MINING HISTORY

As far back as 1755, anthracite was being used to a limited extent as a fuel in homes, but it was not until the period from 1825 to 1835 that anthracite mining became an economically important industry. By 1828, railroad construction began and quickly spread throughout the geographic region. By the time the rail line to Philadelphia was completed in 1842, the anthracite industry became one of the giant economic industries in the United States, with most of the major coal companies being formed between 1825 and 1875.

Since the discovery of coal in the anthracite region, several methods have been used to remove the coal. One such method is the use of deep mines. There are three types of deep mines found in the region; drift, slope and shaft. A drift mine extends directly into a coal bed at an outcrop and follows the bed upward, usually at a slight angle to facilitate drainage. A slope mine extends downward at an angle of 45° or more to a fixed landing. The shaft mine uses a vertical entry to reach a desired point below the surface, where gangways would be driven into the coal beds. Where possible tunnels were driven into coal beds from the base of mountains to drain mine workings and to move men and materials.

Deep mines were located throughout the coal bearing areas of the watershed, with the heaviest concentrations in the areas south of Trevorton, north and northwest of Ashland, southwest of Girardville and surrounding Mahanoy City. See Figure 3, p. 18 for a complete distribution.

The methods used to remove coal from the deep mines consisted of the room and pillar method, chute methods, and the longwall method. Where the coal beds dipped less than 20°, the room and pillar method was used, when the dip was greater than 20° the chute method was employed. The longwall method was seldom used in this region. In both the room and pillar, and the chute methods, rooms and intervening pillars are removed and supporting timber inserted, this would result in the removal of approximately 50 percent of the coal. Later, a second mining or "robbing" might be done. This involved further removal of the pillars and the insertion of more supporting timbers. This was done until the roof began to sag and crack, or until the roof actually caved in. This resulted in an additional 10 to 20 percent removal of coal. This "robbing" is partially responsible for the barrier breaches and mine subsidence i.e., mine roof collapse, which occur today.

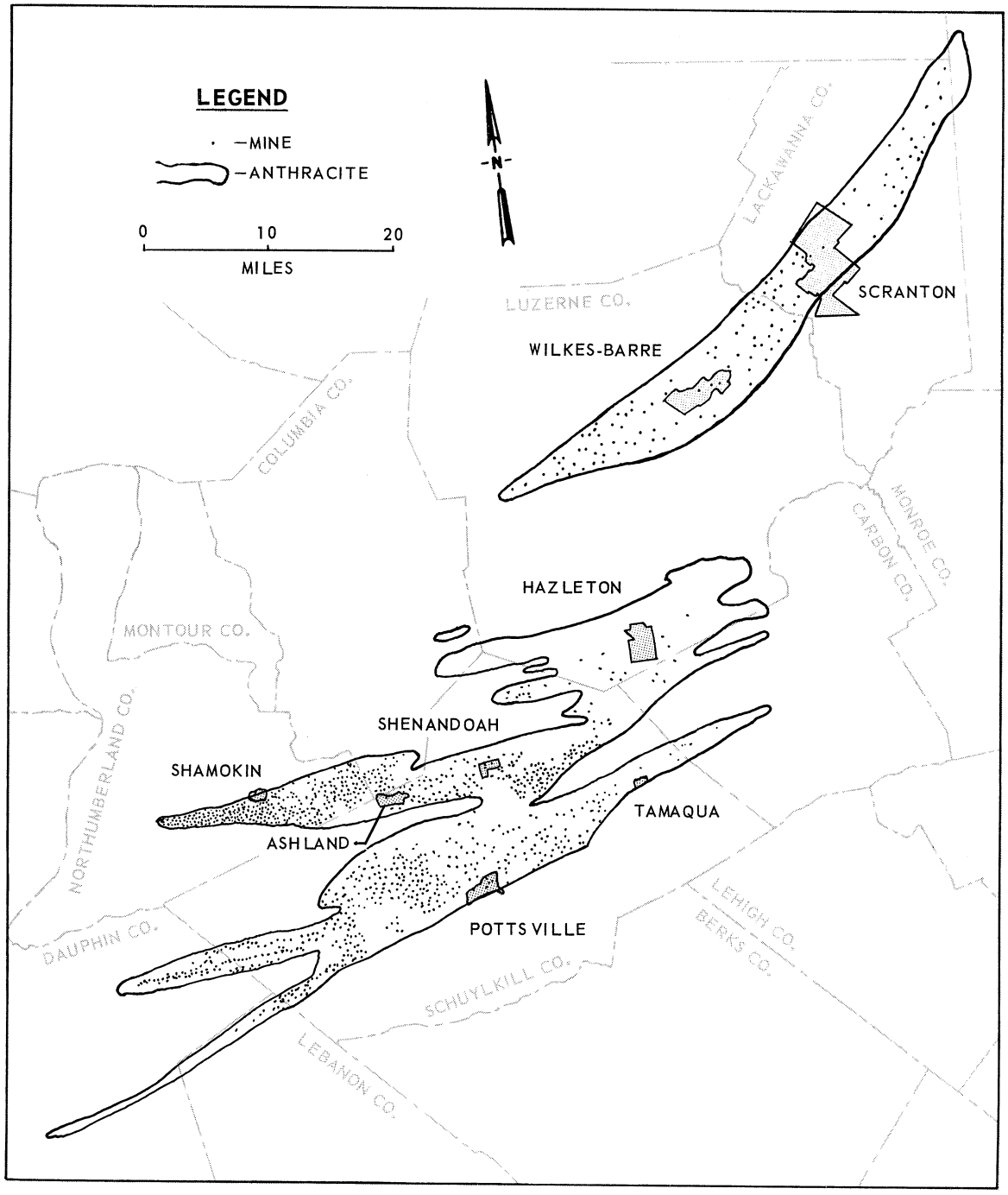

Figure 3. Distribution of deep anthracite mines, 1957
(After Deasy and Griess, 1963)

Many of the abandoned deep mines still contain large amounts of coal, but water seeping into the workings forced them to close. Some of the entrances to the abandoned deep mines are still open. These, along with numerous cropfalls create a substantial safety hazard.

Today, there are fewer deep mines in operation than at any time in the recent past. Active deep mines are now concentrated in the regions, south of Trevorton and west northwest of Ashland.

Approximately 25 percent of the Mahanoy Creek Watershed has either been strip mined or affected by the strip mining process. The strip mining was roughly concentrated in a two mile wide strip of land from Delano to the watershed boundary 4.5 miles west of Ashland, and again in the area between Big and Mahanoy Mountains, south of Trevorton See Figure 4, p. 20 for a complete distribution. The size of the strip pits depends on the amount of overburden that must be removed to expose the coal bed. The ratio of the thickness of the overburden to the thickness of the coal bed due to economic considerations is seldom higher than 25:1. Because some beds in the anthracite region are quite thick and stand almost on edge, the size of the strip pits can be quite large. The regions most devastated by strip mining include the areas south of Trevorton, southeast of Lost Creek north of Girardville, and the area north of Ashland.

In 1963 Pennsylvania passed the Bituminous and Anthracite Open Pit Mining Laws, requiring strip mine operators to restore the land to its original contours. However, the law made no provisions for restoring the thousands of acres of land already strip mined. The strip mining that is done today is centered around the areas north of Mahanoy City and south of Trevorton. Exploratory drilling for coal seams is being carried on in a number of areas.

A secondary source of coal in the anthracite region involves bank mining. In past years, because of the vast amounts of coal available, collieries did not wash and prepare material unless it contained a certain percentage of coal, and the coal was of a high enough grade. Also, only a limited market for fine grain coal existed, and much of it along with the other waste material was deposited on huge waste piles. Many operators when mining a major coal bed such as the Mammouth Vein (at times more than 70 feet thick), would ignore the smaller coal beds, which could often be close to 4 feet thick, above it. The coal from these smaller beds would be placed along with other rock on waste piles. It is now possible to rework these old piles for the coal. This process is called bank mining. Most bank mines are located near the old collieries, with some rich coal deposits under thousands of tons of worthless waste material.

Although a minor source of coal production, dredging techniques have been used

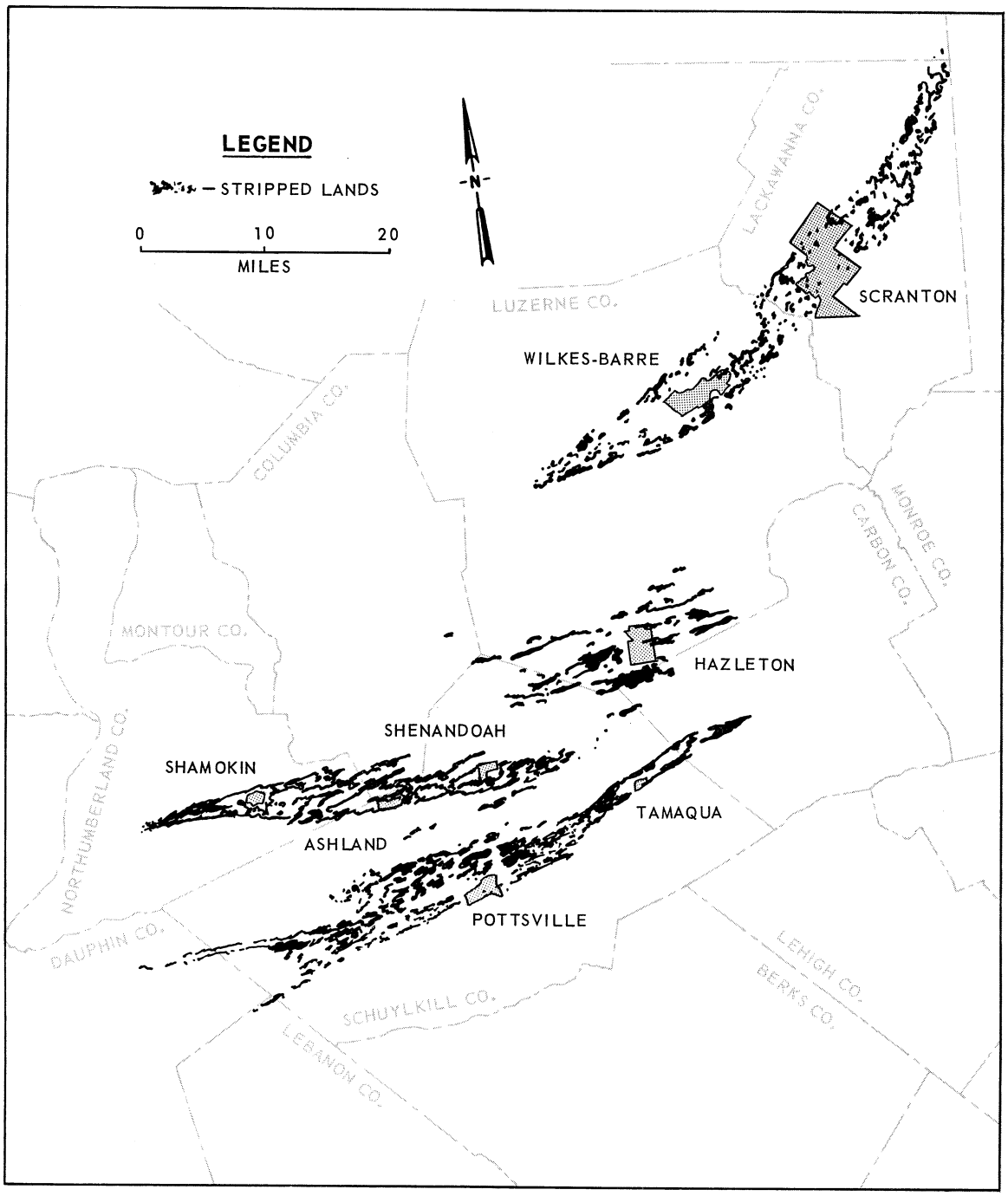

Figure 4. Distribution of areas affected by strip mining, 1960
(After Deasy and Griess, 1963)

in the watershed. The coal in the stream bed having originated from erosion of mining operations and coal preparation plants. In the area south of Trevorton along Mahanoy Creek there are two or three dredging operators removing coal from the silt deposits in the bottom of the creek. In this section of Mahanoy Creek, the water is continually eroding and depositing material, thus assuring a new supply of coal. With the closing down of many mines, coal being eroded into the stream has decreased substantially, resulting in a sharp decrease of production from dredging operations.

The mining and processing of millions of tons of coal has produced vast amounts of waste material in the region. The materials consist of three types of mineral waste: rock (1-5% coal), culm (20-80% coal), and silt (20-80% coal). Size is the major difference between culm and silt with culm materials being much coarser material. Figure 5, p. 22, shows the distribution of this material.

Over the years, huge amounts of silt have been deposited, i.e., on waste piles or discharged directly into the streams. At one time parts of Mahanoy Creek were flowing over 40 feet of deposited silt. During periods of flooding or heavy runoff, large amounts of material are eroded and washed into streams. When the water recedes the silt is deposited along the stream bed itself. Along some streams in the watershed there are portions of botton land where silt deposits have killed vegetation and destroyed farm land. Presently all of Mahanoy and Shenandoan Creeks and Zerbe Run from Trevorton downstream are affected to some extent by silt deposits. The heaviest silt deposits are concentrated along Mahanoy Creek from just below Ashland, downstream past Gordon, and again along the creek in the stretch south of Trevorton, In both of these areas, the silt deposits have killed vegetation. One large silt deposit is located along Zerbe Run 5 miles west of Trevorton.

Some of the larger silt piles in the watershed are located along North Mahanoy Creek near Park Place, and along the southern side of Mahanoy Creek between Mahanoy City and Gilberton. Two miles southeast of Shenandoah located on both sides of the road are several large silt piles. Just east of Centralia are a number of silt piles. A huge silt pile (over a mile long and 500 feet wide) exists along Zerbe Run on the west end of Trevorton. Numerous operations are still depositing silt, including collieries located 2 miles west of Mahanoy City and 5 miles west of Ashland, and also collieries at Shenandoah, Gilberton and Trevorton, (see Plates A and B).

Culm and rock banks are located throughout the coal bearing portion of the watershed, but are concentrated near the abandoned deep mines and collieries. Some of the larger culm and rock banks are located just east of Girardville, 2 miles east-northeast of Gilberton, and east of Centralia.

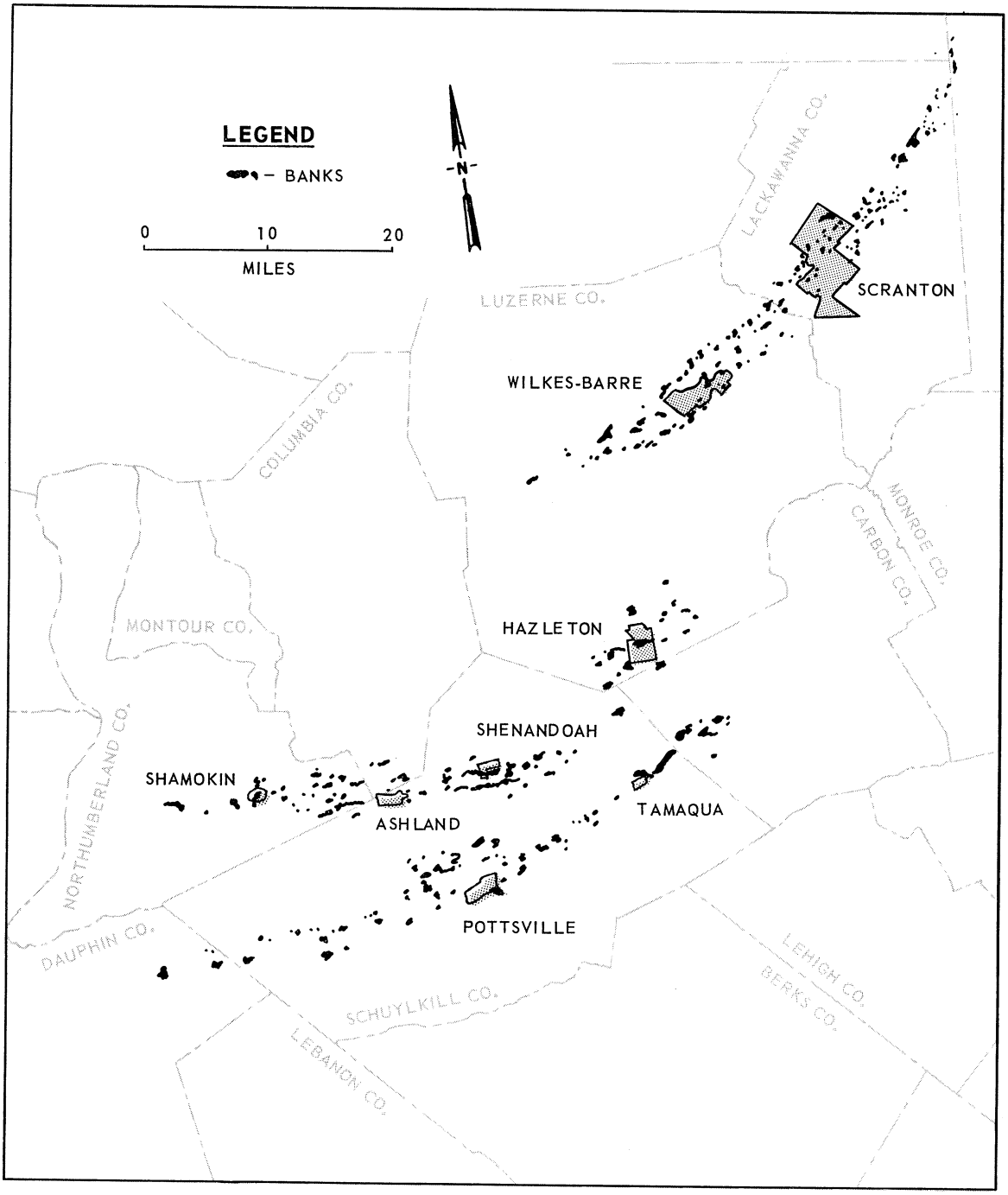

Figure 5. Distribution of culm, silt and rock banks, 1960
(After Deasy and Griess, 1963)

Although coal production today is only a fraction of what it was in the early 1900's there are more active mines now than during those peak years. In earlier times, operators were able to choose the best and most accessible coal veins to mine. This made it possible for a realtively few mines to produce large amounts of coal. Today the "easy" coal has been removed, and active mines are now removing coal from small and less accessible beds. The average mine today employs fewer people and produces much less coal than a mine did in the past.

In the anthracite region, the number of large deep mines (650), small deep mines (1150), and strip mines (230), all reached their maximum numbers around 1954 and 1955. A small deep mine is one that employs less than five people. A large deep mine has five or more employees. The number of bank mines (140), peaked in 1945. In 1960 there were 100 bank mines, 160 strip mines, 360 large deep mines, and 790 small deep mines in the anthracite region (see Figure 6, p. 24).

The production of coal in the anthracite region peaked at about 100 million net tons in 1917. During this period, the Western Middle Field also reached its peak production of 18.5 million tons. More than 90 percent of the coal produced in 1917 was mined by deep mining techniques. In 1960 the entire anthracite region produced about 18.0 million tons, of this 5.0 million was from the western middle field. At this time deep mining accounted for less than 50 percent of the coal produced. Of the total, 7,575,567 tons was from deep mining, 7,138,743 from strip mining and 3,006,803 from bank mining. Anthracite production data are given in Figure 7, p. 25.

By 1970 strip mining was the primary method of coal extraction, producing over 2-1/2 times as much coal as deep mines. Culm banks production also surpassed coal production from deep mines (see Table).

TABLE 1
PENNSYLVANIA ANTHRACITE PRODUCED IN 1970
(THOUSAND SHORT TONS)*

SOURCE (COAL FIELDS)	UNDERGROUND MINES	STRIP MINES	CULM BANKS	FROM RIVER DREDGING
Eastern Middle	19	857	635	-
Western Middle	307	1,088	1,145	W
Southern	860	1,591	733	W
Northern	556	1,006	524	-
Total	1,742	4,542	3,037	409

W = Withheld to avoid disclosure of Company Data.

* Data from Minerals Yearbook, 1970

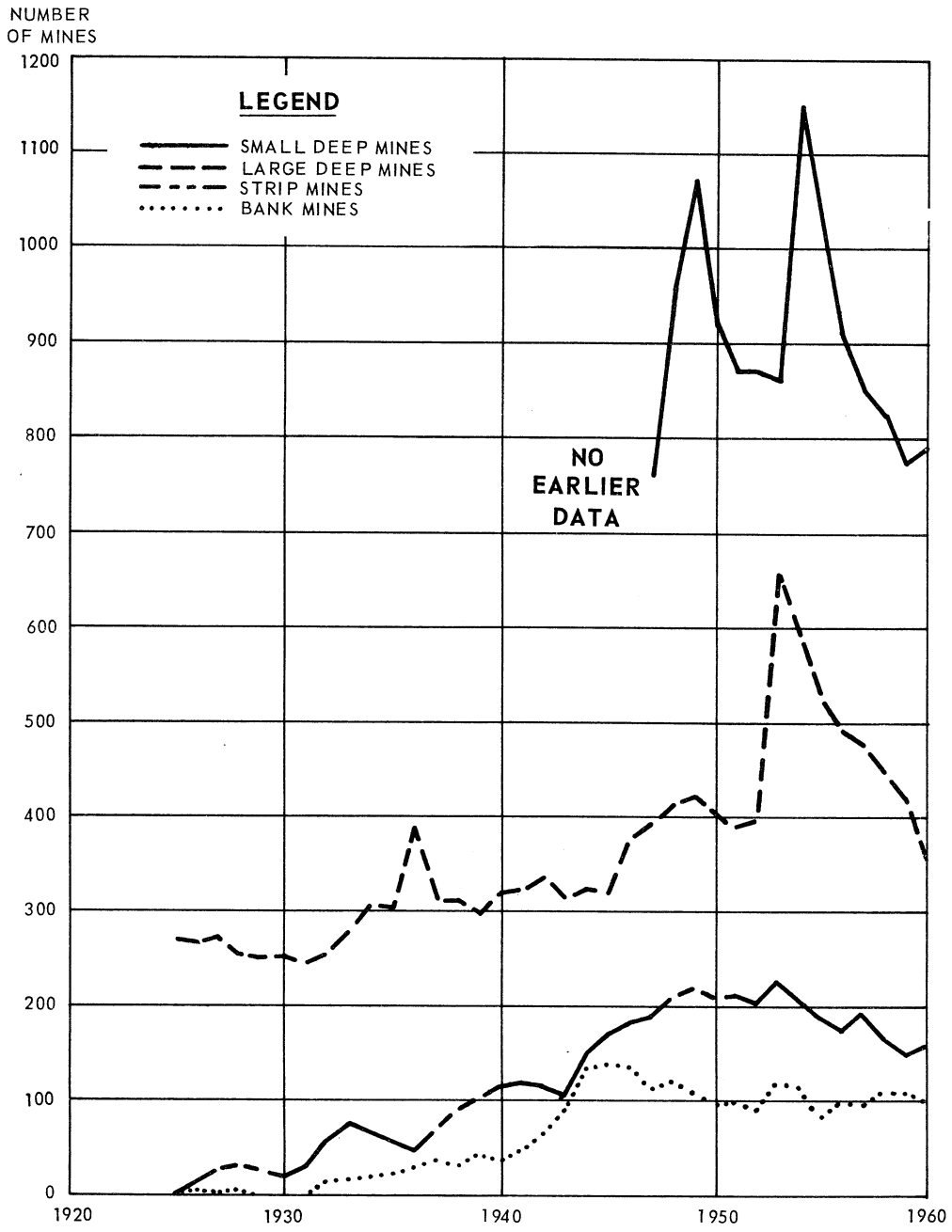

Figure 6. Number of anthracite mines by types, 1925-1960
(After Deasy and Griess, 1963)

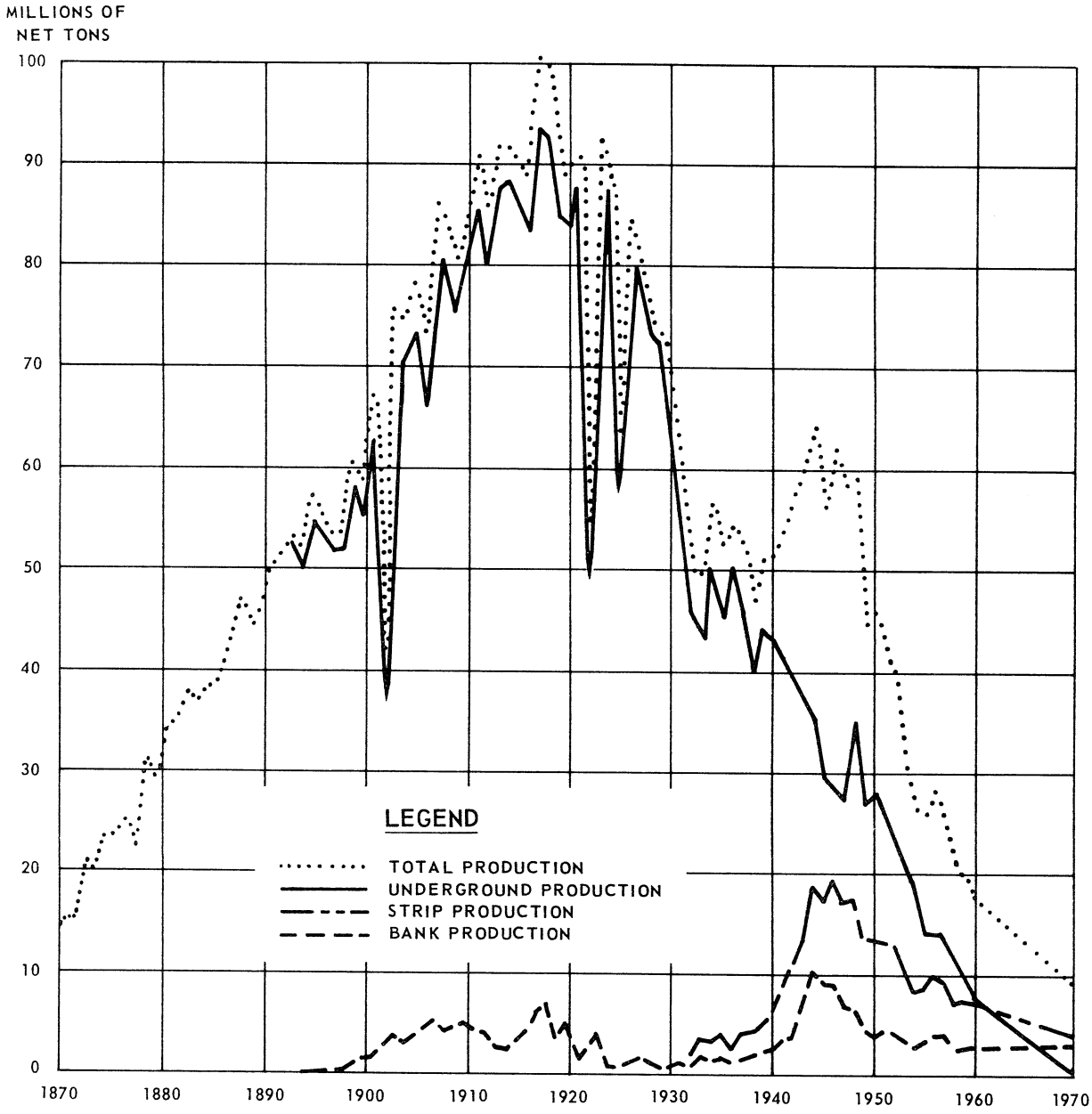

Figure 7. Anthracite production, 1870-1970
(After Deasy and Griess, 1963)

Although on a much smaller scale than the past, there are still several active mines in the Mahanoy Creek Watershed. The remaining active mines in the watershed are listed by category in Tables 2A and 2B.

TABLE 2A

ACTIVE STRIP MINE PERMITS

DISTRICT NO.	PERMIT NO.	PERMITEE NAME	LOCATION	TOWNSHIP	COUNTY
3	16-1	Lehigh Valley Anthracite	76° 9' 20'' (Long.) 40° 47' 50'' (Lat.)	Mahanoy	Schuylkill
3	16-12	Lehigh Valley Anthracite	76° 20' 99'' 40° 47' 50''	Conyngham	Columbia
3	16-14	Lehigh Valley Anthracite	76° 7' 30'' 40° 49' 20''	Mahanoy	Schuylkill
3	16-17	Lehigh Valley Anthracite	76° 17' 40'' 40° 48' 00''	W. Mahanoy & Butler	Schuylkill
3	16-18	Lehigh Valley Anthracite	76° 9' 40'' 40° 49' 20''	Mahanoy	Schuylkill
3	16-24	Lehigh Valley Anthracite	76° 17' 10'' 40° 48' 10''	Mahanoy & Union	Schuylkill
3	23-8	Reading Anthracite Co	76° 11' 10'' 40° 49' 20''	Mahanoy	Schuylkill
3	23-9	Reading Anthracite Co.	76° 11' 10'' 40° 49' 20''	Mahanoy	Schuylkill
3	23-12	Reading Anthracite Co.	76° 40' 20'' 40° 45' 50''	Zerbe	Northumberland
3	23-19	Reading Anthracite Co.	76° 40' 30'' 40° 46' 20''	Zerbe	Northumberland
3	47-37	Rosini Coal Co.	76° 38' 50'' 40° 46' 10''	Zerbe	Northumberland

TABLE 2A (Cont'd)

ACTIVE STRIP MINE PERMITS

DISTRICT NO.	PERMIT NO.	PERMITEE NAME	LOCATION	TOWNSHIP	COUNTY
3	47-45	Rosini Coal Co.	76° 38' 50'' 40° 46' 10''	Zerbe	Northumberland
3	47-46	Rosini Coal Co.	76° 38' 10'' 40° 46' 10''	Zerbe	Northumberland
3	47-46	Rosini Coal Co.	76° 38' 10'' 40° 46' 10''	Zerbe	Northumberland
3	86-8	Brook Contracting Co.	76° 13' 40'' 40° 49' 00''	W. Mahanoy	Schuylkill
3	172-1	H.S. & H. Coal Co.	76° 38' 50'' 40° 46' 20''	Zerbe	Northumberland

TABLE 2B

UNDERGROUND DEEP MINES PERMITS

COMPANY	TOWNSHIP	COUNTY
MINING DISTRICT #6		
Polcovich Coal Co.	Conynsham	Columbia
Fireside Mining Inc.	Butler	Schuylkill
White Coal Co.	Conynsham	Schuylkill
MINING DISTRICT #7		
Zanella Brothers Coal Co.	Conynsham	Columbia
Metzinger Co.	Conynsham	Columbia
Locustdale Mining Co.	Conynsham	Columbia
Pewor Coal Co.	Conynsham	Columbia
Zakrowski Coal Co.	Conynsham	Columbia
MINING DISTRICT #8		
Norwood Mining Co.	West Cameron	Northumberland
Split Vein Coal Co.	Zerbe	Northumberland
D & J (s) Coal Co.	West Cameron	Northumberland
Twin Oaks Coal Co.	Zerbe	Northumberland
T & L Coal Co.	Zerbe	Northumberland
4-D Coal Co.	Zerbe	Northumberland