basin

### Extent

Includes tributary basins of Macoupin Creek, LaMoine River, Sangamon River, Salt and Sugar creeks, South Fork Sangamon River, Spoon River, Mackinaw River, Vermilion River, Fox River, Kankakee River, and Des Plaines and DuPage rivers.

### Topography and Drainage

1. Comprised of all of Chicago Lake Plain, almost all of Kankakee Plain, most of Bloomington Ridged Plain, large parts of Galesburg Upland Plain and Springfield-Salem Plain, part of Calhoun County Hill Country, and a bit of Kaskaskia Ridges.

2. Topography varies from nearly flat in the plains areas to ridged and knobby in Bloomington Ridged Plain and to generally rugged, alternating ridges and valleys in Calhoun County Hill Country. Principal stream valleys incised in plains. Maximum local relief usually 150 to 300 feet, but up to 430 feet along lower part of Illinois Valley.

3. Relatively complete system of stream drainage in most of the area but lakes, marshes, bogs, and undrained depressions are abundant in northeast part, less common elsewhere. Principal streams are graded and generally have floodplains bordered by sand and gravel terraces, but at some places they have relatively narrow, steep-walled, deep valleys. Illinois River has a broad, flat-bottomed valley with steep walls, with gradient lower below Hennepin than above, but its smaller tributaries generally have deep, relatively narrow, steep-walled valleys and relatively steep gradients.

4. Natural surface drainage mostly good, but poor or slow on plains areas, in lowlands along principal rivers, and in lake region in north part of area and in undrained depressions elsewhere. Many artificial drainage ditches and subsurface drains in northeast and east-central parts and in lowlands along Illinois and other large rivers. Run-off rapid on slopes, slow on plains and in lowlands.

### Geology

1. Generally underlain by glacial deposits consisting of stony clay, silt, sand, and gravel. Bedrock is exposed generally only along or near principal stream valleys. Surficial mantle of loess ranges from 0 to more than 25 feet in thickness, thickest along Illinois Valley and thinnest in northeast part.

2. Exposed bedrock along and north of Illinois and Kankakee Rivers.

east of LaSalle and along Illinois River south of Beardstown consists of thick limestone, dolomite, sandstone, and shale formations; elsewhere it consists principally of thin shale, sandstone, limestone, coal, and underlay formations belonging to the Pennsylvanian ("Coal Measures") system.

3. Permeability of soil and subsoil is rapid in the lowlands along Illinois, Kankakee, and Des Plaines rivers, in the Chicago Lake Plain, and in McHenry County; elsewhere it is moderate to slow (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of dolomite and limestone for aggregate, concrete aggregate, railroad ballast, riprap, road metal, building stone, metallurgical dolomite, Portland and hydraulic cements, lime, whiting, etc.

2. Large and extensive deposits of sand and gravel.

3. Large deposits of silica sand (sandstone) for glass, steel molding-sand, abrasives, sodium silicate, ground silica, etc.

4. Shale and clay for structural clay products, refractories, bonding clay, foundry clay, pottery, etc.

5. Deposits of natural-bonded molding-sand.

6. Deposits of peat, muck, and marl.

7. Extensive coal beds of variable thickness, except in northeast part of basin, producing important amounts of coal from both underground and strip mine.

8. Oil and gas is obtained from the bedrock formation at some places in the south and west parts of the basin; small amounts of gas are also obtained from the glacial deposits throughout most of the basin.

9. Groundwater in the glacial deposits and in the surficial bedrock formation is dependent on local rainfall and surface waters; in the deeper fresh-water aquifers it is mostly not, being derived mainly from rainfall in distant areas where the formations are exposed. In the southwest part of the basin the groundwater in most of the bedrock aquifers is highly mineralized.

### Mississippi River, Basin IV

#### Extent

Comprises area drained by streams directly tributary to Mississippi River between Illinois and Rock Rivers. Principal tributaries are Bay Creek, The Sny, Bear Creek, Henderson Creek, Pope Creek, and Edwards River.

#### Topography and Drainage

1. Comprised principally of the west part of Galesburg, Upland Plain, together with the larger part of Calhoun County Hill Country.

2. Generally a series of valleys incised deeply in an upland plain, becoming a rugged alternation of ridges and valleys in Calhoun County Hill Country; low-lying bottomland along Mississippi River.

Maximum local relief 300 feet.

3. Well developed drainage systems. Mississippi River and principal tributaries have low gradients and broad, flat-bottomed valleys with steep, locally precipitous walls; smaller streams generally have narrow V-shaped valleys and steep gradients.

4. Natural surface drainage generally good; numerous artificial drainage ditches and other improvements of natural streams in lowlands along Mississippi River. Run-off mostly rapid, slow on upland plain tracts



and in lowlands. Considerable underground drainage, causing numerous underground channels, caves, sinkholes, and springs.

### Geology

1. Most of the area is underlain by glacial drift, consisting principally of stony clay mantled by loess; principal valleys are partly filled with silt, sand, and gravel outwash of glacial age and with recent alluvium; smaller valleys contain gravel rubble derived from bedrock formations. Loess mantle ranges in thickness from 4 to 25 feet, thickest along Mississippi Valley.

2. Exposed bedrock consists principally of thick limestone, shale, and sandstone formations; thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") system occur in the north part, along the east border, and at the south end of the basin.

3. Permeability of soil and subsoil is rapid in Mississippi lowlands, moderate to slow elsewhere (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, rock wool, whiting, etc.

2. Sand and gravel dredged from Mississippi River in deposits along principal stream.

3. Deposits of silica sand (sandstone) for glass, steel, molding-sand, abrasives, sodium silicate, ground silica, etc.

4. Clay and shale for structural clay products, refractories, pottery, etc.

5. Deposits of natural-bonded molding sand.
6. Coal-beds of limited extent and variable thickness, producing principally from underground mines.
7. Groundwater in the glacial deposits and in the artificial bedrock formation is dependent on local rainfall and surface waters; in the deeper fresh-water aquifers it is mostly not, being derived mainly from rainfall in distant areas where the formations are exposed. In the south part of the basin the groundwater in most of the bedrock aquifers is highly mineralized.

### Rock River Basin

#### Extent

Includes tributary basins of Green, Kishwaukee, and Pecatonica rivers.

#### Topography and Drainage

1. Comprised of most of Rock River Hill Country, all of Green River Lowland, ~~and~~ <sup>and</sup> parts<sup>s</sup> of Galesburg Upland Plain, and ~~part~~ of Bloomington Ridged Plain.
2. Generally moderately rugged, except in Green River Lowland.
3. Well developed drainage systems except in Green River Lowland; principal streams have low gradients and generally flow in broad, flat-bottomed, terraced valleys with relatively steep walls, the most notable exception being the constricted portion of Rock River Valley from below Rockford to below Dixon; minor streams generally have narrow V-shaped valleys and high gradients; many artificial drainage ditches in Green River Lowland.

4. Natural surface drainage generally good, except in Green River Lowland; some underground drainage locally in the Rock River Hill Country, where dolomite bedrock near the surface is creviced; sinkholes occur locally.

5. Run-off is rapid in the hilly areas, contributing to local flash floods; slow in Green River Lowland.

### Geology

1. Bedrock generally at or near <sup>r</sup> surface except in northeast part and in Green River Lowland; covered by glacial drift.

2. Glacial drift consists of till (pebbly clay) and gravel, mantled by loess. Principal valleys are partly filled with silt, sand, and gravel outwash of glacial age; Pecatonica Valley partly filled with slack-water silts; Green River Lowland underlain by sand and pebbly sand. Loess mantle <sup>o</sup> to more than 25 feet thick, thickest near Mississippi Valley.

3. Exposed bedrock consists dominantly of thick limestone and dolomite formations, with some shale and sandstone; in the Galesburg Upland Plain and south part of Green River Lowland it consists of thin shale, sandstone, limestone, coal, and underclay formations belonging to the Pennsylvanian ("Coal Measures") System.

4. Rock rubble and boulder gravel are common along smaller, high-gradient streams; silt and sand alluvium constitutes valley-bottom and low terraces along larger streams.

5. Permeability of soil and subsoil rapid in lowlands, moderate elsewhere (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of dolomite and limestone for agstone,

concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, metallurgical dolomite, Portland cement, etc.

2. Large and extensive deposits of sand and gravel.
3. Large deposits of silica sand (sandstone) for glass, steel molding-sand, ground silica, abrasives, etc.
4. Clay and shale for structural clay products.
5. Deposits of natural-bonded molding-sand.
6. Deposits of peat and muck.
7. Coal beds of limited extent in vicinity of Rock Island.
8. Groundwater in the glacial deposits and in the surficial bedrock aquifers is dependent on local rainfall and surface waters; in the deeper aquifers it is not, being derived principally from the rainfall in distant areas where the formations are exposed.

### Mississippi River, Basin V

#### Extent

Comprises area drained by streams directly tributary to Mississippi River north of Rock River; principal tributaries are Plum and Apple Rivers.

#### Topography and Drainage

1. Comprised of all <sup>of</sup> Dubuque Hill Country and west border of Rock River Hill Country.
2. Generally fugged; high divides and deepvalleys alternating; some rock prominences cap the divides; local relief commonly 300-400 feet, maximum 450 feet.

3. Well developed dendritic drainage systems; most streams have narrow V-shaped valleys and steep gradients; Mississippi River has low gradient and broad, flat-bottomed, terraced valley with precipitous walls.

4. Natural surface drainage and run-off rapid, flash floods common in the hill country; slow in lowlands. Considerable underground drainage, causing underground channels, numerous springs, small caves, and sinkholes.

### Geology

1. A non-glaciated or lightly glaciated area of bedrock, mantled by loess.

2. Exposed bedrock consists dominantly of thick limestone or dolomite formations with an intervening shale formation.

3. Loess mantle is 10 to more than 25 feet thick, thickest along Mississippi Valley; the latter valley is filled with silt, sand, and gravel outwash of glacial age, as much as 250 feet deep. Many of the smaller valleys contain rubble derived from the bedrock formations.

4. Permeability of soil and subsoil is generally rapid, locally moderate (State Soil Survey classification).

### Geological Resources

1. Large and extensive deposits of dolomite and limestone for agstone, concrete aggregate, railroad ballast, riprap, road metal, building stone, lime, metallurgical dolomite, Portland cement, etc.

2. Sand and gravel dredged from Mississippi River.

3. Deposits of natural-bonded molding-sand.

4. Clay and shale for structural clay products.

5. Deposits of peat and muck.

6. Groundwater in the glacial deposits and in the surficial bedrock aquifers is dependent on local rainfall and surface waters; in the deeper aquifers it is not, being derived principally from the rainfall in distant areas where the formations are exposed.