An Index of Coal Production in Alabama and Tennessee

Coal mining is a sick industry. At the beginning of the century the mineral provided 90 per cent of the nation's mechanical energy, but, as everyone knows, it has consistently lost rank since then to its competitors, oil, natural gas, and water power, until at the present time it provides a scant 50 per cent of total energy. Since 1900 the nation's consumption of mechanical energy has almost quadrupled, but coal, first obtaining an inferior share of the market's growth, has since the early '20's suffered an absolute decline in the number of energy units provided.

This *Review* has published data on the coal industry in the Sixth District for many years, reporting the number of tons produced in Alabama and Tennessee. These data have now been indexed, and adjusted for seasonal variation.

Referring to the chart of this new series, on page 6, it will be noticed that the depression of the coal industry since the early '20's has been even more severe in this District than in the nation. This greater decline of coal mining in the District is largely accounted for by the fact that the heavy industries of the nation have remained relatively depressed throughout the past decade, and the collateral fact that the mines of Alabama and Tennessee are twice as dependent upon the activity of the heavy industries as are the mines of the country at large [in 1937, 33 per cent of this District's coal was consumed in making coke, the fuel of the iron and steel industry, as compared with 17 per cent of the nation's coal]. This fact, explaining our poorer showing in past years, may at the same time provide a brighter prospect, for the task of rearmament falls mostly upon the heavy goods industries, and if we have properly assigned the cause of our greater depression, we may expect the District's coal industry to improve relative to the nation in the near future.

According to 1939 production figures, Alabama and Tennessee, the only states producing coal in significant quantities in the District, have respective ranks of eight and eleven among the thirty-four coal producing states, and produce, respectively, 3.1 and 1.3 per cent of the nation's coal. Although the contribution of these states to the national total is small, the coal industry represents an important element in the industrial pattern of these states, particularly in Alabama. Adamson[2] estimates that in 1929 the mining industry distributed 6 per cent of that state's non-agricultural income, while Department of Commerce estimates for the same year indicate that the national mining industry accounted for only 3 per cent of the national non-agricultural income.

The District's coal production is, however, small in relation to its consumption, for Alabama and Tennessee do not produce enough coal to supply the six states, and perhaps not even enough to supply themselves. No data exist on the consumption of coal in the District for heating purposes. The *Minerals Year Book* estimates that in 1939 about 30 per cent of the national coal output was used for heating, but no estimates are provided on a state or regional basis. We may be sure, however, that, owing to our warmer climate, our larger proportion of rural population, and our lower per capita income, our six states do not consume for domestic and commercial heating their proportionate share. State data on the industrial consumption of coal do exist, and, supplemented with a rough state allocation of coal consumed by railroads in the "Southern Region," provide the basis of the table on page 6. As the table shows, coal uses of industry and railroading alone consumed in 1937, the latest year for which all the data are available, 15 per cent more coal than the District produced.

▶ The original data for the District index of coal production are collected by the Bituminous Coal Division of the Department of the Interior. The final figures released by this agency are based upon detailed annual reports of production and mine operations furnished voluntarily by the coal producers. These figures, however, are usually about 18 months late, and the agency therefore estimates current production on the basis of the railroad carloadings of all important coal carriers, shipments by river, and reports from a number of mining companies and operators' associations. Although the difference between the preliminary estimates and the final figures is usually very slight, it is our intention to make the necessary revisions in our index at the time of the issuance of the final data for each year. In the present index the final figures extend through the year 1938.

Since the data are released as aggregate net tons of coal produced by states, no problems of sampling and weighting were encountered, and a very simple method of index number construction was therefore adequate: for each month the daily average of the total coal produced in Alabama and Tennessee was related to the daily average of the total coal produced in those states during the base period 1935-1939. The years 1935-1939 were selected as a base because, as has been suggested in these columns before, this base permits the index to fluctuate more nearly around the 100 mark, and, having been adopted by many government departments, it facilitates comparison with other economic series.

Serious problems were encountered, however, in adjusting the series for seasonal variation. Because of the greater dependence of the District's coal industry upon the steel industry and other non-domestic users, output is little, if at all, affected by changes in the weather, and does not assume, therefore, as regular a seasonal pattern as one might expect. In addition to this difficulty, the occurrence of industry-wide strikes, particularly noticeable in the chart in

INDEX OF COAL PRODUCTION — ALABAMA AND TENNESSEE
1935-1939 daily average = 100
Unadjusted Index

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1921 . . .	137	115	96	90	94	98	92	98	110	126	116	92	105
1922 . . .	123	139	147	105	126	146	138	148	145	161	170	176	144
1923 . . .	182	169	171	165	160	159	159	159	168	163	164	143	163
1924 . . .	177	166	152	116	112	116	119	130	159	168	169	168	146
1925 . . .	176	155	134	127	130	133	145	164	178	173	188	185	157
1926 . . .	192	173	158	149	136	144	152	156	169	175	202	183	165
1927 . . .	210	199	195	150	135	134	133	157	161	147	140	132	158
1928 . . .	161	149	142	144	138	129	132	130	144	150	153	150	143
1929 . . .	161	164	139	139	143	131	134	136	149	154	125	162	145
1930 . . .	163	146	126	131	124	116	109	111	122	128	136	132	129
1931 . . .	132	118	118	106	105	97	93	97	101	94	96	87	104
1932 . . .	79	74	75	64	64	54	52	60	71	85	87	83	71
1933 . . .	80	76	61	61	67	71	95	99	93	74	75	82	78
1934 . . .	92	107	94	49	96	79	74	72	76	80	82	88	83
1935 . . .	96	110	107	71	85	86	66	73	72	14	61	105	79
1936 . . .	114	120	95	104	91	88	94	97	115	112	132	133	108
1937 . . .	126	132	144	22	87	109	113	112	119	118	117	115	110
1938 . . .	102	109	92	91	83	70	73	86	102	111	117	122	97
1939 . . .	129	130	124	22	46	99	108	108	119	134	136	136	108
1940 . . .	147	144	126	128	131	125	121	123	130	127			

[1]Unadjusted indexes for Alabama and Tennessee individually are available upon request.

[2]Adamson, W. M., *Income in Counties of Alabama*, University of Alabama, 1939, p. 86.

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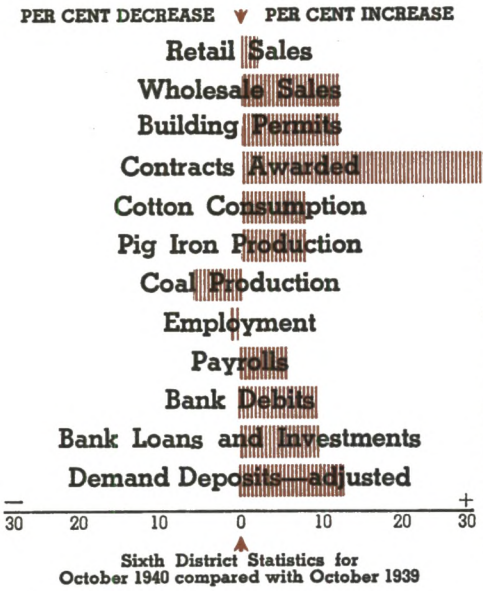
Reconnaissance



Sixth District Statistics for October 1940 compared with October 1939

(*Continued from Page* 1)

Construction contracts awarded in October increased 68 per cent over the September total, residential awards were up 40 per cent, and "All Other" contracts rose 83 per cent, and building permits at twenty cities increased 26 per cent. Textile activity increased 10 per cent in October and was up 27 per cent from the midsummer level. Steel mill activity in the Birmingham area was at 105 per cent of capacity during October, as compared with an average of 94.3 per cent for the country, and in the first three weeks of November the Alabama rate was 109 per cent and that for the country 96 per cent.

PRODUCTION AND CONSUMPTION OF BITUMINOUS COAL IN THE SIXTH FEDERAL RESERVE DISTRICT AND THE UNITED STATES FOR THE YEAR 1937[1]—(Thousands of Net Tons)

	PRODUCTION[2]	CONSUMPTION							
		Coke Industry[2]	Manufacturing[3]	Electric Power[4]	Class 1 Railroads[5]	Other[6]	Exports[2]	Total
Alabama.....	445,531	74,502	88,459	44,766	82,667	7	7	7
Florida.....	12,440	5,802	1,121	280	1,807	7	7	7
Georgia.....			30		1,881	7	7	7
Louisiana.....			739	33	2,284	7	7	7
Mississippi....			27		799	7	7	7
Tennessee....			240	22	1,408	7	7	7
Six States.....	5,213	110	2,016	359	1,311	7	7	7
United States.	17,653	5,912	4,173	694	9,490	138,103	13,145	441,642

[1] The latest year for which all data are available. [2] **Minerals Year Book, 1939.** [3] **Biennial Census of Manufacturers, 1937.** [4] **Minerals Year Book, 1939,** and **Electric Power Statistics, 1937.** [5] Total consumption of Southern Region **(Minerals Year Book, 1939)** allocated to states on basis of miles of road owned, 1937 **(Statistical Abstract, 1939).** [6] Largely an estimate of coal used for domestic and commercial heating. [7] No data available.

(*Continued from Page* 5)

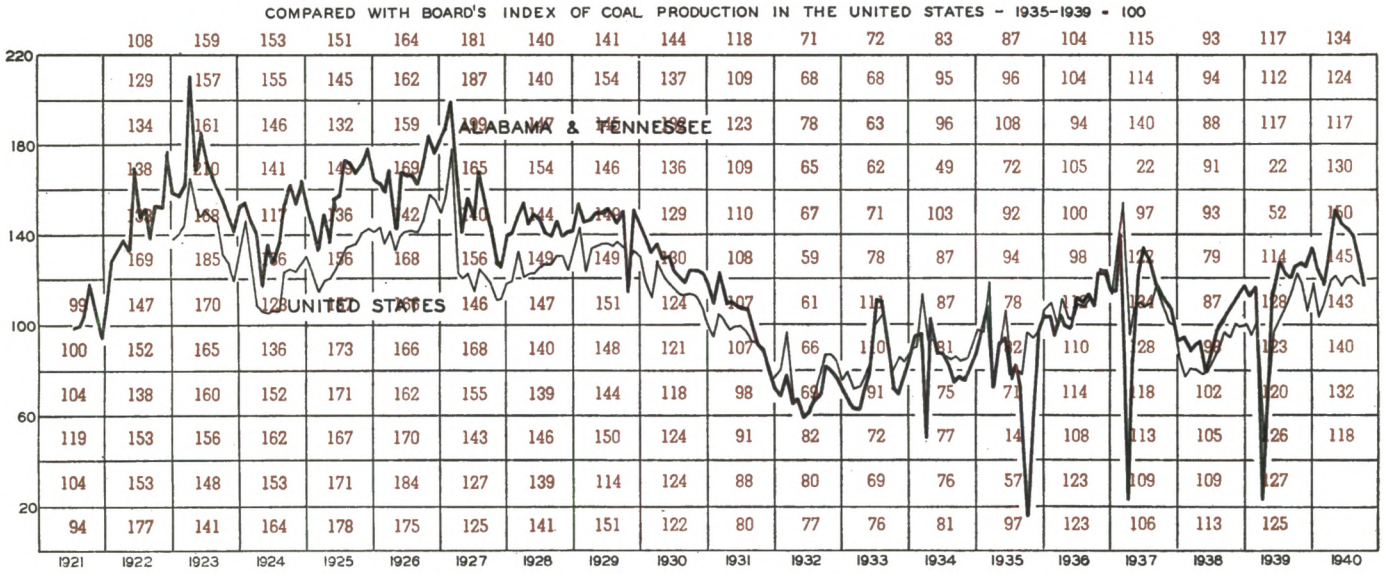
1934, 1935, 1937, and 1939, makes it impossible to isolate the seasonality of the series with orthodox methods. A freer method was therefore adopted.[3] The final seasonal adjustment is not too happy, but, since the method of seasonal adjustment adopted selects the seasonal factor for any point to a considerable extent on the basis of the factor's ability to smooth the curve, there is good reason to believe that the seasonally adjusted series is not smooth simply because it does not contain any very important regular seasonality.—J. E.

[3]Strikes in the District's mines cause the unadjusted index to drop close to zero. The usual method of seasonal adjustment calculates percentages of a 12-months moving average of the data, which percentages provide the seasonal factors. The assumption involved is that a 12-months moving average is capable of depicting the true cyclical and trend movements of the data, thus isolating the seasonality. However, in a series so deeply scarred by strikes, a moving average cannot properly depict the cycles, for a strike causes the moving average to fall sharply six months before, and rise equally sharply six months after, the event. These shifts are totally unrelated to the true cyclical pattern, and they make impossible the calculation of rational seasonal factors by this method. Therefore, the 12-months moving average was raised, free-hand, throughout the strike periods to approximate the appearance the curve would have had without strikes.

Further, there is no good reason to believe that so rigid a tool as a 12-months moving average can reveal the true cyclical pattern of a series even if there are no strikes, for it does not reach the peaks or troughs of the series, lags at turning points, and accommodates itself to any random movement with step-like adjustments 6 months before and after the event. Consequently, a method that by the use of a 12-months moving average seeks to find the seasonal elements as residuals is no more objective than one that with an equally rough assumed seasonality seeks to find the cyclical movements as residuals. For this reason free-hand adjustments of the 12-months moving average were not confined to periods affected by strikes but were made wherever such adjustments improved the regularity of the seasonal pattern throughout an appreciable number of months.—E. H.

NEW INDEX OF COAL PRODUCTION IN ALABAMA & TENNESSEE - 1935-1939 = 100

COMPARED WITH BOARD'S INDEX OF COAL PRODUCTION IN THE UNITED STATES - 1935-1939 = 100



Red figures are the seasonally adjusted index of coal production in Alabama and Tennessee.

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