STATE OF ILLINOIS
DWIGHT H. GREEN, *Governor*
DEPARTMENT OF REGISTRATION AND EDUCATION
FRANK G. THOMPSON, *Director*

DIVISION OF THE
STATE GEOLOGICAL SURVEY
M. M. LEIGHTON, *Chief*
URBANA

REPORT OF INVESTIGATIONS—NO. 94

ILLINOIS MINERAL INDUSTRY IN 1942

BY

WALTER H. VOSKUIL AND DOUGLAS F. STEVENS

Printed by authority of the State of Illinois

URBANA, ILLINOIS
1944

ORGANIZATION

STATE OF ILLINOIS

HON. DWIGHT H. GREEN, *Governor*

DEPARTMENT OF REGISTRATION AND EDUCATION

HON. FRANK G. THOMPSON, *Director*

BOARD OF NATURAL RESOURCES AND CONSERVATION

HON. FRANK G. THOMPSON, *Chairman*
EDSON S. BASTIN, PH.D., D.SC., *Geology*
ROGER ADAMS, PH.D., D.SC., *Chemistry*
LOUIS R. HOWSON, C.E., *Engineering*
WILLIAM TRELEASE, D.SC., LL.D., *Biology*
EZRA JACOB KRAUS, PH.D., D.SC., *Forestry*
ARTHUR CUTTS WILLARD, D.ENGR., LL.D.
President of the University of Illinois

GEOLOGICAL SURVEY DIVISION

M. M. LEIGHTON, *Chief*

(57326)
14

SCIENTIFIC AND TECHNICAL STAFF OF THE

STATE GEOLOGICAL SURVEY DIVISION

100 Natural Resources Building, Urbana

M. M. LEIGHTON, PH.D., *Chief*
ENID TOWNLEY, M.S., *Assistant to the Chief*
VELDA A. MILLARD, *Junior Asst. to the Chief*
DORIS EYLER, A.B., *Geological Assistant*
BETTY J. WESTERBEEK, *Geological Assistant*

GEOLOGICAL RESOURCES

Coal

G. H. CADY, PH.D., *Senior Geologist and Head*
L. C. MCCABE, PH.D., *Geologist* (on leave)
R. J. HELFINSTINE, M.S., *Mech. Engineer*
CHARLES C. BOLEY, M.S., *Assoc. Mining Eng.*
HEINZ A. LOWENSTAM, PH.D., *Assoc. Geologist*
BRYAN PARKS, M.S., *Asst. Geologist*
EARLE F. TAYLOR, M.S., *Asst. Geologist* (on leave)
M. W. PULLEN, JR., M.S., *Asst. Geologist*
ROBERT M. KOSANKE, M.A., *Asst. Geologist*
ROBERT ELLINGWOOD, B.S., *Asst. Geologist*
GEORGE M. WILSON, B.S., *Asst. Geologist*
ARNOLD EDDINGS, B.A., *Research Assistant* (on leave)
HENRY L. SMITH, A.B., *Research Assistant*
RAYMOND SIEVER, B.S., *Research Assistant*
JOHN A. HARRISON, B.S., *Research Assistant* (on leave)
MARY E. BARNES, B.S., *Research Assistant*
VIRGINIA KREMERS, B.S., *Research Assistant*
MARGARET PARKER, B.S., *Research Assistant*

Industrial Minerals

J. E. LAMAR, B.S., *Geologist and Head*
H. B. WILLMAN, PH.D., *Assoc. Geologist*
ROBERT M. GROGAN, PH.D., *Assoc. Geologist*
ROBERT R. REYNOLDS, M.S., *Asst. Geologist*
MARGARET COPELAND, A.B., *Research Assistant*

Oil and Gas

A. H. BELL, PH D., *Geologist and Head*
CARL A. BAYS, PH.D., *Geologist and Engineer*
FREDERICK SQUIRES, B.S., *Petroleum Engineer*
STEWART FOLK, M.S., *Assoc. Geologist*
WILLIAM H. EASTON, PH.D., *Assoc. Geologist*
ERNEST P. DUBOIS, PH.D., *Asst. Geologist*
PAUL G. LUCKHARDT, M.S., *Asst. Geologist* (on leave)
WAYNE F. MEENTS, *Asst. Geologist*
JAMES S. YOLTON, M.S., *Asst. Geologist*
MARGARET SANDS, B.S., *Research Assistant*

Areal and Engineering Geology

GEORGE E. EKBLAW, PH.D., *Geologist and Head*
RICHARD F. FISHER, M.S., *Asst. Geologist*

Subsurface Geology

L. E. WORKMAN, M.S., *Geologist and Head*
CARL A. BAYS, PH.D., *Geologist and Engineer*
CHARLES W. CARTER, PH.D., *Assoc. Geologist*
ARNOLD C. MASON, B.S., *Assoc. Geologist* (on leave)
C. LELAND HORBERG, PH.D., *Assoc. Geologist*
FRANK E. TIPPIE, B.S., *Asst. Geologist*
MERLYN B. BUHLE, M.S., *Asst. Geologist*
PAUL HERBERT, JR., B.S., *Asst. Geologist*
CHARLES G. JOHNSON, A.B., *Asst. Geologist*
DOROTHY B. SPEZIALE, M.S., *Asst. Geologist*
MARGARET CASTLE, *Research Assistant*
RUTH E. ROTH, B.S., *Research Assistant*

Stratigraphy and Paleontology

J. MARVIN WELLER, PH.D., *Geologist and Head*
CHALMER L. COOPER, M.S., *Assoc. Geologist*
WILLIAM H. EASTON, PH.D., *Assoc. Geologist*

Petrography

RALPH E. GRIM, PH.D., *Petrographer*
RICHARDS A. ROWLAND, PH.D., *Asst. Petrographer* (on leave)

Physics

R. J. PIERSOL, PH.D., *Physicist*
B. J. GREENWOOD, B.S., *Mech. Engineer*
DONALD O. HOLLAND, M.S., *Asst. Physicist* (on leave)

GEOCHEMISTRY

FRANK H. REED, PH.D., *Chief Chemist*
H. W. JACKMAN, M.S.E., *Chemical Engineer*
JAMES C. MCCULLOUGH, *Research Associate*
ELIZABETH ROSS MILLS, M.S., *Research Assistant*

Coal

G. R. YOHE, PH.D., *Chemist*

Industrial Minerals

J. S. MACHIN, PH.D., *Chemist and Head*
DELBERT L. HANNA, A.M., *Asst. Chemist*

Fluorspar

G. C. FINGER, PH.D., *Chemist*

X-ray and Spectrography

W. F. BRADLEY, PH.D., *Chemist*

Analytical

O. W. REES, PH.D., *Chemist and Head*
HOWARD S. CLARK, A.B., *Assoc. Chemist*
L. D. MCVICKER, B.S., *Assoc. Chemist*
P. W. HENLINE, M.S., *Assoc. Chemical Engineer*
WILLIAM F. WAGNER, M.S., *Asst. Chemist*
CAMERON D. LEWIS, B.A., *Asst. Chemist*
HERBERT N. HAZELKORN, B.S., *Research Assistant*
CAROL J. ADAMS, B.S., *Research Assistant*

MINERAL ECONOMICS

W. H. VOSKUIL, PH.D., *Mineral Economist*
DOUGLAS F. STEVENS, M.E., *Research Associate*
ETHEL M. KING, *Research Assistant*

PUBLICATIONS AND RECORDS

GEORGE E. EKBLAW, PH.D., *Geologic Editor*
CHALMER L. COOPER, M.S., *Geologic Editor*
DOROTHY E. ROSE, B.S., *Technical Editor*
PORTIA ALLYN SMITH, *Asst. Technical Editor*
ALMA R. SWEENY, A.B., *Technical Files Clerk*
ROSEMARY METZGER, *Technical Assistant*
MEREDITH M. CALKINS, *Geologic Draftsman*
BEULAH FEATHERSTONE, B.F.A., *Asst. Geologic Draftsman*
LESLIE D. VAUGHAN, *Asst. Photographer*

Consultants: *Ceramics,* CULLEN W. PARMELEE, M.S., D.SC., *and* RALPH K. HURSH, B.S., *University of Illinois*
Mechanical Engineering, SEICHI KONZO, M.S., *University of Illinois*
Topographic Mapping in Cooperation with the United States Geological Survey.
This report is a Contribution of the Mineral Economics Section.

December 1, 1943.

CONTENTS

ILLUSTRATIONS

TABLES

ILLINOIS MINERAL INDUSTRY IN 1942

BY

WALTER H. VOSKUIL AND DOUGLAS F. STEVENS

INTRODUCTION

ILLINOIS MINERAL INDUSTRY in 1942 exceeded the high record of value of output attained during the previous year. The total value of mineral production for the year amounted to $338,959,000 mined and sold or used by producers within the State. The additional value of $194,187,000 for mineral materials processed, but not mined, in Illinois, brought the total value of all minerals produced and processed during 1942, for which data are available, to $533,146,000. This was an increase of $33,929,000, or 6.8 per cent over the previous year and exceeded by 4.3 per cent the previous all-time high record established in 1920.

During the year 1942 most of the resources of our State and the energies of her people were devoted to the prosecution of the Second World War. The demands for military equipment and supplies had widely varying effects on our different mineral industries.

The changes in value of 1942 production from 1941 for the principal mineral materials were as follows:

	Per cent change from 1941		Per cent change from 1941
Liquefied petroleum gases	+92	Metals—zinc and lead	+24
Natural gas, sold and used as such	+49	Refractory products	+23
Fluorspar	+41	Limestone and dolomite	+17
Silica sand	+41	Cement	+17
Ground silica	+32	Whitewares and pottery	+13
Lime	+31	Natural gasoline	— 1
Fuller's earth	+26	Clays	— 4
Coal	+24	Crude oil	—16
Sand and gravel	+24	Structural clay products	—23

Compared with other states, Illinois in 1942 ranked first in value of production of silica sand, fluorspar, ground silica, and tripoli (amorphous silica); second in quantity of sand and gravel and in value of limestone and dolomite; third in quantity of coal; fourth in value of sand and gravel and of pig iron; and fifth in value of crude oil, lime, and coke and by-products.

Ranking of states by total value of production is not available for the past year.

Comparing the value of various minerals produced in Illinois during 1942, among themselves, petroleum ranked first with a value of $150,060,000; coal ranked second with a value of $123,603,000; stone, cement, and lime ranked third with a value of $25,565,000 (a second successive all-

TABLE 1.—SUMMARY OF MINERAL
SOLD OR USED BY

Product	Unit	Detail Table	1940				
			Quantity	Value	Av.	Rank among States	
						Quant.	Value
Petroleum—							
Crude oil	bbls.	19	147,647,000	*$156,500,000	*$1.06	4	4
Natural gas	M. cu. ft.	"	*9,739,407	*300,848	*.031		
Natural gasoline	gals.	"	*21,498,601	*805,265	*.037	*10	*10
Liquefied petroleum gases	"	"	*9,974,102	*274,000	*.028		
			—	*157,880,113	—		
Coal—bituminous	tons	5	51,283,000	86,667,000	1.69	3	4
Stone—							
Limestone and dolomite	tons	26	9,487,369	7,751,479	.82	4	4
Cement	bbls.	32	5,006,727	7,347,253	1.47	8	10
Lime	tons	33	161,358	1,150,113	7.15	8	6
			—	16,248,845	—		
Clay and clay products—							
Clays (except fuller's earth)	tons	37	160,666	340,376	2.12	6	7
Fuller's earth	"	"	24,974	205,494	8.24	4	4
Clay products—structural	equiv. tons	"	1,272,654	7,051,300	5.55		4
White wares and pottery	—	"	—	4,965,374	—		
Refractory products	tons	"	198,343	3,872,045	19.50		
			—	16,434,589	—		
Sand and gravel—							
Silica sand	tons	34	1,396,087	1,811,363	1.30		
Sand (other than silica sand)	"	"	3,518,135	1,450,400	.41		
Gravel	"	"	5,839,226	2,576,362	.44		
			10,753,448	5,838,125	.54	4	5
Fluorspar	tons	41	104,698	2,313,747	22.10	1	1
Metals—							
Zinc	tons	45	4,818	607,068	126.00		
Lead	"	"	1,508	150,800	100.00		
Silver	fine ounces	"	4,766	3,389	0.71		
			—	761,257	—		
Ground silica	tons	35	106,397	628,488	5.88	1	1
Tripoli (amorphous silica)	"	36	11,521	155,576	13.45	2	1
Other minerals	"	46	279,724	242,526	—		
Annual mineral production			—	*$287,170,266	—		5
Minerals processed, but not mined, in Illinois[2]							
Coke and byproducts	—	47	—	26,951,464		6	5
Packaged fuel	tons	"	3,813	36,531	9.60	7	7
Pig iron	"	"	4,093,623	73,882,065	18.05	4	4
Sulfuric acid	"	"	188,355	1,721,565	9.15	2	2
Slab zinc (out of state ore)	"	"	97,001	12,222,126	126.00	3	3
Miscellaneous minerals	"	"	—	—	—		
			—	114,813,751	—		
Total minerals produced and processed			—	*$401,984,017	—		

[1] Compiled from various sources, as stated in each detailed table. See footnotes for each table.

[2] Other processed minerals produced in Illinois include pig lead, mineral wool, expanded vermiculite, alumina, phosphates, etc., but data for them are not available.

PRODUCTION OF ILLINOIS PRODUCERS, 1940-1942 [1]

1941					1942					
Quantity	Value	Av.	Rank among States		Quantity	Value	Av.	Per cent change in value from 1941	Rank among States	
			Quant.	Value					Quant.	Value
*132,393,000	*$172,100,000	$1.30	4	4	106,391,000	$144,800,000	$1.36	—15.9	5	5
*12,656,636	*382,756	.03			16,436,437	570,712	.035	+48.8		
*54,872,000	*2,693,000	*.049	*8	*6	66,616,000	2,664,640	.04	—1.1	8	
38,293,000	1,054,000	.028	*4	*6	73,619,000	2,024,522	.028	+92.1		
—	*176,229,756	—			—	150,059,874	—	—14.9		
55,365,835	100,212,000	1.81	3	*4	65,746,204	123,602,864	1.88	+23.6	3	
12,206,136	11,104,104	.91	4	3	14,006,556	13,014,429	.93	+17.2	4	2
6,033,440	8,799,667	1.46	9	9	7,087,400	10,284,111	1.45	+16.9	10	10
246,278	1,723,850	7.02	6	5	314,077	2,266,152	7.21	+31.5	6	5
—	21,627,621	—			—	25,564,692	—	+18.2		
222,405	490,525	2.20	6	7	196,759	468,836	2.38	—4.4	6	7
26,676	209,577	7.87	4	4	30,421	264,611	8.70	+26.3	4	4
1,556,420	8,248,514	5.32		4	1,135,167	6,326,510	5.57	—23.3		
—	6,555,472	—			—	7,381,217	—	+12.6		
244,352	4,791,299	19.61			275,456	5,918,118	21.48	+23.3		
—	20,295,387	—			—	20,359,292	—	+0.3		
2,092,700	2,872,961	1.37			3,103,897	4,055,602	1.31	+41.2	1	1
5,038,032	2,249,091	.45			5,470,381	2,628,110	.48	+16.8		
8,230,247	3,764,944	.46			9,694,083	4,845,388	.50	+28.7		
15,360,979	8,886,996	.58	*4	5	18,268,361	11,529,100	.63	+29.7	2	4
133,333	3,047,247	22.85	2	1	161,949	4,306,750	26.59	+41.3	1	1
9,198	1,379,700	150.00			9,389	1,746,354	182.00	+26.5		
2,376	270,864	114.00			2,344	314,096	134.00	+16.0		
20,340	14,464	0.71			104	74	.71			
—	1,665,028	—			—	2,060,524	—	+23.7		
139,116	849,609	6.10	1	1	166,303	1,122,756	6.79	+32.1	1	1
13,833	200,700	14.45	1	1	12,575	203,390	16.17	+1.3	1	1
137,053	171,177	—			57,489	149,737	—	—		
—	*$333,185,521	—		*5	—	$338,958,979	—	+1.7		
—	33,654,940		6	5	—	35,038,054	—	+4.1	6	5
8,924	95,431	10.60	7	7	4,980	60,001	12.05	—37.2	7	7
5,461,459	113,558,606	20.79	4	4	5,871,858	125,662,134	21.30	+10.6	4	4
*213,749	*1,814,729	*8.49	*2	*2	215,494	2,036,418	9.45	+12.2		
112,723	16,908,450	150.00	3	3	[3]	[3]				
—	—	—			—	31,390,781	—	—		
—	*166,032,156	—			—	194,187,388	—	+16.9		
—	*$499,217,677	—			—	$533,146,367	—	+6.8		

[3] Included in "Miscellaneous minerals."
* Final revision.

time record); clay and clay products ranked fourth with a value of $20,359,000; sand and gravel and silica sand ranked fifth with a value of $11,529,000 (an all-time high record).

Considering mineral materials processed, but not mined, in Illinois, pig iron ranked first with a value of $125,662,000 (a second successive all-time high record); coke and byproducts were second with $35,038,000. Other processed mineral materials are produced in Illinois in large amounts, but data for them are not available.

Acknowledgments

This report is made possible through the cooperation of the Bureau of Mines and the Bituminous Coal Division of the United States Department of the Interior, the Illinois State Department of Mines and Minerals, and the cooperation of mineral producers throughout Illinois in furnishing information regarding their operations.

Each of the sections of this report was prepared in close collaboration with the heads of the several mineral research divisions of the Illinois State Geological Survey. Special assistance and advice were contributed by J. E. Lamar, Geologist and Head of the Industrial Minerals Division; G. H. Cady, Senior Geologist and Head of the Coal Division; A. H. Bell, Geologist and Head of the Oil and Gas Division; C. W. Carter, Associate Geologist in the Oil and Gas Division; and Ralph E. Grim, Petrographer.

Effect of War on Demand for Illinois Minerals

A first glance at the record of mineral production in Illinois shows that, with the exception of petroleum, clays, and structural clay products, there was a general and substantial increase in output of minerals in 1942 as compared with two previous years, 1940 and 1941. This situation was anticipated in view of the increased tempo of industrial activity as war production went into high gear and in view of the importance of minerals in that activity. A close examination of the production record, however, shows the discriminating effects of the demands created by the armaments program.

The increased demand on industrial minerals used in the metallurgical industry is particularly noteworthy. Demand for refractory products increased 23 per cent, silica sand 41 per cent, ground silica 32 per cent, and lime 31 per cent.

The production of coal increased 18 per cent in quantity and 24 per cent in value, whereas the output of crude oil, on the other hand, declined 19 per cent in quantity and 16 per cent in value.

Production of crude oil in Illinois continued to decline from the high level of 1940. The decline of productivity in some of the larger and older fields of the Illinois basin, together with the decrease in the size of new pools currently discovered, were the initial cause of the production loss. However, the normal procedure of meeting a strong market demand by more intensified exploration and wildcat drilling was curtailed by the restrictions imposed upon the purchase of drilling field equipment and supplies for the oil-producing industry, and other causes.

Mineral output in building materials lagged behind output of industrial minerals. Residential building, which reached a peak in the third quarter of 1941, fell off in the fourth quarter and declined sharply all through 1942. Industrial construction and military and naval construction increased from almost negligible values in 1940, continued to increase during 1941, and dominated the picture in the first half of 1942. By the end of the third quarter in 1942, military and industrial construction had reached a peak and thereafter fell off sharply. This was reflected in a decline in demand for non-metallic materials used in building construction.

SUMMARY OF PRODUCTION AND VALUE OF ILLINOIS MINERALS IN 1942

A summary of the production and value of Illinois minerals in 1942 is presented in table 1, with comparative data for 1940 and 1941. Detailed figures for each mineral are given in the various sections of this report, to which reference is made in table 1.

The unit of quantity measurement used for each mineral product is that commonly used in the commercial handling of that material. Wherever possible the net or short ton of 2,000 pounds is used, but some products are sold by the gallon, barrel, cubic foot, or by the number of pieces. In some materials, diversity of products makes it impossible to give any measure of quantity.

The value of each mineral product, in its first marketable form, is given as its net selling price at point of origin, without including any transportation expense other than that necessary in bringing it from the mine to the place where it is made into a marketable product. Wherever possible, average or unit rates of value are given. The quantity and value of metals are given, not as those of the ores, but in terms of the recovered metals.

Mineral production is considered as those minerals or mineral materials which were mined and sold or used by producers in Illinois. Mineral materials which were processed, but not mined, in Illinois are shown separately. Every effort has been made to avoid duplication.

Illinois has attained a position of importance among the various states in the production of several mineral materials. Its rank both in quantity and value of these materials is given in table 1.

In order to permit comparison of recent mineral production with that in previous years, figure 1 and table 2 are presented, which show the value of annual mineral production of Illinois from 1914 to 1942, inclusive. These indicate the effect on the State's mineral industry of the first World War and the period of great industrial activity which followed through 1923, then a period of gradual reduction through 1929, followed by extreme reduction through the depression years, and then gradual increases through 1937. A temporary decline in 1938 preceded the period of great activity caused by the second World War beginning in 1939. During 1942 a new all-time high record was attained for total value of minerals produced and processed in Illinois.

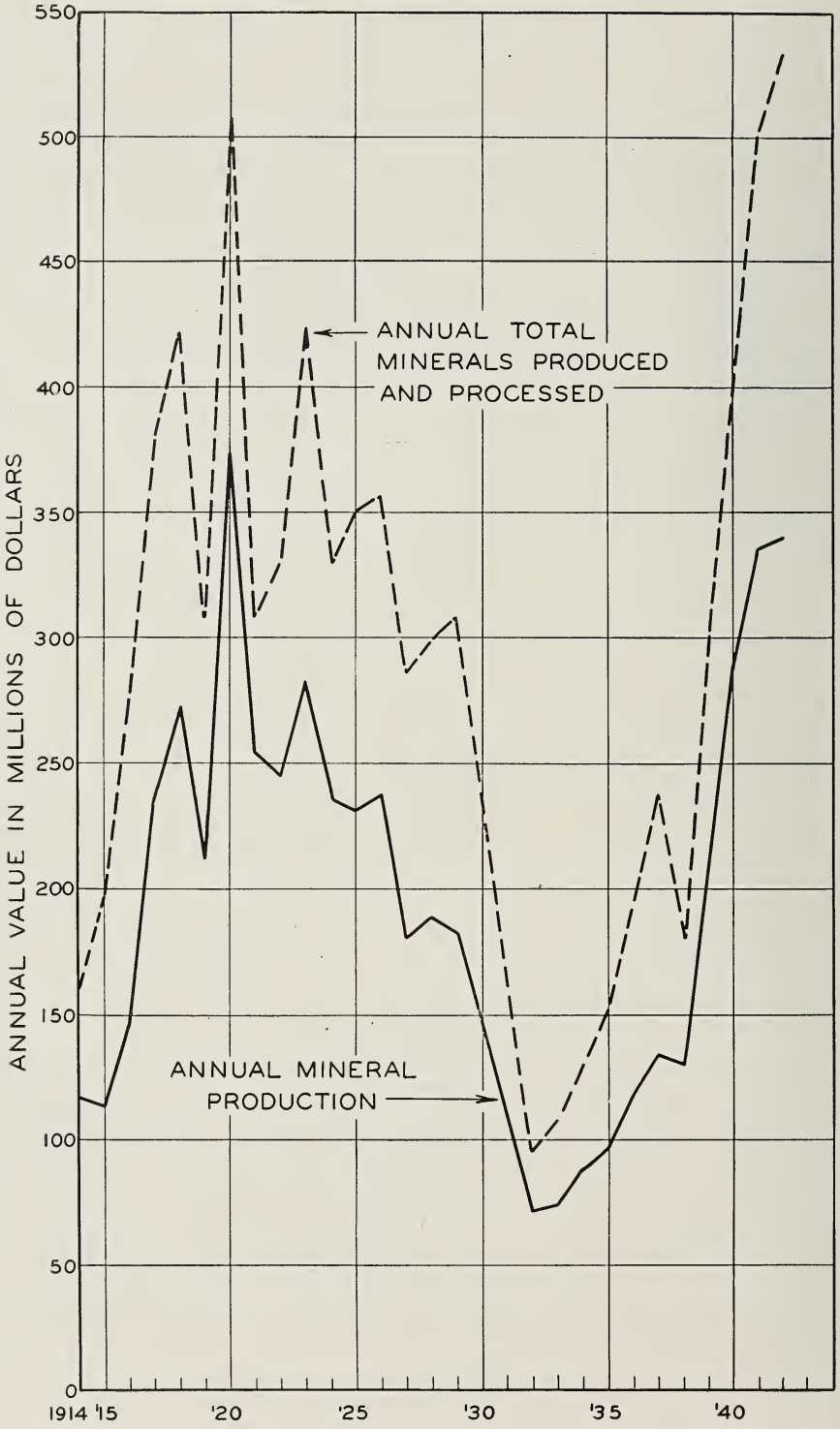

FIG. 1.—Value of annual mineral production in Illinois, 1914-1942

TABLE 2.—VALUE OF ILLINOIS MINERAL PRODUCTION
SUMMARY OF ANNUAL VALUES, 1914-1942 [1]
(In thousands of dollars)

Year	Mineral Production of Illinois (thousands)	Minerals Processed, but not Mined, in Illinois (thousands)	Total Minerals Produced and Processed (thousands)
1914	$117,166	$44,843	$162,009
15	114,446	82,871	197,317
16	146,360	130,082	276,442
17	234,736	144,754	379,490
18	271,244	149,740	420,984
19	213,701	95,077	308,778
1920	373,926	137,228	511,154
21	254,019	54,136	308,155
22	244,618	85,820	330,438
23	282,761	142,131	424,892
24	235,796	95,506	331,302
1925	231,658	118,702	350,360
26	237,242	119,642	356,884
27	180,394	105,099	285,493
28	188,099	110,622	298,721
29	182,791	125,516	308,307
1930	148,311	89,303	237,614
31	108,066	52,014	160,080
32	71,693	24,385	96,078
33	74,837	34,786	109,623
34	89,212	41,405	130,617
1935	96,484	57,038	153,522
36	117,916	78,693	196,609
37	133,437	104,359	237,796
38	130,155	50,482	180,637
39	215,178	86,324	301,502
1940	*287,170	114,814	*401,984
41	*333,186	*166,032	*499,218
42	338,959	194,187	533,146

[1] Compiled from U. S. Geol. Survey, Mineral Resources of U. S.—1914 to 1923, incl.
U. S. Bur. Mines, Mineral Resources of U. S.—1924 to 1931, incl.
U. S. Bur. Mines, Minerals Yearbooks—1932 to 1938, incl.
Minerals Yearbooks and joint canvasses made by U. S. Bur. Mines and Illinois Geol. Survey—1939 to 1942, incl.
* Final revision.

COAL

The coal output of Illinois in 1942 was 65,746,204 tons, valued at approximately $123,602,864. Coal continues, as in the past three years, the second mineral product in value in the State, ranking next to petroleum. Illinois ranks third in the United States in quantity of bituminous coal produced, being exceeded only by West Virginia and Pennsylvania. Illinois produced 11.3 per cent of the national total in 1942.

TABLE 3.—BITUMINOUS COAL PRODUCTION IN THE UNITED STATES, BY STATES, 1938-1942[1, 2]
(In thousands of net tons)

	1938	1939	1940	1941	1942
Alabama	11,062	12,047	15,324	15,204	18,870
Alaska	155	148	174	241	280
Arkansas and Oklahoma	2,442	2,340	3,100	3,423	4,146
Colorado	5,663	5,923	6,589	6,905	7,990
Georgia and North Carolina	[3]	[3]	42	40	44
Illinois	42,387	47,627	51,283	55,366	65,746
Indiana	14,758	16,943	18,869	22,590	25,470
Iowa	3,103	2,948	3,231	2,950	2,990
Kansas and Missouri	6,090	5,948	6,676	7,445	8,340
Kentucky:					
Eastern	31,177	34,266	40,346	41,510	46,727
Western	7,368	8,291	8,795	11,765	13,240
Maryland	1,281	1,443	1,503	1,748	1,898
Michigan	495	457	410	370	320
Montana	2,732	2,804	2,867	3,200	3,858
New Mexico	1,239	1,230	1,111	1,250	1,696
North and South Dakota	2,098	2,120	2,284	2,426	2,488
Ohio	18,591	20,289	22,772	29,690	34,600
Pennsylvania (bituminous)	77,705	92,584	116,603	127,470	143,174
Tennessee	4,472	5,185	6,008	6,713	7,425
Texas	879	826	621	368	342
Utah	2,947	3,285	3,576	4,013	5,670
Virginia	12,283	13,531	15,348	18,340	19,900
Washington	1,567	1,690	1,650	1,875	1,988
West Virginia:					
Southern	{ 93,288	108,362	126,438	140,886	{ 111,486
Northern					45,264
Wyoming	5,204	5,373	5,808	6,647	8,025
Other states[4]	34	39	17	21	19
Total bituminous	349,020	395,699	461,445	512,456	581,996

[1] Final figures for 1938, 1939, and 1940 from U. S. Bur. Mines, Minerals Yearbooks. Final figures for 1941 and preliminary figures for 1942 from U. S. Dept. Interior, Bituminous Coal Div., Weekly Coal Reports; with the exception of those for Illinois (which include all mines irrespective of size of production) from Illinois Dept. Mines and Minerals, annual Coal Reports; total figures for the U. S. include this additional production.
[2] Includes lignite.
[3] Included in "Other states."
[4] The states reporting are not identical from year to year.

PRODUCTION

The production of bituminous coal in each state for 1938 to 1942 inclusive is shown in table 3. During the past five years, ending with 1942, a

progressive increase in production has occurred in the nation as a whole, as also in Illinois.

Table 4 shows the production of coal in the Eastern Interior basin comprising the coal producing districts of Illinois, Indiana, and Western Kentucky. The production history of these three districts and the contribution of each to the total production of the Eastern Interior basin is shown in this table.

TABLE 4.—PRODUCTION OF BITUMINOUS COAL IN THE EASTERN INTERIOR COAL FIELD, 1913-1942[1]

(In thousands of net tons)

Year	Illinois		Indiana		West Kentucky		Total
	Amount	Per cent[2]	Amount	Per cent[2]	Amount	Per cent[2]	
1913....	61,619	*70.5*	17,166	*19.7*	8,518	*9.8*	87,303
1914....	57,589	*70.2*	16,641	*20.3*	7,838	*9.5*	82,068
1915....	58,830	*70.6*	17,006	*20.4*	7,542	*9.0*	83,378
1916....	66,195	*70.4*	20,094	*21.3*	7,787	*8.3*	94,076
1917....	86,199	*70.1*	26,539	*21.6*	10,214	*8.3*	122,952
1918....	89,291	*68.2*	30,679	*23.5*	10,799	*8.3*	130,769
1919....	60,863	*67.4*	20,912	*23.1*	8,632	*9.5*	90,407
1920....	88,725	*68.8*	29,351	*22.7*	11,036	*8.5*	129,112
1921....	69,603	*70.7*	20,320	*20.6*	8,616	*8.7*	98,539
1922....	58,468	*63.9*	19,133	*21.0*	13,734	*15.1*	91,335
1923....	79,310	*68.0*	26,229	*22.6*	10,890	*9.4*	116,429
1924....	68,323	*69.2*	21,480	*21.7*	9,020	*9.1*	98,823
1925....	66,909	*66.8*	21,223	*21.1*	12,187	*12.1*	100,321
1926....	69,367	*64.3*	23,186	*21.4*	15,464	*14.3*	108,017
1927....	46,848	*54.4*	17,936	*20.9*	21,205	*24.7*	85,989
1928....	55,948	*63.2*	16,379	*18.5*	16,277	*18.3*	88,604
1929....	60,658	*64.9*	18,344	*19.6*	14,437	*15.5*	93,439
1930....	53,731	*66.2*	16,490	*21.3*	10,915	*13.5*	81,136
1931....	44,303	*66.0*	14,295	*21.2*	8,579	*12.8*	67,177
1932....	33,475	*59.3*	13,324	*23.7*	9,540	*17.0*	56,339
1933....	37,413	*63.4*	13,761	*23.3*	7,834	*13.3*	59,008
1934....	41,272	*64.2*	14,794	*23.0*	8,215	*12.8*	64,281
1935....	45,525	*65.6*	15,754	*22.7*	8,134	*11.7*	69,413
1936....	50,927	*66.1*	17,822	*23.1*	8,370	*10.8*	77,119
1937....	51,602	*66.2*	17,765	*22.8*	8,563	*11.0*	77,930
1938....	41,912	*65.5*	14,759	*23.0*	7,368	*11.5*	64,039
1939....	46,783	*65.0*	16,943	*23.5*	8,291	*11.5*	72,017
1940....	50,610	*65.3*	18,869	*24.1*	8,795	*11.2*	78,274
1941....	54,200	*61.2*	22,590	*25.5*	11,765	*13.3*	88,555
1942....	63,750	*62.2*	25,470	*24.9*	13,240	*12.9*	102,460

[1] Annual Volume of Mineral Resources of the United States, Part II, 1913-1930; Minerals Yearbook, 1931-1941; Weekly Coal Report No. W.C.R. 1335, February 20, 1943. Does not include mines with daily production of less than 50 tons.

[2] Per cent of total in Eastern Interior coal field.

Illinois coal production for 1942 is shown in table 5 by types of mines, giving the counties and mine inspection districts. Local mines are those which do not ship by rail. The regional concentration of the Illinois coal industry is shown in this table. Franklin County, in the southern part of

TABLE 5.—COAL PRODUCTION OF ALL ILLINOIS MINES
(In

Mine inspection district	County	Shipping mines					
		Strip		Underground		Total	
		No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons
14	Adams						
6	Bond			1	50,756	1	50,756
14	Brown						
1	Bureau			1	42,118	1	42,118
4	Christian			6	6,019,794	6	6,019,794
13	Clinton			4	285,683	4	285,683
13	Crawford						
5	Edgar						
10	Franklin			12	13,924,971	12	13,924,971
3	Fulton	9	5,245,434	5	242,888	14	5,488,322
11	Gallatin						
7	Greene						
1	Grundy						
14	Hancock						
3	Henry	2	549,014	1	77,637	3	626,651
9	Jackson	1	515,980	3	1,982,665	4	2,498,645
13	Jefferson			1	516,606	1	516,606
7	Jersey						
3	Knox	2	1,157,195	1	17,930	3	1,175,125
1	LaSalle	2	142,909	2	186,567	4	329,476
1	Livingston						
2	Logan						
14	McDonough						
4	Macon						
6	Macoupin			8	4,834,379	8	4,834,379
7	Madison			5	1,809,536	5	1,809,536
13	Marion			1	223,999	1	223,999
1	Marshall						
4	Menard						
14	Mercer						
6	Montgomery			1	900,159	1	900,159
4	Morgan						
9	Perry	2	2,971,566	10	1,212,902	12	4,184,468
2	Peoria			1	422,061	1	422,061
7	Pike						
9	Randolph	1	937,764	4	1,086,288	5	2,024,052
14	Rock Island						
8	St. Clair	1	327,240	16	1,350,209	17	1,677,449
11	Saline	1	581,558	9	3,837,146	10	4,418,704
4	Sangamon			8	3,140,447	8	3,140,447
14	Schuyler	1	103,355			1	103,355
7	Scott						
4	Shelby						
2	Stark						
2	Tazewell						

BY TYPE OF MINE, AND BY COUNTIES, 1942[1]
tons)

Local mines						County total			
Strip		Underground		Total					
No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons	Per cent of State total	Mine inspection district
1	151	.....	.....	1	151	1	151	.....	14
.....	.....	.....	.....	.....	.....	1	50,756	*0.1*	6
1	31	.....	.....	1	31	1	31	.....	14
1	66,487	4	4,798	5	71,285	6	113,403	*0.2*	1
.....	.....	1	13,743	1	13,743	7	6,033,537	*9.2*	4
.....	.....	.....	.....	.....	.....	4	285,683	*0.4*	13
.....	.....	1	216	1	216	1	216	.....	13
.....	.....	4	37,305	4	37,305	4	37,305	.....	5
.....	.....	.....	.....	.....	.....	12	13,924,971	*21.2*	10
1	158,404	63	302,760	64	461,164	78	5,949,486	*9.1*	3
.....	.....	13	66,646	13	66,646	13	66,646	*0.1*	11
.....	.....	18	1,939	18	1,939	18	1,939	.....	7
1	60,333	3	14,001	4	74,334	4	74,334	*0.1*	1
1	15,637	2	196	3	15,833	3	15,833	.....	14
.....	.....	11	85,651	11	85,651	14	712,302	*1.1*	3
.....	.....	9	58,470	9	58,470	13	2,557,115	*3.9*	9
1	34	1	22	2	56	3	516,662	*0.8*	13
.....	.....	1	42	1	42	1	42	.....	7
1	358	15	206,702	16	207,060	19	1,382,185	*2.1*	3
7	29,343	8	31,031	15	60,374	19	389,850	*0.6*	1
1	1,013	3	4,338	4	5,351	4	5,351	.....	1
.....	.....	2	48,962	2	48,962	2	48,962	*0.1*	2
4	5,661	19	3,560	23	9,221	23	9,221	.....	14
.....	.....	1	7,474	1	7,474	1	7,474	.....	4
.....	.....	2	26,517	2	26,517	10	4,860,896	*7.4*	6
.....	.....	16	273,944	16	273,944	21	2,083,480	*3.2*	7
.....	.....	.....	.....	.....	.....	1	223,999	*0.3*	13
1	80	6	4,143	7	4,223	7	4,223	.....	1
.....	.....	14	109,527	14	109,527	14	109,527	*0.2*	4
.....	.....	7	14,883	7	14,883	7	14,883	.....	14
.....	.....	.....	.....	.....	.....	1	900,159	*1.4*	6
.....	.....	1	134	1	134	1	134	.....	4
1	32,637	7	25,306	8	57,943	20	4,242,411	*6.5*	9
.....	.....	57	462,532	57	462,532	58	884,593	*1.3*	2
.....	.....	1	9	1	9	1	9	.....	7
.....	.....	6	40,726	6	40,726	11	2,064,778	*3.2*	9
.....	.....	7	10,448	7	10,448	7	10,448	.....	14
2	728,788	23	282,311	25	1,011,099	42	2,688,548	*4.1*	8
.....	.....	9	37,155	9	37,155	19	4,455,859	*6.8*	11
.....	.....	14	149,816	14	149,816	22	3,290,263	*5.0*	4
2	259	24	39,739	26	39,998	27	143,353	*0.2*	14
.....	.....	2	181	2	181	2	181	.....	7
.....	.....	5	6,479	5	6,479	5	6,479	.....	4
.....	.....	7	7,665	7	7,665	7	7,665	.....	2
.....	.....	3	134,195	3	134,195	3	134,195	*0.2*	2

TABLE 5.—

Mine inspection district	County	Shipping mines					
		Strip		Underground		Total	
		No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons
5	Vermilion	1	230,857	4	1,851,153	5	2,082,010
13	Wabash	.....	.....	.....	.....	.....	.....
14	Warren	.....	.....	.....	.....	.....	.....
13	Washington	.....	.....	2	346,900	2	346,900
1	Will	2	1,283,193	.....	.....	2	1,283,193
12	Williamson	3	781,170	7	1,895,265	10	2,676,435
2	Woodford	.....	.....	1	39,334	1	39,334
Number of mines		28		114		142	
Total produced—1942			14,827,235		46,297,393		61,124,628

SUMMARY OF PRODUCTION

	1941		1942		
	Number of mines[2]	Tons	Number of mines[2]	Tons	Per cent change from 1941
Strip mines					
Shipping	29	13,360,820	28	14,827,235	+11.0
Local	29	881,096	30	1,110,446	+26.0
	58	14,241,916	58	15,937,681	+11.9
Underground mines					
Shipping	113	37,672,499	114	46,297,393	+22.9
Local	628	3,451,420	513	3,511,130	+ 1.7
	741	41,123,919	627	49,808,523	+21.1
Total coal produced	799	55,365,835	685	65,746,204	+18.7

[1] Compiled from Illinois Department of Mines and Minerals, Sixty-first Coal Report, 1942.
[2] Number of mines reporting production during 1942.

the State, and Christian County, in the central part, showed the greatest production. A map showing the location of the principal coal mining districts and coal beds mined is given in figure 2.

Seasonal variation in demand for bituminous coal, as reflected in the production by months during 1942 in Illinois and in the United States, is shown in table 6. Because of the heavy demands upon the coal industry occasioned by the war, the usual seasonal slump beginning about April 1 and carrying through the summer did not occur. This seasonal decline, under normal conditions, is more pronounced in the producing districts

Concluded.

Local mines						County total			Mine inspection district
Strip		Underground		Total					
No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons	No. mines[2]	Tons	Per cent of State total	
3	10,489	59	226,663	62	237,152	67	2,319,162	*3.5*	5
.....	.....	3	4,049	3	4,049	3	4,049	.....	13
.....	.....	3	12,346	3	12,346	3	12,346	.....	14
.....	.....	4	14,873	4	14,873	6	361,773	*0.5*	13
.....	.....	.....	.....	.....	.....	2	1,283,193	*2.0*	1
1	741	54	739,633	55	740,374	65	3,416,809	*5.2*	12
.....	.....	.....	.....	.....	.....	1	39,334	.....	2
30	1,110,446	513	3,511,130	543	4,621,576	685	65,746,204	*100.0*	

of Illinois, Indiana, and Western Kentucky, than in the Appalachian fields. In the latter district, lake cargo shipments serve to sustain demand and output during the summer season.

TABLE 6.—PRODUCTION OF BITUMINOUS COAL IN ILLINOIS AND IN THE UNITED STATES, BY MONTHS, 1942[1]
(In thousands of net tons)

Month	United States	Illinois	
		Amount	Per cent[2]
January	49,032	5,852	*11.97*
February	44,374	5,340	*12.06*
March	47,796	5,250	*11.02*
April	48,332	4,925	*10.22*
May	47,860	4,983	*10.44*
June	48,220	5,124	*10.65*
July	47,832	4,820	*10.13*
August	47,851	4,850	*10.16*
September	49,843	5,955	*10.99*
October	51,791	5,900	*11.43*
November	47,474	5,290	*11.18*
December	49,595	5,961	*12.02*
	580,000	63,750	
Small mines in Illinois[3]	1,996	1,996	
Total	581,996	65,746	Av. *11.3*

[1] Bituminous Coal Div., Weekly Coal Reports, No. W.C.R. 1336, February 27, 1943.
[2] Per cent of U. S. total production.
[3] By difference.

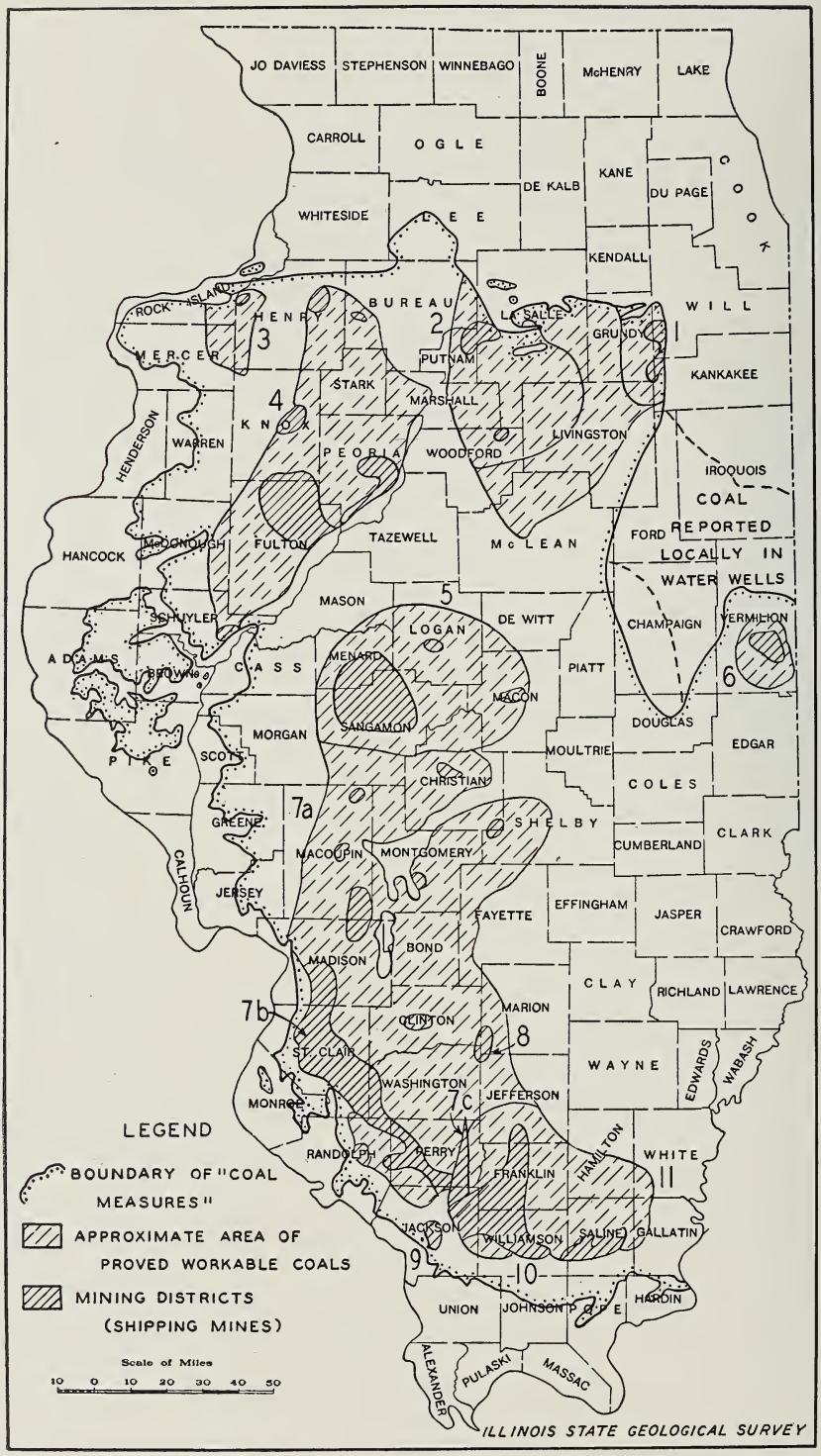

FIG. 2.—Map of Illinois showing location of principal coal mining districts and coal beds mined (see p. 23)

The amount of coal produced and its value at the mines from 1913-14 to 1942 is shown in table 7. Each year since 1938 has shown a progressive increase both in production and in average value, due to increasing fuel demand from industries making military equipment and supplies. Production during 1942 was 73 per cent of the record production attained for 1917-18 during the first World War, whereas the average value during 1942 was 81 per cent of that for 1917-18 and was only 61 per cent of the record high value attained during 1919-20. During 1917-18 there were 967 coal mines in operation in Illinois, while during 1942 there were 685 coal mines in operation.

The annual production of coal in Illinois from 1913-14 to 1942 is shown graphically in figure 3, classified according to methods of mining. Strip mining showed an all-time high record of production during 1942.

PRINCIPAL COAL MINING DISTRICTS AND THE PRINCIPAL COAL BEDS MINED
(See Fig. 2.)

Map. No.	*Mining district*		*Coal beds mined*
1	Wilmington	Longwall	LaSalle (No. 2)
2	LaSalle, or Third Vein	Longwall	LaSalle (No. 2)
3	Rock Island-Mercer (abandoned)		Rock Island (No. 1)
4	Fulton-Peoria		Herrin (No. 6)
	Fulton-Peoria		Springfield (No. 5)
5	Springfield		Springfield (No. 5)
6	Danville		Danville (No. 7)
	Danville		Grape Creek
7	Southwestern Illinois		
	a) Standard		Herrin (No. 6)
	b) Belleville		Herrin (No. 6)
	c) DuQuoin		Herrin (No. 6)
8	Centralia		Herrin (No. 6)
9	Murphysboro or Big Muddy (abandoned)		Murphysboro
10	Franklin-Williamson		Herrin (No. 6)
	Franklin-Williamson		Harrisburg (No. 5)
11	Saline County		Herrin (No. 6)
	Saline County		Harrisburg (No. 5)

TABLE 7.—AMOUNT AND VALUE OF COAL PRODUCED IN ILLINOIS, SHOWING NUMBER AND TYPE OF MINES, 1913-14 TO 1942†
(In thousands of net tons, and thousands of dollars)

Year	Number of mines[1]							Production (thousands of tons)							Value at mines	
	Shipping		Local		Total			Strip			Underground			Total production	Total (thousands of dollars)	Average per ton[2]
	Strip	Underground	Strip	Underground	Strip	Underground	All	Shipping	Local	Total strip	Shipping	Local	Total underground			
1913-14[3]	4	336	[6]	456	4	792	796	182	[6]	182	59,197	1,337	60,534	60,716	$ 68,022	$1.12
1914-15	2	278	[6]	499	2	777	779	195	[6]	195	55,978	1,429	57,407	57,602	63,362	1.10
1915-16	3	281	[6]	519	3	800	803	344	[6]	344	61,939	1,391	63,330	63,674	79,593	1.25
1916-17	5	319	[6]	486	5	805	810	419	[6]	419	76,993	1,572	78,565	78,984	148,490	1.88
1917-18	4	366	[6]	597	4	963	967	498	[6]	498	87,808	1,673	89,481	89,979	208,751	2.32
1918-19	3	370	[6]	564	3	934	937	394	[6]	394	73,358	1,348	74,706	75,100	172,730	2.30
1919-20	6	367	[6]	565	6	932	938	510	[6]	510	71,900	1,511	73,411	73,921	227,677	3.08
1920-21	6	383	[6]	662	6	1,045	1,051	606	[6]	606	77,933	1,583	79,516	80,122	219,534	2.74
1921-22	10	342	[6]	781	10	1,123	1,133	625	[6]	625	60,781	1,871	62,652	63,277	182,781	2.89
1922-23	8	366	[6]	762	8	1,128	1,136	951	[6]	951	72,460	2,103	74,563	75,514	188,785	2.50
1923-24	17	312	[6]	703	17	1,015	1,032	1,498	[6]	1,498	68,826	1,985	70,811	72,309	164,141	2.27
1924-25	18	237	[6]	658	18	895	913	3,054	[6]	3,054	61,126	1,994	63,120	66,174	144,921	2.19
1925[4]	18	237	[6]	613	18	850	868	1,787	[6]	1,787	34,045	1,180	35,225	37,012	81,056	2.19
1926[5]	16	228	[6]	677	16	905	921	3,583	[6]	3,583	64,253	1,977	66,230	69,813	149,400	2.14
1927	15	226	[6]	665	15	891	906	2,757	[6]	2,757	42,169	2,024	44,193	46,950	101,412	2.16
1928	15	191	35	616	50	807	857	4,224	122	4,346	50,060	1,805	51,865	56,211	112,422	2.00
1929	17	183	43	560	60	743	803	5,251	99	5,350	53,825	1,953	55,778	61,128	114,309	1.87
1930	15	170	11	743	26	913	939	6,220	56	6,276	45,777	1,982	47,759	54,035	94,021	1.74
1931	16	151	29	798	45	949	994	6,549	71	6,620	36,524	2,009	38,533	45,153	76,760	1.70
1932	17	145	43	888	60	1,033	1,093	6,628	129	6,757	24,774	2,590	27,364	34,121	52,205	1.53
1933	20	139	36	1,071	56	1,210	1,266	5,599	115	5,714	29,792	2,814	32,606	38,320	55,950	1.46
1934	26	146	129	1,046	155	1,192	1,347	6,008	214	6,222	32,647	2,855	35,502	41,724	65,089	1.56

1935	28	154	127	1,041	155	1,195	1,350	7,135	346	7,481	34,275	3,257	37,532	45,013	70,220	1.56
1936	30	146	86	980	116	1,126	1,242	8,873	474	9,347	38,412	3,717	42,129	51,476	79,788	[7] 1.55
1937	31	137	70	782	101	919	1,020	11,176	550	11,726	36,886	3,820	40,706	52,432	82,318	[7] 1.57
1938	25	124	74	746	99	870	969	10,059	620	10,679	28,384	3,324	31,708	42,387	63,581	[7] 1.50
1939	26	120	82	748	108	868	976	11,296	990	12,286	31,698	3,643	35,341	47,627	78,108	1.64
1940	27	112	53	696	80	808	888	12,025	1,255	13,280	34,047	3,955	38,002	51,282	86,667	[7] 1.69
1941	29	113	29	628	58	741	799	13,361	881	14,242	37,673	3,451	41,124	55,366	100,212	[7] 1.81
1942	28	114	30	513	58	627	685	14,827	1,111	15,938	46,298	3,511	49,808	65,746	123,603	[7] 1.88

† Compiled from Illinois Dept. Mines and Minerals, Annual Coal Reports, revised.

[1] Number of mines reporting production during year indicated.

[2] Average values from U. S. Geol. Survey, Mineral Resources of U. S.—1914 to 1922, incl.
U. S. Bur. Mines, Mineral Resources of U. S.—1923 to 1931, incl.
U. S. Bur Mines, Mineral Yearbooks—1932 to 1935, incl., 1939, 1940.
Calculated from cost of production data of U. S. Dept. Interior, Bituminous Coal Div.—1936 to 1938, incl., 1941, 1942.

[3] Covers production for fiscal year July 1-June 30, for each year prior to July 1, 1925.

[4] Covers production for July 1-Dec. 31, 1925.

[5] Covers production for calendar year, for each year beginning with 1926.

[6] Production of local strip mines included with that of local underground mines prior to 1928.

[7] Values include selling cost for 1936-38, 1940-42.
Values for years prior to 1936, and for 1939, exclude selling cost.

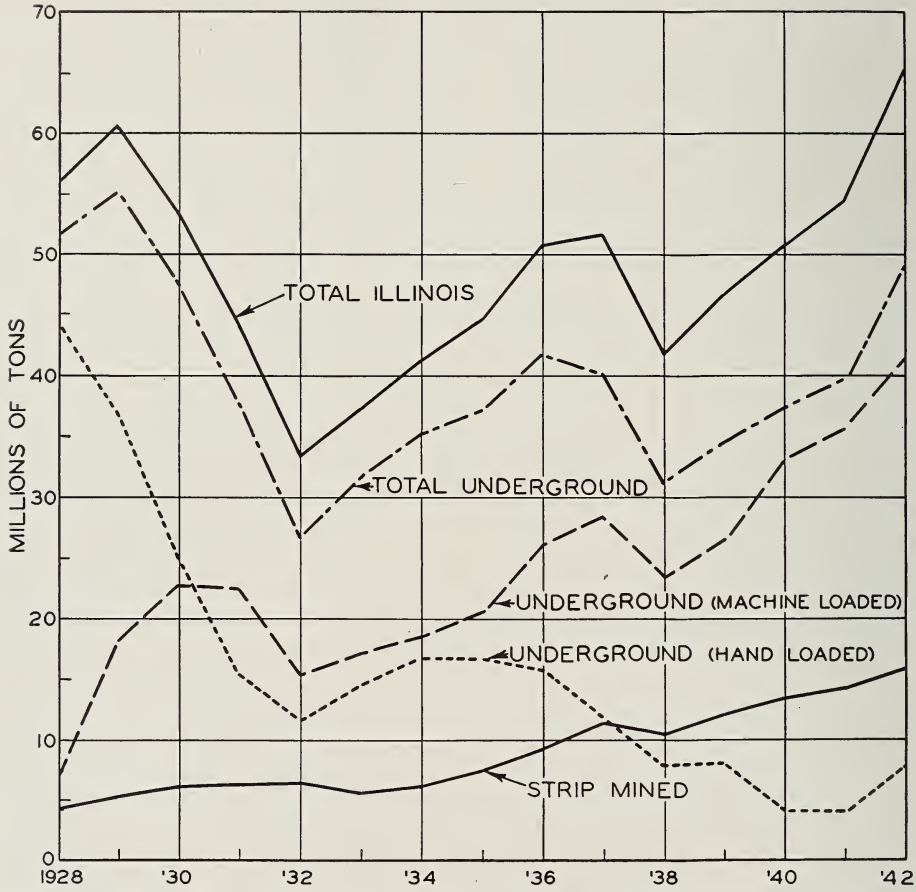

Fig. 3.—Annual production of Illinois coal, classified by mining methods, 1928-1942.

Distribution

The Illinois coal market area comprises the states of Illinois, Wisconsin, Iowa, Missouri, Kansas, Nebraska, Minnesota, South Dakota, and North Dakota. The principal producing districts which supply this market are Districts Nos. 7 and 8 (southern West Virginia, Virginia, and eastern Kentucky) in the Appalachian region, and districts 9 (western Kentucky), 10 (Illinois), and 11 (Indiana) in the Eastern Interior coal basin. Much of the coal consumed in this area is shipped by rail. Table 8 gives a detailed distribution report of all-rail coal shipped into this area during 1941 and 1942, showing quantities of coal shipped into each of the principal divisions of the market area from the various producing localities, and the percentage change from the preceding year for each division of the area.

The Chicago industrial district is the focal area into which enters a substantial portion of the coal produced in Illinois or shipped into Illinois from competing or adjacent fields.

The Chicago industrial district itself is one of the large coal consumers in the nation, both in absolute quantity and in tons of coal per worker employed. A survey of coal consumption in manufacturing industries in 1939, made by the Bureau of the Census, indicates that Chicago is exceeded only by Pittsburgh as a consumer of coal in industry. Both are important metallurgical centers.

A comparison of coal consumption in eleven important industrial areas in the United States is shown in table 9. The high consumption per person employed in the Pittsburgh area is due to the large coking industry in this area. Since not all of the coal coked in the Pittsburgh district is used there, the solid fuel actually consumed in this area is somewhat less than the apparent amount.

TABLE 8.—ORIGIN AND DESTINATION OF REVENUE RAILROAD SHIPMENTS OF COAL FROM
(Exclusive of non-
(In net

From	To: Chicago District	Illinois, other[2]	Milwaukee, Wis.	Wisconsin, other	Council Bluffs, Iowa[3]	Iowa, other
1941						
Western Penna.	1,130	18,883	.....	.....	.....	34
Cent. Penna., Somerset-Myersdale, Cumberland-Piedmont	22,908	5,751	392	6,714	692	9,673
Fairmont, W. Va.	100,233	7,939	.....	228	.....	1,042
N. and E. Ohio	859	188	.....	394	.....	870
S. Ohio	1,725	.....	.....	.....	.....	243
Kanawha, Logan, Kenova-Thacker	1,483,730	110,467	765	16,176	394	170,757
New River-Winding Gulf, Pocahontas-Tug River	9,360,947	436,525	65,772	637,635	.....	69,218
NE. Kentucky, McRoberts	1,370,140	92,158	269	21,111	.....	118,685
Virginia	222,790	43,028	2,867	65,311	46	12,773
Hazard, Harlan, S. Appalachians	3,473,161	425,852	502	46,445	297	581,815
N. Illinois	523,974	3,327,901	.....	209,601	.....	1,114,591
Cent. and S. Illinois	5,272,813	10,637,836	48,474	1,378,809	27,768	1,477,508
Indiana	3,437,543	1,405,800	228,919	855,280	267	524,517
Western Kentucky	650,446	359,146	1,073	136,600	4,780	267,329
Grand total	25,922,399	16,871,474	349,033	3,374,304	34,244	4,349,055
Per cent of change from 1940	*+20.5*	*+14.8*	*+35.1*	*+17.6*	*+39.1*	*+ 1.0*
1942						
Western Penna.	5,023	28,642	.....	.....	.....	.....
Cent. Penna., Somerset-Myersdale, Cumberland-Piedmont	18,147	5,345	174	7,941	596	11,276
Fairmont, W. Va.	137,776	8,528	49	357	.....	660
N. and E. Ohio	1,195	183	.....	489	.....	509
S. Ohio	2,433	.....	.....	50	.....	448
Kanawha, Logan, Kenova-Thacker	2,327,548	169,787	3,258	19,840	394	201,626
New River-Winding Gulf, Pocahontas-Tug River	9,755,335	488,157	127,008	685,086	48	85,457
NE. Kentucky, McRoberts	2,681,672	109,524	817	30,231	43	148,929
Virginia	283,062	50,972	577	81,173	194	20,487
Hazard, Harlan, S. Appalachians	3,341,359	526,070	308	56,435	460	724,782
Ex-river coal	41,377	.....	.....	.....	.....	.....
Northern Illinois	820,140	4,127,696	2,405	183,878	147	1,400,618
Central and S. Illinois	6,079,795	12,462,090	75,718	1,631,359	63,917	2,007,602
Indiana	3,596,192	1,576,663	298,798	831,266	218	511,665
Western Kentucky	767,164	350,812	50	191,457	7,576	311,189
Grand total	29,858,218	19,904,469	509,162	3,719,562	73,593	5,425,248
Per cent of change from 1941	*+15.2*	*+18.0*	*+45.9*	*+10.2*	*+114.9*	*+24.7*

[1] Data from U. S. Dept. Interior Bituminous Coal Div., Monthly Coal Distribution Report, No. 136. April 23, 1943.

[2] Includes Davenport, Iowa, for shipments from Ohio and the Crescent, and includes Davenport, Bettendorf, and Iowanna, Iowa, for shipments from Illinois, Indiana, and Western Kentucky; excludes East St. Louis, Illinois.

ILLINOIS, INDIANA, WESTERN KENTUCKY, AND THE APPALACHIAN FIELDS IN 1941 AND 1942[1]
revenue railroad fuel)
tons)

St. Louis, Mo.[4]	Kansas City, Mo.[5]	St. Joseph, Mo.[6]	Missouri, other	Kansas, other	Nebraska, other	Minnesota	South Dakota	North Dakota	Total	Per cent of total
1941										
.....	.....	.....	.....	.....	.....	.....	.....	.....	20,047	.....
24,771	504	304	1,547	1,210	1,260	5,373	943	.....	82,042	*0.1*
1,623	.....	.....	.....	.....	.....	.....	.....	.....	111,065	*0.2*
.....	.....	.....	.....	.....	.....	34	.....	.....	2,345	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	1,968	.....
177,927	.....	.....	346	.....	.....	5,892	459	.....	1,966,913	*3.4*
575,529	.....	.....	448	59	30	69,814	4,665	.....	11,220,642	*19.4*
.....	.....	.....	809	.....	289	21,256	1,358	.....	1,626,075	*2.8*
289,355	.....	.....	267	.....	.....	9,945	1,349	.....	647,731	*1.1*
23,997	.....	.....	693	.....	903	29,188	1,475	.....	4,584,328	*8.0*
.....	.....	.....	4,240	.....	119	39,218	254	.....	5,219,898	*9.0*
3,595,647	10,228	4,237	1,143,436	12,229	72,716	348,151	110,525	532	24,140,909	*41.8*
14,415	275	.....	1,925	.....	1,285	80,245	1,277	.....	6,551,748	*11.4*
88,963	.....	.....	42,088	.....	5,091	55,256	13,323	1,756	1,625,851	*2.8*
4,792,227	11,007	4,541	1,195,799	13,498	81,693	664,372	135,628	2,288	57,801,562	*100.0*
+3.3	*+50.2*	*—34.4*	*+3.9*	*—4.9*	*—11.9*	*—6.1*	*—5.5*	*—38.4*	*+14.6*	
1942										
39	.....	.....	.....	.....	.....	.....	.....	.....	33,704	.....
32,621	871	352	1,616	1,462	1,538	6,617	1,201	.....	89,757	*0.1*
1,128	.....	.....	.....	.....	.....	.....	.....	.....	148,498	*0.2*
.....	.....	.....	.....	.....	.....	42	52	.....	2,470	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	2,931	.....
219,782	.....	.....	327	.....	166	11,441	474	.....	2,954,643	*4.3*
640,871	46	.....	401	122	.....	64,318	4,689	.....	11,851,538	*17.2*
474	.....	.....	357	.....	976	22,084	1,499	.....	2,996,606	*4.4*
300,981	.....	.....	56	.....	105	8,707	1,053	.....	747,367	*1.1*
22,239	.....	.....	870	.....	1,742	28,636	1,000	.....	4,703,901	*6.9*
.....	.....	.....	.....	.....	.....	.....	.....	.....	41,377	*0.1*
.....	.....	51	12,597	.....	24,951	42,133	2,024	.....	6,616,640	*9.7*
4,229,879	97,577	10,966	1,831,391	158,356	124,318	496,192	149,833	622	29,419,615	*43.1*
17,115	234	.....	2,480	.....	1,060	84,333	1,123	.....	6,921,150	*10.1*
135,184	.....	.....	48,406	.....	8,846	48,121	19,382	154	1,888,341	*2.8*
5,600,313	98,728	11,369	1,898,501	159,940	163,702	812,624	182,333	776	68,418,538	*100.0*
+16.9	*+797.0*	*+150.4*	*+58.8*	*+1084.9*	*+100.4*	*+22.3*	*+34.4*	*—66.1*	*+18.5*	

[3] Includes Omaha and South Omaha, Nebraska.
[4] Includes East St. Louis, Illinois.
[5] Includes Kansas City, Kansas.
[6] Includes Atchison and Leavenworth, Kansas.

The highest average fuel consumption per worker employed is in those cities in which the industrial activity is dominantly metallurgical and metal working, such as Chicago, Pittsburgh, Detroit, and Cleveland.

TABLE 9.—CONSUMPTION OF COAL BY MANUFACTURING INDUSTRIES, 1939[1]

Industrial area[2]	Number of wage earners	Coal consumed[3] (tons)	Average per worker (tons)
New York-Newark-Jersey City	849,608	5,585,366	6.6
Chicago	483,593	13,615,216	28.1
Philadelphia-Camden	321,725	4,253,159	13.2
Detroit	311,332	7,329,380	23.5
Boston	237,496	2,372,195	10.0
Pittsburgh	191,903	16,594,696	86.5
Cleveland	140,653	6,540,233	46.5
St. Louis	126,831	1,971,454	15.5
Milwaukee	98,414	1,596,678	16.2
Minneapolis-St. Paul	48,608	632,207	13.0
Indianapolis	38,838	769,458	19.8
Total for 11 districts	2,849,001	61,260,042	21.5
Total United States	7,886,567	142,787,289	18.1

[1] Sixteenth Census of the United States; 1940, Manufacturers; 1939, vol. 1, Table 4, p. 352.
[2] This term signifies an area having as its nucleus an important manufacturing city and comprising the county in which the city is located, together with any adjoining county or counties in which there is a great development of manufacturing industry.
[3] Includes 1,788,246 tons of anthracite.

Cities in which the manufacturing activities are mainly metal fabrication are second in importance in coal consumption per worker employed, as for example, Indianapolis, St. Louis, and Milwaukee.

In those cities where the textile industries, leather industries, and needle trades are important, consumption of coal is considerably lower—notably, New York, Philadelphia, and Boston.

In addition to the large industrial market, Chicago is an important center for the redistribution of coal for domestic heating in the surrounding communities. Much of the coal used for domestic heating purposes in the Chicago district is obtained from the low-volatile and medium-volatile fields of southern West Virginia and eastern Kentucky. Coal for this purpose is moved more economically and with less wastage by rail rather than over the lakes. Prepared sizes are required, which, in the case of Pocahontas coal, suffer severe degradation in the rail-lake haul. In this case, rescreening is necessary, with the resultant substantial loss of domestic-class coal. Secondly, the season of domestic demand does not fit into the lake navigation season, so that storage by dealers would be required. Finally, the domestic market is in the interior of the city and the outlying suburbs; hence lake-borne coal would still require an additional rail-haul to retailers' yards. Under these conditions, coal shippers dealing in the domestic trade have found all-rail haul the most profitable means of supplying this market.

Lake Shipments of Coal

The data on lake shipments of coal do not specify the destinations of coal originating in each field. Some inferences regarding the destinations can be made, however, from the nature of the market. In table 10 is shown the origin of lake cargo coal in the years 1940, 1941, and 1942. As noted in this table, the bulk of the shipments come from Pennsylvania and from the low-, medium-, and high-volatile districts of southern West Virginia and eastern Kentucky. Shipments from the low- and medium-volatile fields consist of screenings destined to the coke ovens of the Chicago district. Coal from Pennsylvania is destined to Upper Lake Michigan and Lake Superior ports, both in the prepared sizes and as screenings for domestic and industrial fuel. Total receipts of Upper Lake ports is shown in table 11.

Table 10.—Origin of Lake Cargo Coal, 1940-1942
(In thousands of net tons)

From	1940[1]	1941[2]	1942[2]
Ohio	2,646	3,947	4,171
Pennsylvania	11,578	11,612	9,305
Moundsville, West Virginia	308	395	358
Fairmont, Cumberland, Piedmont	2,049	2,568	2,420
Southern West Virginia—low volatile	10,372	9,010	9,160
Southern West Virginia—high volatile	12,025	14,277	14,746
Eastern Kentucky, Tennessee, and Virginia	9,133	9,585	9,295
Total	48,111	51,394	49,455

[1] Monthly Coal Distribution Report, M.C.D. No. 123, March 3, 1942.
[2] Monthly Coal Distribution Report, M.C.D. No. 135, March 15, 1943.

Table 11.—Lake Cargo Shipments and Receipts of Coal at Upper Lake Docks, 1934-1942[1]
(In thousands of net tons)

Year	Bituminous coal loaded into vessels at Lake Erie ports	Receipts at		Total receipts
		Lake Superior ports	Lake Michigan ports[2]	
1934	34,869	8,023	4,535	12,558
1935	34,730	6,829	4,043	10,872
1936	44,011	9,358	5,114	14,472
1937	43,645	9,115	4,822	13,937
1938	34,173	6,614	3,758	10,372
1939	39,837	6,515	4,229	10,744
1940	46,548	6,991	4,436	11,427
1941	49,733	8,356	4,830	13,186
1942	47,815	8,108	5,068	13,176

[1] U. S. Bituminous Coal Div., Monthly Coal Distribution Report.
[2] Ports on Lake Michigan north of Waukegan.

TABLE 12.—SOURCES OF ALL-RAIL COAL DESTINED FOR CHICAGO, 1940-1942.
(In net tons)

	1940[1]	1941[2]	1942[2]	Per cent change 1942 from 1941
Western Pennsylvania	2,034	1,130	5,023	+344.5
Central Pennsylvania, Somerset-Myersdale, and Cumberland-Piedmont	15,115	22,908	18,147	— 20.8
Fairmont, West Virginia	72,784	100,233	137,776	+ 37.4
Northern and Eastern Ohio	1,117	859	1,195	+ 39.1
Southern Ohio	500	1,725	2,433	+ 41.0
Kanawha, Logan, and Kenova-Thacker	1,032,100	1,483,730	2,327,548	+ 56.9
New River-Winding Gulf and Pocahontas-Tug River	7,188,931	9,360,947	9,755,335	+ 4.2
NE. Kentucky and McRoberts	1,180,704	1,370,140	2,681,672	+ 90.5
Virginia	251,938	222,790	283,062	+ 27.1
Hazard, Harlan, and Southern Appalachian	3,027,320	3,473,161	3,341,359	— 0.9
Ex-river coal	43	.....	41,377	.....
Northern Illinois	585,943	523,947	820,140	+ 56.5
Central and Southern Illinois	4,770,944	5,272,813	6,079,795	+ 15.3
Indiana	2,847,860	3,437,543	3,596,192	+ 4.6
Western Kentucky	532,695	650,446	767,164	+ 17.9
Total	21,510,028	25,922,399	29,858,216	+ 15.2
Per cent of Chicago total supplied by Illinois	24.9	22.3	23.1	

[1] U. S. Monthly Coal Distribution Report, M.C.D. No. 124, April 3, 1942.
[2] U. S. Monthly Coal Distribution Report, M.C.D. No. 136, April 23, 1943.

TABLE 13.—SOURCES OF COAL DESTINED FOR ST. LOUIS, 1940-1942.
(In net tons)

From	1940[1]	1941[2]	1942[2]	Per cent change 1942 from 1941
Central Pennsylvania	4,736	24,771	32,660	+31.8
Fairmont, Pa.	655	1,623	1,128	— 3.0
Kanawha, W. Va.	181,281	177,927	219,782	+ 1.5
New River, W. Va.	425,433	575,529	640,871	+11.4
Virginia and Northeast Kentucky	157,716	289,355	301,455	+ 4.2
Hazard, Harlan	18,076	23,997	22,239	— 7.3
Illinois	3,748,905	3,595,647	4,229,879	+16.9
Indiana	42,290	14,415	17,115	+18.7
Western Kentucky	59,775	88,963	135,184	+51.9
Total	4,638,867	4,792,227	5,600,313	+18.4
Per cent of St. Louis total received from Illinois	80.8	75.3	75.5	

[1] Monthly Coal Distribution Report, M.C.D. No. 124, April 3, 1942.
[2] Monthly Coal Distribution Report, M.C.D. No. 136, April 23, 1943.

Tables 12 and 13 give data on all-rail shipments of coal from Appalachian and Eastern Interior coal fields into the Chicago and St. Louis markets.

Consumption of Domestic Fuels in Illinois in 1940

The data submitted in table 14 is a part of a study made by the Office of Price Administration in connection with the possibility of a shortage of coal supply and the need of allocation and rationing.

The principal basic information for the study was the data on the number of houses, the type of fuels used, and the kind of dwelling units in each state. This information was obtained from the 1940 Census of Housing, Second Series. In this analysis of fuel consumption, three kinds of dwelling units have been distinguished: centrally heated, space heated, and apartments. An index of fuel requirements per dwelling unit was constructed from data on temperature deficiencies. The heat values of various fuels are fairly well known. By a combination of these factors, a reasonable estimate of the fuel consumption can be obtained.

There are, no doubt, certain inaccuracies in the calculations, and further refinements in methods are needed, but it is thought that this preliminary estimate will be valuable as a basis for calculations in the future.

Degree-Days for Illinois

Comparison of the degree-day record for the 1942-43 heating season with the normal average for 47 Illinois cities is given in table 15. Figures in column M are the monthly cumulative average for the 1942-43 heating season, and those in column A are the normal cumulative average for the entire period during which records have been kept, as published in Report of Investigations No. 87, table 16, page 36.

These records indicate that the 1942-43 heating season showed colder than normal weather, or greater upward departures from normal degree-days, in 29 cities or towns having a combined population of 4,037,683. The combined increases in departures from normal amounted to 6,728 degree-days, or an average of +232 degree-days per city. Most of these cities are located in the northern half of the State above the latitude of Quincy and Danville. The 1942-43 heating season showed warmer than normal weather, or decreases from normal degree-days, in 18 cities or towns having a combined population of 178,453. The combined decreases from normal amounted to 2,597 degree-days, or an average of —144 degree-days per city. Most of these cities are located in the southern half of the State.

Degree-days are the number of degrees of temperature that the average temperature for each day falls below 65° Fahrenheit. These are totaled for each month and a cumulative total for the heating season through each month is determined. These data averaged over a long period of time give a reliable guide to the fuel needs of the locality in which the temperatures are recorded. This information is given in table 16, Report of Investigations No. 87, referred to above.

Figure 4 gives this information in graphic form on a map showing areas of equal degree-days for Illinois and the adjacent region. The normal cumulative average is given for each city.

TABLE 14.—DOMESTIC FUEL CONSUMPTION IN ILLINOIS IN 1940[1]

	Fuels used for residential heating								
	Total	Bituminous coal	Fuel oil	Coke	Wood	Anthracite	Gas	Other	None
Fuels used—per cent of total	*100.00*	*77.08*	*7.54*	*7.11*	*3.55*	*2.30*	*2.23*	*0.19*	—
Total occupied private dwelling units by type of fuel	2,167,027	1,670,258	163,475	154,085	76,886	49,764	48,420	3,389	750
Total occupied apartment dwelling units by type of heating fuel	527,864	434,707	24,335	40,085	—	12,954	15,783	—	—
Per cent distribution	*100.00*	*82.36*	*4.61*	*7.59*	—	*2.45*	*2.99*	—	—
Total occupied private dwelling units, centrally heated, by types of heating fuel	804,114	656,052	36,753	60,525	4,654	19,540	23,822	2,768	—
Per cent distribution	*100.00*	*81.59*	*4.57*	*7.53*	*.58*	*2.43*	*2.96*	*0.34*	—
Total occupied private dwelling units, space heated, by types of fuel	835,049	579,519	102,387	53,457	72,232	17,268	8,815	621	750
Per cent distribution	*100.00*	*69.40*	*12.26*	*6.40*	*8.65*	*2.07*	*1.06*	*0.07*	*0.09*
Consumption of heating fuels, by type, by all private dwelling units		9,974,307 (Tons)	3,614 (M bbls.)	793,359 (Tons)	932,186 (Cords)	263,748 (Tons)	6,820,701 (M cu. ft.)	—	—
Per dwelling unit		*5.84*	*22.11*	*5.15*	*12.12*	*5.30*	*14.09*	—	—
Consumption of heating fuel, by type, by apartment unit		2,421,318 (Tons)	598,884 (M bbls.)	196,817 (Tons)	—	65,418 (Tons)	1,953,135 (M cu. ft.)	—	—
Per dwelling unit		*5.57*	*24.61*	*4.91*	—	*5.05*	*12.38*	—	—
Consumption of fuel by type, centrally heated dwelling units		5,090,964 (Tons)	1,259,853 (M bbls.)	413,991 (Tons)	61,479 (Cords)	137,366 (Tons)	4,106,913 (M cu. ft.)	—	—
Per dwelling unit		*7.76*	*34.28*	*6.84*	*13.21*	*7.03*	*172.4*	—	—
Consumption of heating fuel, by types, by space heated dwelling units		2,248,534 (Tons)	1,754,913 (M bbls.)	182,823 (Tons)	870,607 (Cords)	60,783 (Tons)	759,853 (M cu. ft.)	—	—
Per dwelling unit		*3.88*	*17.14*	*3.42*	*12.05*	*3.52*	*8.62*	—	—

[1] Data from "The Residential Consumption of Fuels in 1940," Fuel Section, Fuel and Utilities Branch, Services Division, Office of Civilian Supply, February 27, 1943.

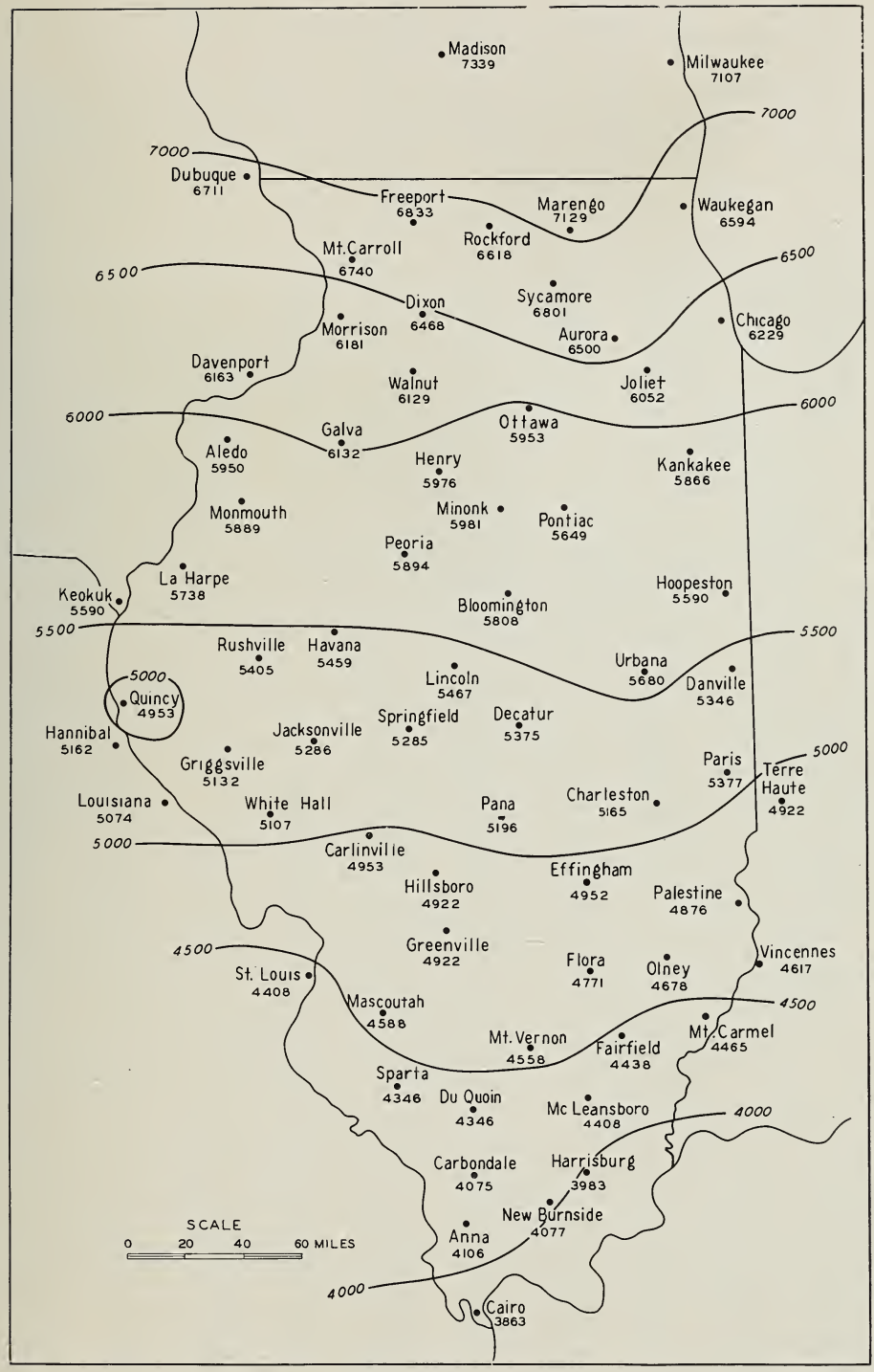

FIG. 4.—Degree-day map of Illinois and adjacent region showing cumulative average degree-days (based on data through 1941). Degree-days are the number of degrees of temperature that the average daily temperature falls below 65° F., and are totaled for the heating season.

TABLE 15.—DEGREE-DAYS FOR 47 ILLINOIS CITIES DURING 1942-1943, BY MONTHS, COMPARED WITH NORMAL AVERAGE OVER THE PERIOD DURING WHICH RECORDS HAVE BEEN KEPT[1]

Month	Aurora (Pop. 47,170)[2]		Bloomington (Pop. 32,868)		Cairo (Pop. 14,407)		Carbondale (Pop. 8,550)	
	M	A[3]	M	A	M	A	M	A
September	90	30	0	0	0	0	0	0
October	405	403	310	310	93	155	155	155
November	750	810	660	720	390	510	480	540
December	1,333	1,178	1,271	1,085	868	806	930	868
January	1,333	1,333	1,209	1,209	868	899	930	930
February	1,064	1,120	924	1,316	616	756	672	784
March	1,023	930	899	806	651	527	713	558
April	570	510	450	300	210	210	300	240
May	248	186	155	62	0	0	0	0
Total	6,816	6,500	5,878	5,808	3,696	3,863	4,180	4,075
Departure from Normal	+316		+70		—167		+105	

Month	Carlinville (Pop. 4,965)		Charleston (Pop. 8,197)		Chicago (Pop. 3,396,808)		Danville (Pop. 36,919)	
	M	A	M	A	M	A	M	A
September	0	0	0	0	90	30	0	0
October	217	248	217	279	341	341	310	279
November	540	630	570	660	690	750	600	690
December	1,085	992	1,147	992	1,240	1,116	1,209	1,054
January	1,085	1,116	1,085	1,116	1,271	1,271	1,116	1,147
February	756	924	784	952	1,064	1,064	868	980
March	806	682	837	713	1,023	899	868	744
April	330	330	390	360	570	540	420	390
May	62	31	62	93	279	248	93	62
Total	4,881	4,953	5,092	5,165	6,568	6,259	5,484	5,346
Departure from Normal	—72		—73		+309		+138	

Month	Decatur (Pop. 59,305)		Dixon (Pop. 10,671)		Effingham (Pop. 6,180)		Flora (Pop. 5,474)	
	M	A	M	A	M	A	M	A
September	0	0	60	30	0	0	0	0
October	279	279	372	403	279	248	186	248
November	570	690	720	810	600	660	480	630
December	1,147	1,054	1,333	1,209	1,116	992	1,023	961
January	1,116	1,178	1,333	1,364	1,116	1,085	961	1,054
February	812	1,008	1,064	1,148	812	924	756	896
March	837	744	992	899	868	682	775	650
April	390	360	480	480	420	330	330	300
May	93	62	186	155	93	31	0	31
Total	5,244	5,375	6,540	6,498	5,304	4,952	4,511	4,771
Departure from Normal	—131		+42		+352		—260	

Footnotes are on page 39.

TABLE 15.—*Continued.*

Month	Freeport (Pop. 22,366)		Galva (Pop. 2,812)		Greenville (Pop. 3,391)		Harrisburg (Pop. 11,453)	
	M	A	M	A	M	A	M	A
September....	120	60	30	0	0	0	0	0
October.....	434	434	310	341	217	248	155	155
November....	780	840	690	780	540	660	450	510
December....	1,426	1,240	1,302	1,178	1,054	992	930	837
January.....	1,488	1,426	1,333	1,302	1,054	1,085	837	930
February....	1,148	1,176	1,008	1,120	784	924	616	784
March.....	1,085	961	961	837	806	682	682	527
April.....	510	510	480	450	330	300	240	240
May.....	248	186	155	124	31	31	0	0
Total....	7,239	6,833	6,269	6,132	4,816	4,922	3,910	3,983
Departure from Normal	+406		+137		—106		—73	

Month	Havana (Pop. 3,999)		Hoopeston (Pop. 5,381)		Jacksonville (Pop. 19,844)		Joliet (Pop. 42,365)	
	M	A	M	A	M	A	M	A
September....	0	0	0	0	0	0	90	30
October.....	310	270	217	341	248	279	403	372
November....	660	690	630	690	570	660	750	750
December....	1,240	1,054	1,271	1,085	1,147	1,054	1,333	1,036
January.....	1,240	1,178	1,178	1,178	1,116	1,147	1,333	1,271
February....	924	1,008	924	1,008	812	980	1,064	1,120
March.....	868	744	899	775	806	744	1,023	868
April.....	420	360	480	420	360	360	600	480
May.....	155	155	155	93	93	62	279	155
Total....	5,817	5,459	5,754	5,590	5,152	5,286	6,875	6,082
Departure from Normal	+358		+164		—134		+793	

Month	Kankakee (Pop. 22,241)		LaHarpe (Pop. 1,322)		Lincoln (Pop. 12,752)		McLeansboro (Pop. 2,528)	
	M	A	M	A	M	A	M	A
September....	90	30	0	0	0	0	0	0
October.....	403	341	279	310	310	310	186	186
November....	690	720	630	720	630	690	480	570
December....	1,302	1,116	1,240	1,116	1,209	1,054	1,054	899
January.....	1,240	1,240	1,240	1,209	1,178	1,178	899	1,023
February....	980	1,008	924	1,064	868	1,008	700	840
March.....	930	806	868	806	837	775	744	620
April.....	510	480	390	420	420	390	270	270
May.....	186	155	155	93	93	62	0	0
Total....	6,331	5,896	5,726	5,738	5,545	5,467	4,333	4,408
Departure from Normal	+435		—12		+78		—75	

TABLE 15.—*Continued.*

Month	Marengo (Pop. 2,034)		Mascoutah (Pop. 2,294)		Minonk (Pop. 1,897)		Monmouth (Pop. 9,096)	
	M	A	M	A	M	A	M	A
September	120	90	0	0	60	30	30	30
October	434	465	186	217	341	341	310	341
November	780	870	480	630	720	750	690	750
December	1,395	1,271	992	930	1,302	1,147	1,302	1,147
January	1,395	1,426	961	1,023	1,271	1,271	1,333	1,302
February	1,148	1,204	700	868	980	1,092	980	1,092
March	1,085	1,023	744	620	930	837	930	806
April	570	570	270	300	510	450	450	420
May	279	210	0	0	186	93	186	31
Total	7,206	7,129	4,333	4,588	6,300	6,011	6,211	5,919
Departure from Normal	+77		—255		+289		+292	

Month	Mt. Carmel (Pop. 6,987)		Mt. Carroll (Pop. 1,845)		Mt. Vernon (Pop. 14,724)		New Burnside	
	M	A	M	A	M	A	M	A
September	0	0	90	60	0	0	0	0
October	186	186	403	434	155	217	186	155
November	480	600	750	840	510	600	480	540
December	992	930	1,364	1,240	992	930	961	868
January	899	992	1,395	1,364	930	1,023	899	930
February	700	868	1,092	1,176	728	868	700	756
March	713	589	1,023	930	744	620	744	558
April	270	300	540	510	300	300	300	270
May	0	0	217	186	0	0	0	0
Total	4,240	4,465	6,874	6,740	4,359	4,558	4,270	4,077
Departure from Normal	—225		+134		—199		+193	

Month	Palestine (Pop. 1,626)		Pana (Pop. 5,966)		Paris (Pop. 9,281)		Peoria (Pop. 105,087)	
	M	A	M	A	M	A	M	A
September	0	0	0	0	0	0	0	0
October	217	240	217	279	248	279	310	372
November	540	651	570	660	600	690	720	780
December	1,054	961	1,116	1,023	1,147	1,054	1,240	1,116
January	992	1,085	1,085	1,147	1,116	1,147	1,271	1,271
February	756	896	756	952	840	980	952	1,036
March	806	682	806	713	837	775	930	806
April	360	330	360	360	420	390	480	420
May	0	31	62	62	62	62	186	93
Total	4,725	4,876	4,972	5,196	5,270	5,377	6,089	5,894
Departure from Normal	—151		—224		—107		+195	

TABLE 15.—*Concluded.*

Month	Pontiac (Pop. 9,585)		Quincy (Pop. 40,469)		Rockford (Pop. 84,637)		Rushville (Pop. 2,480)	
	M	A	M	A	M	A	M	A
September	30	30	0	0	90	30	0	0
October	310	310	279	217	372	403	310	279
November	660	690	570	630	720	810	630	720
December	1,240	1,085	1,116	992	1,333	1,209	1,178	1,054
January	1,209	1,209	1,178	1,147	1,364	1,364	1,240	1,178
February	924	1,036	812	924	1,064	1,176	896	1,008
March	899	806	806	713	1,023	930	868	744
April	510	420	330	330	510	510	390	360
May	155	93	124	0	217	186	124	62
Total	5,937	5,679	5,215	4,953	6,693	6,618	5,636	5,405
Departure from Normal	+258		+262		+75		+231	

Month	Sparta (Pop. 3,664)		Springfield (Pop. 75,503)		Sycamore (Pop. 4,702)		Urbana (Pop. 14,064)	
	M	A	M	A	M	A	M	A
September	0	0	0	0	120	60	0	30
October	124	186	248	279	403	434	279	310
November	450	570	600	690	750	840	630	720
December	961	899	1,147	1,023	1,395	1,209	1,240	1,085
January	899	992	1,209	1,147	1,395	1,364	1,147	1,178
February	672	840	840	980	1,092	1,176	992	1,008
March	744	589	837	744	1,054	961	868	775
April	240	270	390	360	570	540	450	450
May	0	0	93	62	279	217	124	124
Total	4,090	4,346	5,364	5,285	7,058	6,801	5,730	5,680
Departure from Normal	—256		+79		+257		+50	

Month	Walnut (Pop. 961)		Waukegan (Pop. 34,241)		White Hall (Pop. 3,025)	
	M	A	M	A	M	A
September	60	30	120	30	0	0
October	341	341	403	403	217	279
November	690	780	720	780	540	660
December	1,333	1,178	1,333	1,147	1,116	1,023
January	1,302	1,302	1,364	1,302	1,116	1,147
February	1,036	1,120	1,064	1,092	812	924
March	961	868	1,023	961	837	713
April	510	450	630	600	330	330
May	186	90	310	279	62	31
Total	6,419	6,159	6,967	6,594	5,030	5,107
Departure from Normal	+260		+373		—77	

[1] Compiled from U. S. Dept. of Commerce, Weather Bureau; Climatological Data.

[2] Population from Sixteenth Census of the United States: 1940.

[3] Column M—Monthly cumulative average for 1942-43 heating season.

Column A—Normal cumulative average for entire period during which records have been kept (see Illinois Geol. Surv. Rept. Inv. No. 87, Table 16).

Fuel Briquets and Packaged Fuel

The states in the Upper Mississippi Valley in 1942 increased their lead over the remainder of the country as consumers of fuel briquets. Major consumers in this area, in order of importance, are Wisconsin, Minnesota, Missouri, North Dakota, South Dakota, and Illinois.

Briquets marketed in Wisconsin and Minnesota are manufactured mainly from low-volatile coal screenings obtainable on the lake docks and produced as a result of the double handling of coal from rail to lake and back to rail again at upper lake docks. In North Dakota and South Dakota, the market is supplied by briquets manufactured from the lignites of North Dakota.

Table 16.—Shipments of Fuel Briquets of Domestic Manufacture into the Illinois Coal Market Area, 1940-1942
(In tons)

Destination	1940[1]	1941[2]	1942[2]
Illinois	31,895	50,398	65,709
Indiana	25,946	45,934	48,868
Iowa	25,509	31,608	47,392
Kansas	5,145	4,957	10,731
Kentucky	5,635	5,734	4,954
Minnesota	217,068	244,767	303,497
Missouri	16,738	82,954	172,269
Nebraska	25,371	23,992	35,111
North Dakota	66,114	80,136	96,912
South Dakota	60,723	64,026	73,744
Wisconsin	230,840	220,939	317,627
Total	710,948	855,445	1,176,814
Total—United States	1,028,175	1,256,964	1,600.300
Per cent of U. S. total	*69.1*	*68.0*	*73.6*

[1] U. S. Dept. Interior, Bureau of Mines, Weekly Coal Report No. WACR 256.
[2] Mineral Market Report MMS No. 1083, June 23, 1943.

Table 16 gives the shipments of fuel briquets of domestic manufacture into the Illinois coal market area in 1940, 1941, and 1942.

The production of fuel briquets in Illinois is increasing, an important part of this production being made from deduster dust, a byproduct obtained in the preparation of stoker fuel from southern Illinois coal. It is impossible to publish data on the production of fuel briquets in Illinois without revealing operations of individual concerns.

Production of packaged fuel in Illinois decreased during 1942, as shown in table 17. This was probably due to labor shortage and to scarcity of coal dust from the rehandling of coal.

TABLE 17.—PRODUCTION AND VALUE OF PACKAGED FUEL IN ILLINOIS, 1938-1942[1]

Year	Amount tons	Value at plants		Number of plants
		Total	Average	
1938	4,133	$42,555	$10.30	5
1939	3,998	40,487	10.10	5
1940	3,813	36,531	9.60	6
1941	8,924	95,431	10.60	6
1942[2]	4,980	60,001	12.05	6

[1] U. S. Dept. Interior, Mineral Yearbooks.
[2] Mineral Market Report MMS No. 1083.

COKE AND BYPRODUCTS

The year 1942 witnessed a new high in coke production in Illinois in response to the heavy demand of the iron and steel industry for metallurgical fuel. The total production of coke in Illinois was 3,690,000 tons valued at $27,364,000. The total value of coke, breeze, tar produced, and other byproducts sold in 1942 was $35,038,000.

A statistical summary of the coke industry in Illinois for the past three years is given in table 18. This includes data on the types of byproduct ovens used, the amounts and sources of coal used, and the coke and various byproducts produced. The production of coke during 1942 showed an increase in value of 8 per cent over the previous year, whereas the total value of coke and byproducts for 1942 showed an increase of 4 per cent.

TABLE 18.—STATISTICAL SUMMARY OF THE COKE INDUSTRY IN ILLINOIS, 1940-1942[1]

	1940			1941			1942		
	Quantity	Value at plants		Quantity	Value at plants		Quantity	Value at plants	
		Thousands of dollars	Av.		Thousands of dollars	Av.		Thousands of dollars	Av.
Coal used (thousands of tons)	4,273	$19,509	$4.57	5,142	$25,319	$4.92	5,225	$27,594	$5.28
Plants in existence	9			9			9		
Ovens in existence	916			915			915		
Coke ovens under construction, December 31, 1942	.....			.....			124		
Types of ovens in Illinois									
Koppers	662			661			379		
Koppers Backer							282		
Sement Solvay	120			120			120		
Wilputte	88			88			88		
Curran-Knowles	46			46			46		
Coal used per ton of coke produced	1.42		6.49	1.40		6.89	1.42		7.50
Sources of coal purchased for coke manufacture in Illinois (M tons)									
Illinois	215			236			227		
Indiana	.....			46			81		
Kentucky	1,246			1,419			1,523		
Pennsylvania	587			378			311		
Tennessee	.....			14			.....		
Virginia	13			11			13		
West Virginia	2,255			3,059			3,200		
Total	4,316			5,163			5,355		
Low-volatile	1,450			1,895			1,905		
Medium-volatile	813			967			976		
High-volatile	2,053			2,301			2,474		

TABLE 18.—*Concluded*

	1940			1941			1942		
	Quantity	Value at plants		Quantity	Value at plants		Quantity	Value at plants	
		Thousands of dollars	Av.		Thousands of dollars	Av.		Thousands of dollars	Av.
Yield of coke (per cent)	*70.56*			*71.20*			*70.63*		
Byproduct coke sold or used by producer (M tons)	3,015	$18,218	$6.04	3,661	$25,215	$ 6.89	3,690	$27,364	$ 7.42
Used by producer in blast furnace[2]	2,002	11,529	5.75	2,585	16,723	6.48	2,561	18,322	7.43
Furnace	[3]	[3]	[3]	8	40	5.00	152	1,210	8.03
Foundry	[3]	[3]	[3]	354	3,811	10.73	298	3,221	10.80
Domestic	799	4,555	5.70	734	4,908	6.71	585	3,964	6.78
Industrial and other use	88	481	5.46	93	677	7.29	109	803	7.36
Production of byproducts									
Coke breeze (M tons)	253	577	2.27	326	782	2.40	[4] 289	[4] 655	2.27
Ammonia (sulfate equivalent) (M pounds)	84,075			95,149			95,466		
Per ton of coal coked (pounds)	20.72			19.40			19.10		
Sulfate sold (M pounds)	69,203	785	.01	74,550	889	.012	74,440	910	.012
Coke oven tar produced (M gals.)	33,740			38,218			38,820		
Per ton of coal coked	7.90			7.43			7.43		
Sold	33,285	1,478	.04	31,575	1,449	.046	29,713	1,601	.054
Coke oven gas produced (millions of cu. ft.)	43,272			51,267			50,672		
Used in heating ovens	12,773			15,834			15,507		
Surplus sold	28,613	5,393	.188	34,302	5,320	.155	34,381	4,508	.131
Light oil and derivatives (M gals.)	4,121	500	.12	[3]			[3]		
Total value of coke and byproducts sold		$26,951			$33,655			$35,038	

[1] U. S. Bur. Mines, Minerals Yearbooks and Mineral Market Report MMS No. 1092, July 22, 1943.
[2] Includes gas used in making producer gas and water gas.
[3] Not available.
[4] Calculated.

PETROLEUM

Petroleum continues to lead in value among the mineral products of Illinois. Production of crude oil in 1942 amounted to 106,391,000 barrels with a value of $144,800,000. If the value of natural gas, natural gasoline, and liquefied petroleum gases also produced in the State is included, the total value is more than $150,000,000. Illinois has fallen to fifth place among the producers of crude oil, being exceeded by Texas, California, Oklahoma, and Louisiana. Illinois produced 7.7 per cent of the national total of crude oil.

Production

General statistics of the petroleum industry in Illinois are presented in table 19 which gives the production and value of crude oil, natural gas, natural gasoline, and liquefied gases.

Crude oil production in the United States is shown in table 20 by districts and states for the years 1937 to 1942 inclusive for comparison with Illinois. These data are presented graphically in figure 5.

TABLE 19.—PRODUCTION AND VALUE OF CRUDE OIL AND RELATED PRODUCTS IN ILLINOIS, 1940-1942[1]

	1940			1941			1942			
	Production	Value at wells		Production	Value at wells		Production	Value at wells		Per cent change in value from 1941
		Total	Av.		Total	Av.		Total	Av.	
Crude oil (bbls.)	147,647,000	*$156,500,000	*$1.06	*132,393,000	*$172,100,000	$1.30	106,391,000	$144,800,000	$1.36	—*15.9*
Natural gas (M cu. ft.)										
Marketed as gas[2]	1,165,328	31,500	.027	1,699,400	51,000	.03	2,573,437	77,200	.03	+*51.4*
Used in fields[3]	*7,825,255	*246,134	*.031	*8,999,256	*273,017	.03	11,645,000	412,000	.035	+*50.9*
Returned to underground formations	*748,824	*23,214	*.031	*1,957,980	*58,739	*.03	2,218,000	81,512	.037	+*38.8*
	*9,739,407	*300,848	*.031	*12,656,636	*382,756	.03	16,436,437	570,712	.035	+*48.8*
Natural gasoline (gals.)	*21,498,601	*805,265	*.037	*54,872,000	*2,693,000	*.049	66,616,000	2,664,640	.04	—*1.1*
Liquefied petroleum gases (butane, propane) (gals.)	*9,974,102	*274,000	*.028	38,293,000	1,054,000	.028	73,619,000	2,024,522	.028	+*92.1*
Total value		*$157,880,113			*$176,229,756			$150,059,874		—*14.9*

[1] U. S. Bur. Mines, Minerals Yearbooks and Annual Petroleum Statement No. P241.
[2] Illinois Geol. Survey, Illinois Petroleum No. 37 (1940), No. 41 (1941), and No. 45 (1942).
[3] Includes extraction loss and fuel used in natural gasoline plants.
* Final revision.

TABLE 20.—CRUDE OIL PRODUCTION IN THE UNITED STATES, BY DISTRICTS AND STATES, 1937-1942[1]
(In thousands of barrels)

Districts and States	1937		1938		1939		1940		1941		1942	
	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]
Midcontinent:												
Arkansas	11,764		18,180		21,238		25,775		26,327		26,628	
North Louisiana	28,883		28,578		25,403		24,406		*24,991		29,310	
Kansas	70,761		60,064		60,703		66,139		*83,242		97,636	
New Mexico	38,854		35,759		37,637		39,129		*39,569		31,544	
Oklahoma	228,839		174,994		159,913		156,164		*154,702		140,690	
Texas (except Gulf)	395,616		360,263		361,005		371,043		*370,840		348,077	
Total	774,717	*60.6*	677,838	*55.8*	665,899	*52.6*	682,656	*50.5*	*699,671	*49.9*	673,885	*48.6*
California:												
California	238,521	*18.6*	249,749	*20.6*	224,354	*17.7*	223,881	*16.5*	230,263	*16.4*	248,326	*17.9*
Gulf Coast:												
Louisiana Gulf	62,041		66,630		68,243		79,178		*90,917		86,475	
Texas Gulf	114,702		115,587		122,523		122,166		*134,732		135,020	
Mississippi	[3]		[4]		107		4,400		*15,327		28,833	
Total	176,743	*13.8*	182,217	*15.0*	190,873	*15.1*	205,744	*15.2*	*240,976	*17.2*	250,328	*18.0*
Rocky Mountain:												
Colorado	1,605		1,412		1,404		1,626		*2,150		2,199	
Montana	5,805		4,946		5,960		6,728		7,526		8,074	
Wyoming	19,166		19,022		21,454		25,711		*29,878		32,812	
Total	26,576	*2.1*	25,380	*2.1*	28,818	*2.3*	34,065	*2.5*	*39,554	*2.8*	43,085	*3.1*

TABLE 20.—*Concluded*

Districts and States	1937		1938		1939		1940		1941		1942	
	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]	Quantity	Per cent[2]
Central:												
Illinois	7,499		24,075		94,912		147,647		*132,393		106,391	
Indiana	844		995		1,711		4,978		*7,411		6,743	
Kentucky	5,484		5,821		5,621		5,188		4,762		4,534	
Ohio	3,559		3,298		3,156		3,159		*3,510		3,543	
Michigan	16,628		18,745		23,462		19,753		*16,359		21,754	
Total	34,014	*2.7*	52,934	*4.4*	128,862	*10.2*	180,725	*13.3*	*164,435	*11.8*	142,965	*10.4*
Eastern:												
Pennsylvania	19,189		17,426		17,382		17,353		16,750		17,779	
New York	5,478		5,045		5,098		4,999		5,185		5,421	
West Virginia	3,845		3,684		3,580		3,444		3,433		3,574	
Total	28,512	*2.2*	26,155	*2.1*	26,060	*2.1*	25,796	*2.0*	25,368	*1.8*	26,774	*1.9*
Other:[5]	77	—	82	—	96	—	347	—	*1,961	*0.1*	1,282	*0.1*
Total United States	1,279,160	*100.0*	1,214,355	*100.0*	1,264,962	*100.0*	1,353,214	*100.0*	*1,402,228	*100.0*	1,386,645	*100.0*
Illinois	7,499	*0.6*	24,075	*2.0*	94,912	*7.5*	147,647	*10.9*	*132,393	**9.4*	106,391	*7.7*

[1] U. S. Bur. Mines, Minerals Yearbooks and Annual Petroleum Statement No. P241.
[2] Per cent of total U. S. production.
[3] No commercial production.
[4] Included in "Other."
[5] The states reporting are not identical from year to year.
* Final revision.

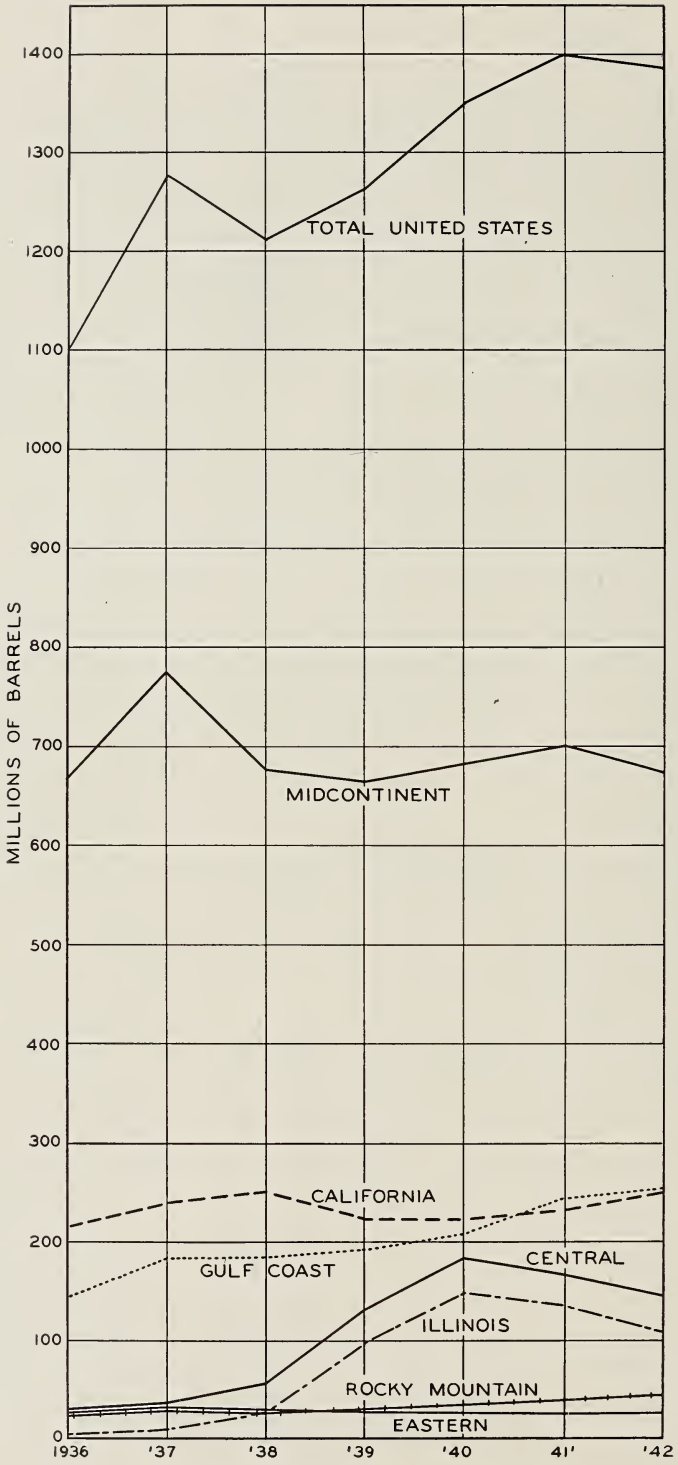

FIG. 5.—Crude oil production in the United States (by districts) and in Illinois, 1936-42.

Prices of Illinois Crude Oil in 1942

The price of crude oil as posted on May 21, 1941, was $1.22 for the old fields, $1.32 for the Carmi-Storms area, and $1.37 for the basin fields. It remained unchanged throughout 1942. The weighted average price of crude petroleum in Illinois in 1942 was $1.36. Under the authority of the Office of Price Administration, maximum prices on crude oil were established under Maximum Price Regulation No. 88, issued February 2, 1942. This regulation established, as a maximum or ceiling price at the well for crude oil, the posted price in effect on October 1, 1941. The average value of crude oil in Illinois, 1937-1942, is shown in table 21.

Table 21.—Average Value of Crude Oil in Illinois, 1937-1942[1]
(Per barrel at wells)

1937	$1.33
1938	1.25
1939	1.07
1940	*1.06
1941	1.30
1942	[2] 1.36

[1] U. S. Bur. Mines, Minerals Yearbooks.
[2] U. S. Bur. Mines, Annual Petroleum Statement No. P241.
* Final Revision.

Supply and Demand

Relationship of supply and demand, as reflected in changes in stocks of crude oil in Illinois and certain refined products in the Central refining

Table 22.—Stocks of Crude Oil and Refined Products in the United States, in Illinois, and in the Central Refining District, by Months, 1942[1]
(In thousands of barrels)

1942	Total crude stocks		Stocks of refined products			
			Central Refining District			United States
	United States	Illinois	Gasoline	Distillate fuel oil[2]	Residual fuel oil[2]	Gasoline
January	253,531	12,334	21,030	4,180	3,888	101,213
February	260,844	12,407	22,820	3,082	3,748	108,297
March	261,832	11,853	23,211	2,526	3,556	106,733
April	257,761	11,885	21,588	2,337	3,240	101,822
May	254,577	10,969	18,996	2,712	3,174	94,681
June	251,421	10,340	16,515	3,663	3,184	87,517
July	245,026	9,108	15,020	4,636	3,615	79,446
August	244,125	9,424	14,638	6,056	3,882	79,526
September	240,043	9,067	14,062	6,262	3,700	78,146
October	237,361	9,859	13,621	6,441	3,057	76,622
November	234,100	9,082	12,376	6,554	2,484	73,216
December	234,354	9,170	15,364	5,783	2,446	80,126

[1] U. S. Bureau of Mines, Monthly Petroleum Statements.
[2] Includes refinery and bulk stocks.

district, in comparison with stocks of crude oil and gasoline in the United States, are shown in table 22.

Data on consumption of refined products and proved reserves of petroleum are not available because of war censorship.

Natural and Manufactured Gas

Large quantities of natural gas are produced from the oil fields of Illinois, but equipment for collecting and transporting this gas requires heavy investment and is not yet available in many localities. Part of the gas is treated to produce natural gasoline and liquefied gases, and part is used to repressure oil wells to increase their production. The production and value of natural gas which is marketed as such, and that used at wells for pumping, lighting, heating, and treating oil, is shown in table 19.

Natural gas from other states in the Central district and from the Midcontinent district is available in some parts of Illinois through pipelines. Consumption of natural gas in Illinois from these various sources is shown in table 23, the larger portion coming from Texas and Louisiana.

Table 23.—Consumption of Natural Gas in Illinois, with Sources, 1936-1941[1]
(In millions of cubic feet)

Year	Ill.	Ind.	Ky.	La.	Kan.	Mo.	Okla.	Texas	Total
1936	862	95	89	17,214	2,385	53	18	51,800	72,516
1937	1,040	13	185	17,367	2,973	34	81	56,957	78,650
1938	1,068	42	135	15,168	2,176	140	89	47,682	66,500
1939	1,816	5	0	17,413	2,455	40	80	55,325	77,134
1940	7,530	7	0	17,917	2,855	18	66	59,695	88,088
1941	9,339	53	0	21,648	2,760	8	88	64,738	98,634

[1] U. S. Bureau of Mines, Minerals Yearbooks.

Table 24.—Gas Sales to Ultimate Consumers in Illinois, by Principal Uses, 1938-1942[1, 2]
(In thousands of therms)

	1938	1939	1940	1941	1942
Residential sales, exclusive of space heating	172,517	170,541	176,266	176,357	182,746
Residential space heating	79,098	88,901	107,312	105,521	124,066
Industrial–interruptible sales	323,439	383,406	377,970	378,658	449,467
Commercial, industrial–non–interruptible, and other sales	124,722	132,289	148,441	172,812	195,045
Total	699,776	775,137	809,989	833,348	951,329

[1] Illinois Commerce Commission, Rates and Research Section, Monthly Summaries of Gas Sales in Illinois, 1942, and Research Bulletins.
[2] Includes manufactured gas.

Before natural gas was available in Illinois, the larger communities were supplied by utility companies with manufactured gas, such as coal gas, coke-oven gas, and water gas. When natural gas was first piped into Illinois, some of the utility companies began furnishing a combination of

natural and manufactured gas. Where sufficient volume of natural gas is available, many utility companies are now supplying all natural gas.

Gas is sold on the basis of fuel value, which is stated in therms. A therm is equal to 100,000 British thermal units, so one ton of coal having an average heat value of 12,500 Btu per pound is equivalent in fuel value to 250 therms of gas. Heat value of gas available in Illinois ranges from 480 Btu per cubic foot for manufactured gas to as high as 1,030 Btu for natural gas.

Gas sales to ultimate consumers in Illinois, showing principal uses by years from 1938 to 1942, inclusive, are shown in table 24. Sales by months during 1942 are shown in table 25. Seasonal variation in demand for residential space heating has been largely offset by increased demand for industrial-interruptible and other kinds of service, giving a reasonably uniform load throughout the year.

TABLE 25.—GAS SALES TO ULTIMATE CONSUMERS IN ILLINOIS, BY USES AND BY MONTHS[1, 2]
(In thousands of therms[3])

Month	Residential sales exclusive of space heating	Residential space heating	Industrial-interruptible sales	Commercial, industrial-non-interruptible, and other sales	Total
January	16,184	21,054	29,549	15,500	82,287
February	14,782	19,301	27,902	14,765	76,750
March	14,729	18,080	35,569	14,943	83,321
April	14,821	13,005	37,858	18,656	84,340
May	15,573	7,083	40,034	17,232	79,922
June	15,460	4,164	43,818	16,553	79,995
July	14,789	2,230	44,438	15,832	77,289
August	14,154	1,709	43,872	15,945	75,680
September	15,225	2,252	39,714	16,537	73,728
October	15,934	6,077	39,458	18,027	79,496
November	15,280	10,890	36,314	14,384	76,868
December	15,815	18,221	30,941	16,671	81,648
Total	182,746	124,066	449,467	195,045	951,324

[1] Monthly Summary of Gas Sales in Illinois, Illinois Commerce Commission.
[2] Includes manufactured gas.
[3] A therm is 100,000 Btu.

NATURAL GASOLINE AND LIQUEFIED PETROLEUM GASES

Annual production of natural gasoline in Illinois has increased more than three times during the past two years, due to the large volume of natural gas available for processing and to increases in number and capacity of plants. The production and value for the past three years is shown in table 19.

Annual production of liquefied petroleum gases, butane and propane, as shown in table 19, has increased more than seven times during the past two years. Their use as fuel for internal-combustion engines, as well as for chemical, domestic, and industrial fuels uses, is steadily increasing their importance. From butane is derived butadiene, the basic raw material for the production of Buna synthetic rubber.

STONE, CEMENT, AND LIME

The Illinois stone industry and the related cement and lime industries comprise a mineral industries group which is exceeded in the value of its products only by the Illinois petroleum and coal industries. The stone, cement, and lime produced in 1942 had a value of more than $25,500,000, which was an increase of 18 per cent over 1941, and for the second year in succession established a new all-time high record.

Stone

Stone (both limestone and dolomite) sold or used by producers in Illinois during 1940-42 is shown in table 26[1]. The total for 1942 was more than 14,000,000 tons, valued at the quarries at more than $13,000,000. This was an increase in value of 17 per cent over 1941, and likewise set an all-time high record for the second successive year, as shown graphically in figure 6. The principal uses by value were for concrete and paving, for agricultural limestone, and for metallurgical uses and flux. Of the various classifications

[1] Data regarding the relatively small amount of sandstone produced in Illinois is included in Table 46—Other Minerals.

Table 26.—Stone (Lime-
Sold or Used by Producers

Use	Type of operation	1940			
		Plants[1]	Amount tons	Value at plants	
				Total	Av.
Agricultural [2]	Commercial	87	2,248,005	$1,904,664	$0.85
Agricultural	Gov.-Contr.	5	36,524	27,036	.75
Concrete and paving	Commercial	52	4,544,773	3,174,154	.70
Concrete and paving	Gov.-Contr.	15	1,115,587	1,055,149	.94
Railroad ballast	Commercial	12	359,540	234,056	.65
Metallurgical and flux	"	9	567,350	572,515	1.01
Whiting substitutes—paint and putty fillers	"	3	10,282	44,157	4.29
Whiting substitutes—rubber and other fillers and pottery	"		[5]	[5]	
Miscellaneous fillers—asphalt, fertilizer, etc. [3]	"	8	62,291	175,843	3.55
Rubble and veneering stone	"	14	23,460	48,062	2.05
Flagging	"	5	1,440	4,129	2.86
Riprap	"	17	340,127	341,812	1.00
Riprap	Gov.-Contr.	4	26,083	12,788	.49
Other uses [4]	Commercial	14	151,907	157,114	1.03
Total limestone and dolomite	Commercial	99	8,309,175	$6,656,506	$0.80
Total limestone and dolomite	Gov.-Contr.	16	1,178,194	1,094,973	.93
Total stone	Both	115	9,487,369	$7,751,479	$0.82

† Based upon joint canvass made by Illinois Geol. Survey and U. S. Bur. Mines.
[1] Number of plants reporting production during year indicated.
[2] Canvass made by Illinois Geol. Survey.

by use, those showing the largest increases in value over 1941 were: Metallurgical uses and flux; fillers for asphalt, fertilizer and other materials; and for railroad ballast. Illinois during 1942 increased its rank to second among all states in value, and fourth in quantity, of stone produced.

In previous reports limestone and dolomite, a variety of limestone which contains a high proportion (25 per cent or more) of magnesium carbonate, have been considered together. The importance of the production of dolomite in Illinois makes it desirable to separate data on dolomite from that on limestone. This has been done and is presented for the first time in table 27. All stone used in the manufacture of cement and lime is reported only under those products (see tables 32 and 33).

Limestone.—Limestone sold or used by producers in Illinois during 1942 amounted to 5,585,000 tons, valued at the quarries at $5,890,000. Details of this are given in table 27. The largest uses were for concrete and paving and for agricultural limestone.

Dolomite.—Dolomite production in Illinois during 1942 amounted to 8,420,000 tons, valued at the quarries at $7,124,000. Details of this are

STONE AND DOLOMITE)
IN ILLINOIS, 1940-1942†

1941				1942				
Plants[1]	Amount tons	Value at plants		Plants[1]	Amount tons	Value at plants		Per cent change in value from 1941
		Total	Av.			Total	Av.	
151	2,799,321	$2,689,946	$0.96	131	3,641,534	$3,422,593	$0.94	+27.0
5	195,140	99,524	.52	3	113,016	74,457	.66	—25.0
58	6,470,237	5,068,430	.79	53	7,554,649	5,954,595	.79	+17.9
19	1,282,098	1,753,852	1.33	17	623,661	951,847	1.52	—45.4
19	529,329	385,961	.73	16	804,853	617,988	.77	+60.0
9	563,989	532,874	.95	9	847,593	1,231,311	1.45	+130.0
3	14,225	81,569	5.73	5	4,379	20,983	4.77	—74.3
	[5]	[5]		4	6,957	27,740	3.98	
5	75,923	178,848	2.33	7	102,551	359,830	3.50	+102.0
11	7,159	25,761	3.60	10	31,047	29,169	.94	+13.0
5	355	1,463	4.11	3	158	785	4.97	—46.5
21	82,276	86,921	1.06	18	54,826	48,547	.89	—44.0
5	74,417	79,487	1.07	2	31,596	42,373	1.34	—46.7
10	111,667	1,194,468	1.07	18	189,736	232,211	1.22	+94.0
161	10,654,481	$9,171,241	$0.86	138	13,238,283	$11,945,752	$0.90	+30.0
20	1,551,655	1,932,863	1.24	17	768,273	1,068,677	1.39	—44.7
181	12,206,136	$11,104,104	$0.91	155	14,006,556	$13,014,429	$0.93	+17.2

[3] Includes stone for coal-mine dusting.
[4] Includes filler for "black-top" roads, stone sand, stone for filter beds, poultry grit, stock feeds, reprocessing, regrinding, glass factories, mineral (rock) wool, concrete blocks, etc.
[5] Included in Whiting substitutes—paint and putty fillers.

TABLE 27.—LIMESTONE AND DOLOMITE
SOLD OR USED BY PRODUCERS IN ILLINOIS, 1942†

Use	Type of operation	Limestone				Dolomite			
		Plants[1]	Amount tons	Value at plants		Plants[1]	Amount tons	Value at plants	
				Total	Av.			Total	Av.
Agricultural[2]	Commercial	89	2,240,798	$2,240,938	$1.00	42	1,400,736	$1,181,655	$0.84
Agricultural	Gov.-Contr.	2	111,292	73,423	.66	1	1,724	1,034	.60
Concrete and paving	Commercial	36	1,946,134	1,813,830	.93	17	5,608,515	4,140,765	.74
Concrete and paving	Gov.-Contr.	9	507,552	837,875	1.66	8	116,109	113,972	.98
Railroad ballast	Commercial	6	266,755	216,226	.81	10	538,098	401,762	.75
Metallurgical and flux	"	5	252,522	259,223	1.03	4	[4] 595,071	972,088	1.63
Whiting substitutes—paint and putty fillers	"	5	4,379	20,983	4.77				
Whiting substitutes—rubber and other fillers and pottery	"	4	6,957	27,740	3.98				
Miscellaneous fillers—asphalt, fertilizers, etc.[3]	"	4	34,316	133,247	3.88	3	68,235	226,583	3.31
Rubble and veneering stone	"	7	17,188	16,861	.98	4	22,416	20,073	.90
Flagging	"	3	158	785	4.97				
Riprap	"	16	46,269	40,782	.88		[5]	[5]	
Riprap	Gov.-Contr.	2	31,596	42,373	1.34				
Other uses	Commercial	12	[6] 119,736	166,158	1.39	4	[7] 70,000	66,053	.95
Total commercial operations	Commercial	92	4,935,212	$4,936,773	$1.00	46	8,303,071	$7,008,979	$0.84
Total gov.-contr. operations	Gov.-Contr.	9	650,440	953,671	1.47	8	117,833	115,006	.98
Total	Both	101	5,585,652	$5,890,444	$1.05	54	8,420,904	$7,123,985	$0.85

† Based upon joint canvass by Illinois Geol. Survey and U. S. Bur. Mines.
[1] Number of plants reporting production.
[2] Canvass by Illinois Geol. Survey.
[3] Includes stone for coal-mine dusting.
[4] Refractory dolomite.
[5] Included in rubble and veneering stone.
[6] Includes filler for "black-top" roads, stone for reprocessing, filter beds, stock feeds, poultry grit, glass factories, etc.
[7] Includes stone for filter beds, stone sand, regrinding, etc.

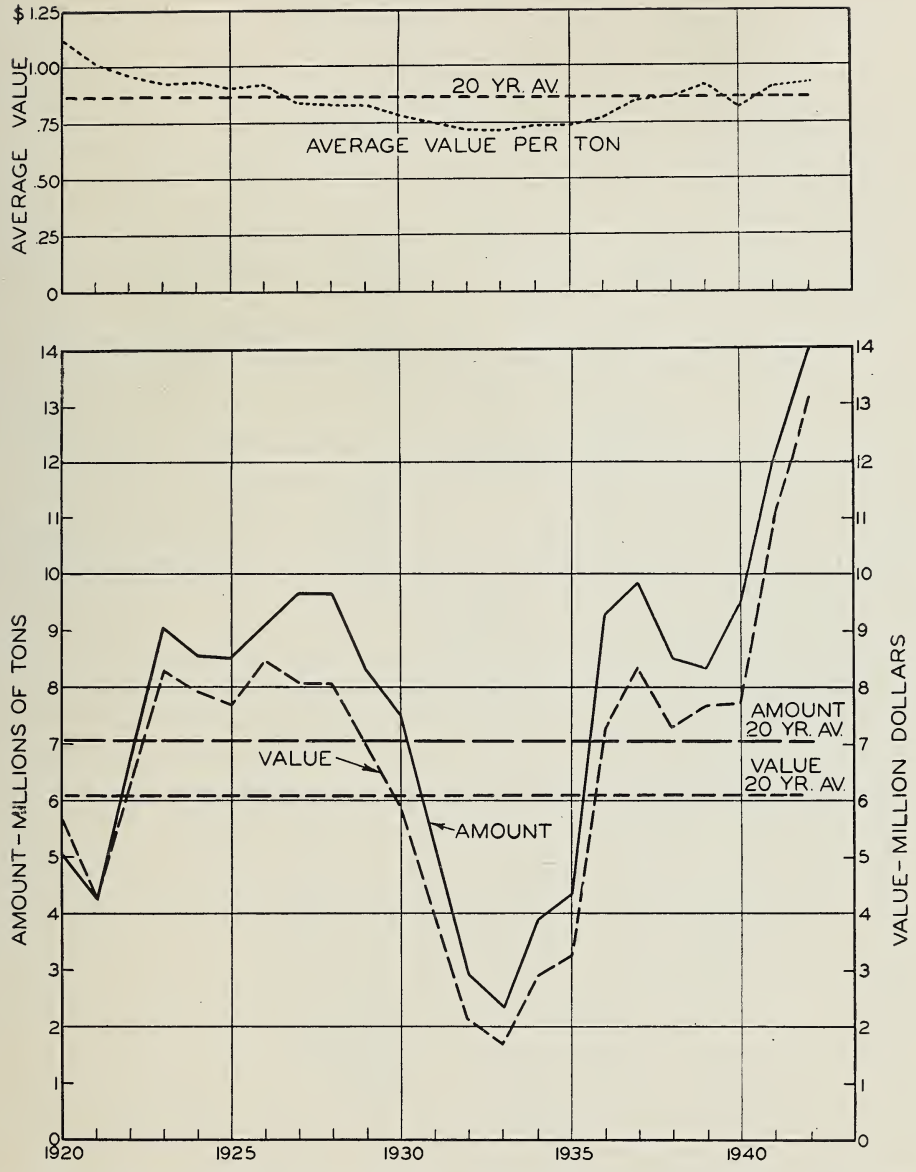

FIG. 6.—Annual production of stone (limestone and dolomite) in Illinois, 1920-1942. (20-yr. average based on data for 1920-1939, inclusive).

given in table 27. The largest uses were for concrete and paving, for agricultural limestone, for metallurgical purposes and flux (refractory dolomite), and for railroad ballast. During 1942 dolomite made up 60 per cent by tonnage and 55 per cent by value of the total stone produced in Illinois.

Commercial and government-and-contractor operations.—Production of commercial operations is separated from that of government-and-contractor operations, which include the following: The State of Illinois, counties, townships, municipalities, and the Work Projects Administration, produced either by themselves or by contractors expressly for their use. Purchases by government agencies from commercial producers are included in commercial operations. During 1942 government-and-contractor operations produced 5½ per cent of the total tonnage of both limestone and dolomite.

Agricultural limestone.—The use of agricultural limestone and dolomite on the farm lands of Illinois established another new record during 1942. More than three and three-quarter million tons were used throughout the State, every county having a part. This shows an increase of 25 per cent in quantity over the previous all-time record established in 1941. This very large increase demonstrates the continued recognition of the importance of this material in preserving and improving the fertility of the soils in order that even greater production of agricultural products will result to meet war-time needs.

The use of ground limestone to improve soil fertility has been aided by various State and Federal agencies and farm organizations, especially the soil conservation program of the U. S. Department of Agriculture, in cooperation with the State of Illinois and the College of Agriculture of the University of Illinois. This use is facilitated by the numerous deposits of limestone in many parts of the State.

During 1942, agricultural limestone was produced in 48 of the 102 counties of the State. Of the total amount used during the year, 95 per cent was produced in Illinois.

Table 28 gives the use of agricultural limestone by counties in Illinois during 1942, showing the amount that was produced in Illinois and that produced in other states. It also shows the arable land in each county, and the average quantity of limestone used, in pounds per acre of arable land. These data are from reports of producers, supplemented by information from county farm advisers. Corresponding data are given for 1941.

Table 29 gives the total amount of agricultural limestone produced in other states but used in Illinois. Table 30 gives the total amount produced in Illinois which was marketed in other states. Table 31 summarizes the disposition and value of Illinois agricultural limestone production during the past three years.

The map (fig. 7) shows the counties of Illinois and their average consumption of agricultural limestone per acre of arable land during 1942.

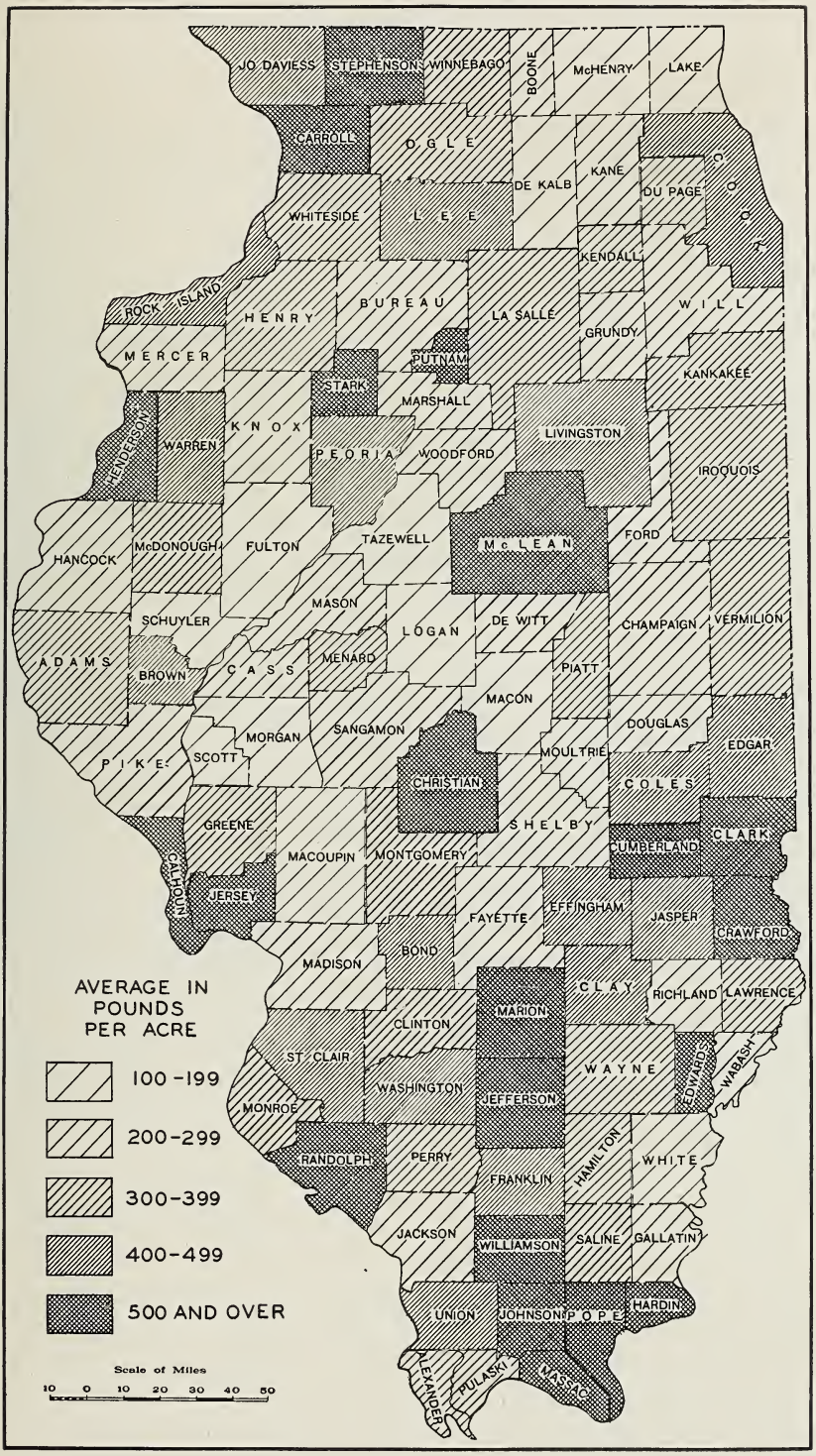

FIG. 7.—Agricultural limestone used in 1942
County averages in pounds per acre of arable land.

TABLE 28.—AGRICULTURAL LIMESTONE USED IN ILLINOIS, BY COUNTIES. 1941 AND 1942[1]

County	Tons used in 1942			Tons used in 1941	Acres of arable land (1939 Census)	Pounds used per acre	
	Produced in Illinois	Produced in other states	Total			1941	1942
Adams	42,976	61	43,037	31,841	252,446	252	340
Alexander	9,050	100	9,150	6,321	49,866	254	366
Bond	27,371	.....	27,371	25,458	122,224	416	448
Boone	14,023	.....	14,023	12,300	115,849	212	242
Brown	17,128	.....	17,128	13,564	71,549	378	479
Bureau	39,481	.....	39,481	25,827	352,777	147	224
Calhoun	18,368	.....	18,368	17,500	62,607	560	587
Carroll	47,700	.....	47,700	33,750	151,498	446	630
Cass	15,635	.....	15,635	12,000	137,405	170	228
Champaign	71,948	.....	71,948	35,124	487,052	144	295
Christian	100,883	.....	100,883	44,184	317,469	278	636
Clark	50,214	5	50,219	39,629	147,721	536	679
Clay	26,676	3,014	29,690	26,563	147,932	360	401
Clinton	35,121	590	35,711	28,245	184,463	306	388
Coles	47,628	.....	47,628	24,788	204,186	244	466
Cook	38,174	.....	38,174	10,000	174,178	114	438
Crawford	33,048	743	33,791	38,893	129,019	604	524
Cumberland	33,868	485	34,353	24,334	111,117	436	618
DeKalb	29,091	.....	29,091	25,700	300,180	172	194
DeWitt	18,127	.....	18,127	18,449	178,758	206	203
Douglas	23,744	811	24,555	12,884	203,651	126	241
DuPage	17,886	.....	17,886	21,486	98,841	434	362
Edgar	62,000	333	62,333	24,899	255,054	196	489
Edwards	17,036	3,570	20,606	28,614	79,811	716	516
Effingham	26,761	10,076	36,837	35,766	153,841	464	479
Fayette	28,313	1,277	29,590	22,472	207,106	216	286
Ford	27,135	.....	27,135	23,589	235,032	200	231
Franklin	23,481	1,339	24,820	22,615	101,537	446	489
Fulton	17,897	5,050	22,947	22,346	267,772	166	171
Gallatin	14,120	.....	14,120	12,000	102,638	234	275
Greene	31,789	.....	31,789	46,432	164,814	562	386
Grundy	23,568	.....	23,568	13,117	193,637	136	243
Hamilton	19,092	171	19,263	10,225	126,415	162	305
Hancock	37,895	1,795	39,690	35,027	265,043	264	299
Hardin	9,414	.....	9,414	7,000	21,367	656	882
Henderson	41,793	.....	41,793	34,242	127,291	536	657
Henry	47,165	9,421	56,586	46,694	327,034	286	346
Iroquois	65,460	17,465	82,925	49,525	536,438	186	309
Jackson	20,428	.....	20,428	20,385	147,931	276	276
Jasper	41,390	23	41,413	37,757	174,186	432	475
Jefferson	41,213	20,354	61,567	26,326	146,453	360	841
Jersey	30,868	.....	30,868	30,142	104,793	572	589
Jo Daviess	30,515	.....	30,515	24,495	144,530	338	422
Johnson	28,612	.....	28,612	23,864	59,742	800	958
Kane	25,116	.....	25,116	21,084	210,186	200	239

[1] From canvass by Illinois Geological Survey, in cooperation with Midwest Agricultural Limestone Institute.

TABLE 28.—*Continued*

County	Tons used in 1942			Tons used in 1941	Acres of arable land (1939 Census)	Pounds used per acre	
	Produced in Illinois	Produced in other states	Total			1941	1942
Kankakee	56,072	.....	56,072	32,668	300,394	218	373
Kendall	29,388	.....	29,388	18,018	150,326	240	391
Knox	15,486	20,341	35,827	34,651	253,753	272	286
Lake	10,775	.....	10,775	8,080	108,847	148	198
LaSalle	86,445	.....	86,445	58,120	506,546	228	342
Lawrence	20,425	.....	20,425	10,747	122,007	176	335
Lee	70,400	.....	70,400	53,850	317,176	338	444
Livingston	118,615	.....	118,615	63,980	522,760	240	454
Logan	20,552	.....	20,552	20,133	305,432	132	135
McDonough	31,294	8,589	39,883	31,523	225,530	278	354
McHenry	20,580	.....	20,580	15,601	211,577	147	195
McLean	142,161	.....	142,161	83,194	557,076	300	510
Macon	18,407	.....	18,407	18,363	263,970	138	139
Macoupin	34,187	200	34,387	50,681	263,157	384	261
Madison	36,283	.....	36,283	32,249	256,470	252	283
Marion	40,098	15,196	55,294	42,306	171,342	492	645
Marshall	18,461	.....	18,461	21,794	158,028	274	234
Mason	23,696	.....	23,696	14,544	225,535	128	210
Massac	21,100	.....	21,100	17,000	56,261	604	750
Menard	23,627	.....	23,627	12,163	128,395	188	368
Mercer	21,000	7,338	28,338	28,728	190,569	300	297
Monroe	25,381	.....	25,381	23,604	144,902	324	350
Montgomery	43,154	.....	43,154	41,022	248,528	330	347
Morgan	11,079	3,259	14,338	15,325	220,259	140	130
Moultrie	21,404	1,109	22,513	11,176	154,637	144	291
Ogle	52,017	.....	52,017	39,763	309,633	256	336
Peoria	45,973	.....	45,973	37,680	203,084	370	453
Perry	18,996	2,450	21,446	17,860	126,300	280	340
Piatt	38,409	.....	38,409	16,577	210,451	156	365
Pike	29,591	450	30,041	28,616	232,460	246	258
Pope	15,988	.....	15,988	11,307	52,202	432	613
Pulaski	10,641	.....	10,641	7,134	53,830	264	395
Putnam	17,819	.....	17,819	18,293	56,148	650	635
Randolph	58,562	2,951	61,513	34,353	196,442	348	626
Richland	17,720	.....	17,720	20,783	132,767	312	267
Rock Island	27,246	1,958	29,204	18,800	127,185	294	458
St. Clair	56,803	.....	56,803	40,862	229,600	354	495
Saline	19,744	.....	19,744	15,016	99,227	302	398
Sangamon	45,932	529	46,461	30,037	358,668	168	259
Schuyler	8,922	.....	8,922	9,678	123,785	156	144
Scott	8,513	51	8,564	8,740	87,070	200	197
Shelby	40,493	368	40,861	24,999	283,990	176	288
Stark	29,992	5,156	35,148	34,215	121,264	564	580
Stephenson	62,000	.....	62,000	18,000	212,702	170	583
Tazewell	22,549	.....	22,549	24,901	265,832	188	170

TABLE 28.—*Concluded*

County	Tons used in 1942			Tons used in 1941	Acres of arable land (1939 Census)	Pounds used per acre	
	Produced in Illinois	Produced in other states	Total			1941	1942
Union	19,725	.....	19,725	18,092	94,140	384	419
Vermilion	74,838	70	74,908	36,645	390,901	188	383
Wabash	4,512	5,722	10,234	8,114	80,345	202	255
Warren	42,375	4,013	46,388	34,264	210,953	324	440
Washington	40,429	8,860	49,289	44,365	211,504	420	466
Wayne	37,665	2,549	40,214	30,691	215,527	284	373
White	18,183	3,089	21,272	13,690	189,016	144	225
Whiteside	44,025	.....	44,025	34,932	274,505	254	320
Will	44,880	104	44,984	20,477	345,147	118	261
Williamson	30,826	.....	30,826	17,655	86,222	432	715
Winnebago	35,315	.....	35,315	30,790	180,603	342	391
Woodford	29,590	.....	29,590	20,436	222,776	182	266
Undistributed	215,989	.....	215,989	410,114	.....	.....	.....
Total	3,695,533	171,035	3,866,568	3,084,855	20,201,195	Av. 306	Av. 383

TABLE 29.—AGRICULTURAL LIMESTONE PRODUCED IN OTHER STATES AND SOLD IN ILLINOIS, 1936-1942.[1]
(In tons)

Year	Amount sold in Illinois	Per cent of total Illinois consumption
1936	77,264	*7.5*
1937	87,479	*7.9*
1938	118,740	*10.2*
1939	71,775	*5.1*
1940	106,912	*5.9*
1941	95,226	*3.2*
1942	171,035	*4.5*

[1] From canvass by Illinois Geological Survey.

TABLE 30.—AGRICULTURAL LIMESTONE PRODUCED IN ILLINOIS AND MARKETED IN OTHER STATES, 1936-1942.[1]
(In tons)

Year	Indiana	Kentucky	Missouri	Michigan	Tennessee	Total
1936	28,976	4,129	587	4,950	6,020	44,398
1937	53,375	12	845	7,522	2,703	64,746
1938	36,356	4	675	1,288	4,100	42,463
1939	3,527	4,735	441	500	18,950	28,169
1940	3,800	5,450	353	325	14,900	[2] 25,778
1941	1,800	940	867	65	1,060	[3] 4,832
1942	28,811	9,700	203	53	.....	[4] 59,017

[1] From canvass by Illinois Geological Survey.
[2] Includes 950 tons to Wisconsin.
[3] Includes 100 tons to Iowa.
[4] Includes 450 tons to Wisconsin and 19,800 tons to unknown destinations outside of Illinois.

TABLE 31.—PRODUCTION AND VALUE OF AGRICULTURAL LIMESTONE IN ILLINOIS, 1940-1942.[1]

	1940			1941			1942		
	Tons	Value		Tons	Value		Tons	Value	
		Total	Av.		Total	Av.		Total	Av.
Produced and used in Illinois (table 28)	2,258,751	$1,910,000	$0.84	2,989,629	$2,784,960	$0.93	3,695,533	$3,441,250	$0.93
Produced in Illinois and marketed in other states (table 30)	25,778	21,700	0.84	4,832	4,510	0.93	59,017	55,800	0.93
Total produced in Illinois	2,284,529	$1,931,700	$0 84	2,994,461	$2,789,470	$0.93	3,754,550	$3,497,050	$0.93

[1] From canvass by Illinois Geological Survey.

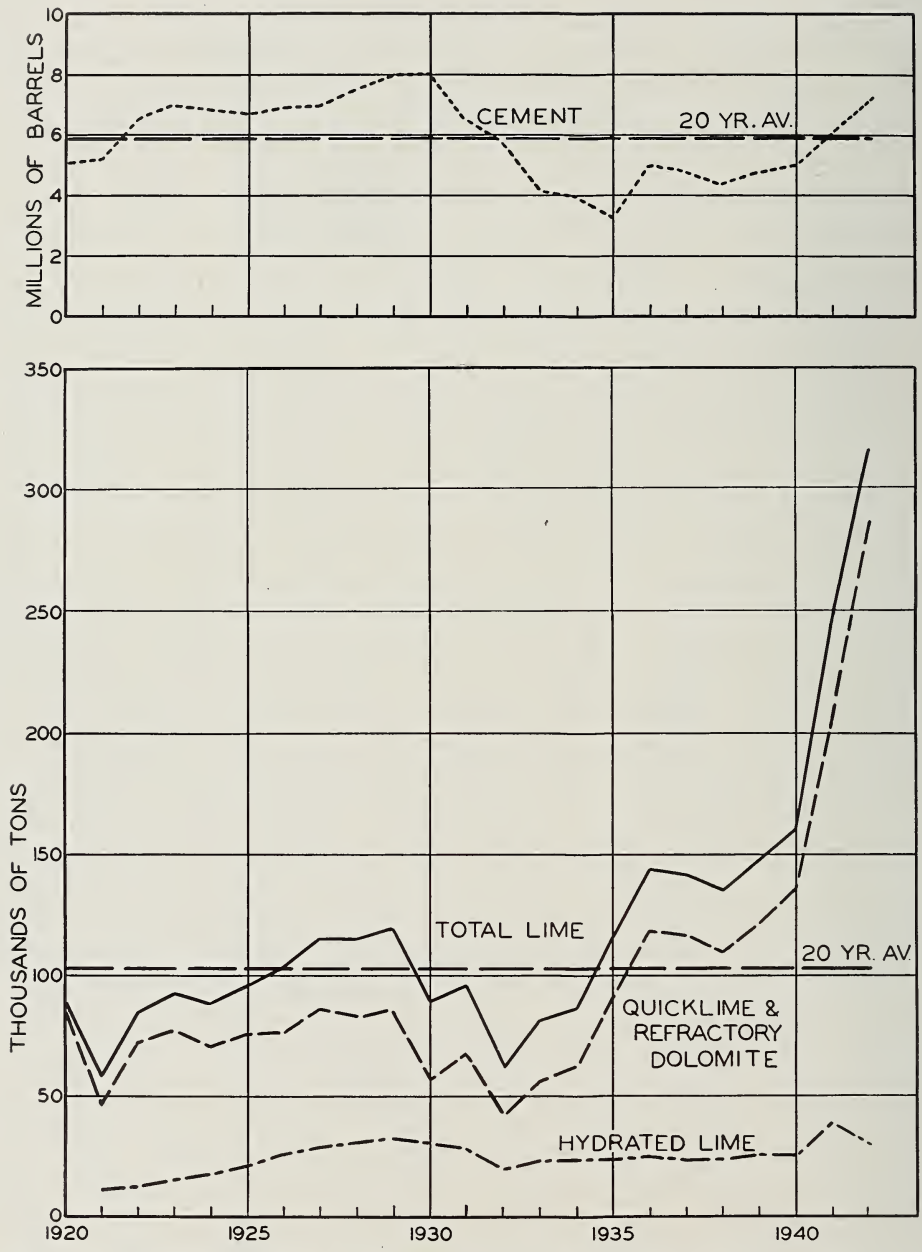

FIG. 8.—Annual shipments of cement and lime by producers in Illinois, 1920-1942. 20-yr. average based on quantities for 1920-1939, inclusive.

Cement

Shipments of cement produced in Illinois during 1942 increased nearly 17 per cent in value from the previous year, as shown in table 32 and figure 8, and amounted to 7,087,000 barrels, valued at the plants at more than $10,284,000. This increase was the result of the large amount of construction for military purposes, and for plants producing war materials and for housing needed in connection with them.

Lime

During 1942 shipments of lime produced in Illinois increased 31 per cent in value from the previous year. As shown in table 33, these amounted to 314,000 tons, valued at plants at $2,266,000. Shipments of quicklime and dead-burned (sintered) dolomite increased 42 per cent, due to large amounts being used in steel and other industries directly connected with production of war materials. Shipments of hydrated lime decreased 20 per cent. Figure 8 shows that both quicklime and total lime shipments during 1942 established new all-time high records, the third year in succession that they had done so. Illinois ranked fifth among all the states in value, and sixth in quantity, of lime produced during 1942.

TABLE 32.—
SOLD OR USED BY PRODUCERS

Kind	Lbs. per bbl.	1940			
		Plants[1]	Amount bbls.	Value at plants	
				Total	Av.
Standard Portland cement	376	.....	[2]	.....	.....
Special Portland cements:					
High-early-strength, and Portland-puzzolan	376	.....	[2]	.....	.....
Low-heat-of-hardening, white, and other	376	.....	[2]	.....	.....
Special hydraulic cements:					
Masonry	280	.....	[2]	.....	.....
Total cement	Equiv. 376	5	[4] 5,006,727	$7,347,253	$1.47

† Canvass by U. S. Bureau of Mines.
[1] Number of plants reporting production during year indicated.
[2] Not differentiated.

TABLE 33.—
SOLD OR USED BY PRODUCERS

Kind and use	1940			
	Plants[1]	Amount tons	Value at plants	
			Total	Av.
Quicklime:[2]				
Building lime	3	15,109	$122,947	$8.11
Chemical and industrial lime:				
Paper-strawboard process, etc	3	6,176	34,499	5.59
Other industrial uses[3]	7	113,981	794,473	7.00
Total quicklime	8	135,266	$951,919	$7.06
Hydrated lime:				
Building lime	5	3,710	$31,889	$8.60
Agricultural lime	3	447	3,383	7.58
Chemical and industrial lime[4]	5	21,935	162,922	7.45
Total hydrated lime	6	26,092	$198,194	$7.60
Total lime	8	161,358	$1,150,113	$7.13

† Canvass by U. S. Bur. Mines.
[1] Number of plants reporting production during year indicated.
[2] Following procedure of U. S. Bur. of Mines, data on dead-burned (sintered) dolomite are included with quicklime. To avoid disclosing operations of individual producers, data on this material are included with "Other industrial uses."

CEMENT
IN ILLINOIS, 1940-1942†

1941				1942				
Plants[1]	Amount bbls.	Value at plants		Plants[1]	Amount bbls.	Value at plants		Per cent change in value from 1941
		Total	Av.			Total	Av.	
.....	[2]	.....	.....	4	6,165,989	$8,585,213	$1.39	.....
.....	[2]	.....	.....	3	502,483	1,000,565	1.99	.....
.....	[2]	.....	.....	3	136,328	201,159	1.47	.....
.....	[2]	.....	.....	4	[3] 379,342	497,174	1.32	.....
5	[4] 6,033,440	$8,799,667	$1.46	4	[5] 7,087,400	$10,284,111	$1.45	*+16.9*

[3] Masonry-cement barrels containing 280 pounds each.
[4] Includes Portland cement and natural cement.
[5] Includes masonry cement reduced to equivalent standard barrels.

LIME
IN ILLINOIS, 1940-1942†

1941				1942				
Plants[1]	Amount tons	Value at plants		Plants[1]	Amount tons	Value at plants		Per cent change in value from 1941
		Total	Av.			Total	Av.	
5	16,020	$142,735	$8.91	5	8,725	$ 83,943	$9.56	*—41.2*
5	11,221	67,286	6.00	3	11,778	62,629	5.32	*—7.0*
7	179,337	1,219,834	6.80	6	262,158	1,885,295	7.20	*+54.6*
9	206,578	$1,429,855	$6.93	8	282,661	$2,031,867	$7.19	*+42.1*
6	6,358	$60,408	$9.50	6	4,128	$ 39,481	$9.56	*—34.7*
3	285	2,440	8.56	5	439	2,877	6.55	*+17.9*
6	33,057	231,147	7.00	5	26,849	191,927	7.15	*—17.0*
6	39,700	$293,995	$7.41	6	31,416	$234,285	$7.46	*—20.0*
9	246,278	$1,723,850	$6.99	9	314,077	$2,266,152	$7.21	*+31.5*

[3] Includes dead-burned (sintered) dolomite; quicklime used in metallurgy-steel (open-hearth furnaces), wire drawing, and smelter flux; petroleum refining; refining aluminum oxide; sewage and trade-wastes treatment; tanneries; water purification and softening; and in manufacturing sand-lime, slag, and silica brick, calcium carbide and cyanamide, coke and gas, insecticides, fungicides, and disinfectants, paints and varnish, retarder, soap and fat, glue.
[4] Includes hydrated lime used in metallurgy-wire drawing; paper-sulfite process; petroleum refining; refining aluminum oxide; tanneries; water purification and softening; and in manufacturing sand-lime, slag, and silica brick, coke and gas, insecticides, etc., paints and varnish, soap and fat.

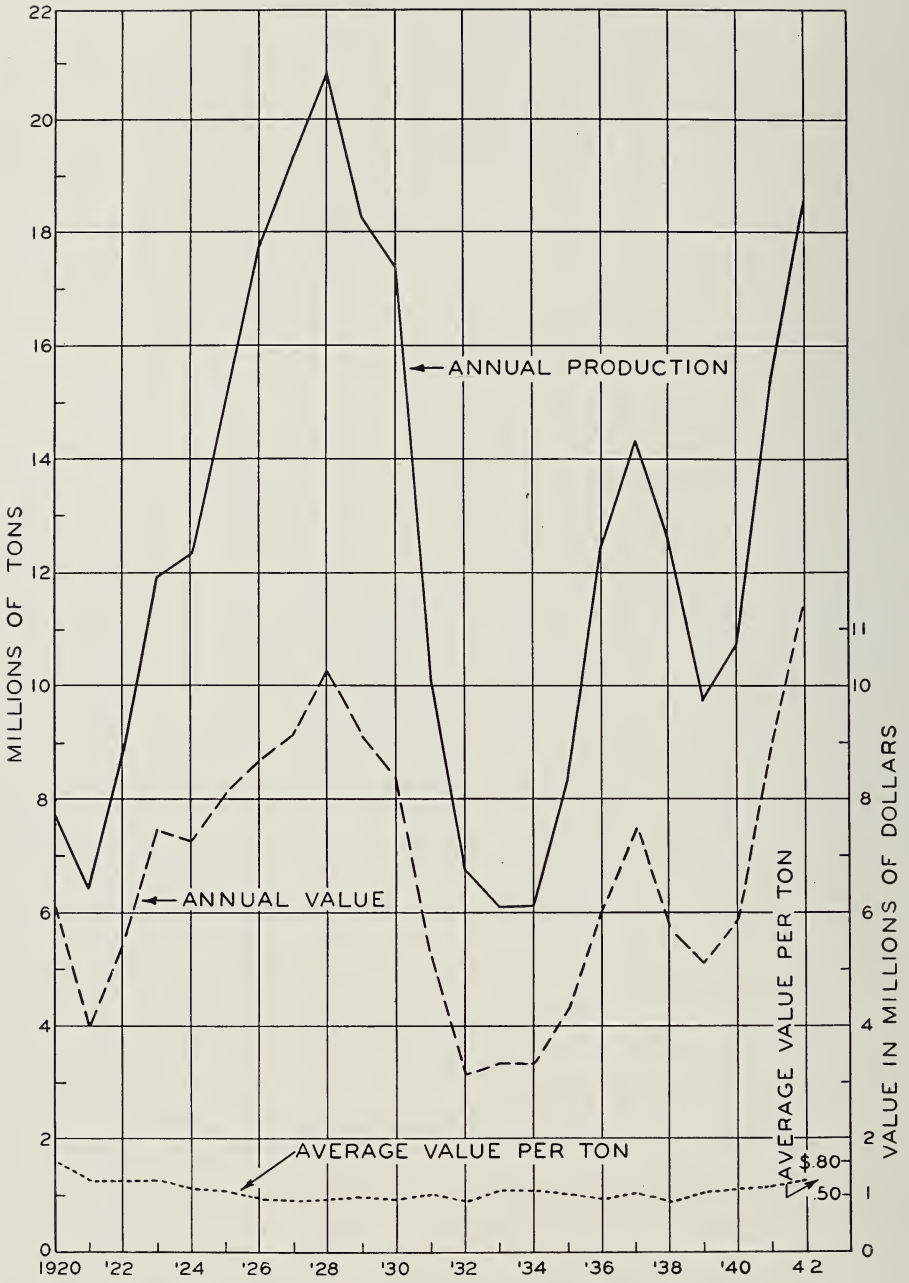

FIG. 9.—Annual production and value of sand and gravel, and silica sand in Illinois, 1920-1942.

SAND AND GRAVEL, AND SILICIA SAND

The sand and gravel industry, the fifth in value of production of the mineral industries of Illinois, made large increases during 1942. As shown in table 34, the total sold or used by producers during 1942 amounted to 18,268,000 tons which was valued at the pits at $11,529,000. This was an increase of 30 per cent in value over the production of the previous year, establishing a new all-time record. The corresponding increase in quantity was 19 per cent over the previous year. This latter increase is significant compared with the corresponding quantity increase for this industry for the entire United States, which was 5 per cent.

In sand and gravel production for 1942, Illinois increased its rank among the states to second in quantity and fourth in value. For the previous year Illinois ranked fourth in quantity and fifth in value, while in 1939 the corresponding rank for Illinois was fifth in quantity and sixth in value. This is a remarkable achievement during the past three years, bringing the sand and gravel industry of Illinois to a position of leadership in the United States.

The annual production and value of sand and gravel, and silica sand in Illinois from 1920 through 1942 is presented graphically in figure 9. The large increase since 1939 is especially notable because sand and gravel are not generally considered very important in war economy. The annual value for 1942, which established an all-time high record, was the result of the great increases in the use of silica sand for steel molding sand and the large increases in the use of other sands for various industrial sands. All of these industrial uses were greatly affected by the production of war materials.

Silica sand.—Illinois in 1942 ranked first among all the states in the value of silica sand produced, which increased 41 per cent in value over that for the previous year. The amount was 3,100,000 tons, valued at the pits at $4,055,000. Approximately 60 per cent of this amount was used for steel molding sand, in which Illinois in 1942 ranked first among all the states. This was valued at $2,070,000, which was practically double the corresponding value for the previous year and five times that for 1939.

The next largest use of silica sand was for glass sand. This was valued at $1,206,000, which was an increase of 17 per cent over that used the previous year. Illinois in 1942 ranked first among all the states in production of this material. Other important uses of silica sand were for blast sand, fire or furnace sand, and engine sand.

Another product of the Illinois silica sand industry is ground silica, also known as "ground quartz" or "silica flour." Data regarding this material are given in table 35.

Sand (other than silica sand).—The production of other types of sand in Illinois during 1942 amounted to 5,470,000 tons, valued at the pits at $2,628,000. This was an increase of 17 per cent over the previous year, as shown in table 34.

Natural-bonded molding sand produced during 1942 amounted to 107,000 tons, valued at $135,000. Principal uses for sand, other than silica

TABLE 34.—SAND AND GRAVEL, AND SILICIA SAND

Use	Type of operation	1940			
		Plants[1]	Amount tons	Value at plants	
				Total	Av.
Silica Sand					
Glass sand[2]	Commercial	3	586,054	$742,959	$1.27
Steel molding sand	"	6	474,569	450,525	.95
Structural and paving sand	"	3	52,833	77,551	1.47
Blast, grinding and polishing sand	"	3	98,183	263,534	2.67
Fire or furnace sand	"	4	68,104	100,652	1.48
Filter and engine sand	"		[6]	—	
Other silica sand[3]	"	2	116,344	176,142	1.51
Total silica sand	"	7	1,396,087	1,811,363	1.30
Sand (other than Silica Sand)					
Natural-bonded molding sand	Commercial	14	78,903	79,877	1.01
Structural sand[4]	"	69	1,652,726	716,281	.43
" " [4]	Gov.-Contr.	5	2,684	506	.19
Paving and highway-structures sand	Commercial	55	1,361,072	517,748	.38
" " " " "	Gov.-Contr.	6	14,536	5,343	.37
Engine sand	Commercial	8	44,521	22,563	.51
Railroad-ballast sand	"	6	315,055	84,444	.27
Other sand	"	11	48,638	23,638	.49
Total sand (other than silica sand)	"	110	3,500,915	1,444,551	.41
" " " " " "	Gov.-Contr.	8	17,220	5,849	.34
" " " " " "	Both	118	3,518,135	1,450,400	.41
Gravel					
Structural gravel[4]	Commercial	74	1,553,123	825,323	.53
" " [4]	Gov.-Contr.	7	84,473	40,601	.48
Paving and highway-structures gravel[5]	Commercial	79	2,061,883	849,165	.41
Paving and highway-structures gravel[5]	Gov.-Contr.	34	548,541	213,366	.39
Railroad-ballast gravel	Commercial	12	1,506,732	608,034	.40
Other gravel	"	19	84,474	39,873	.47
Total gravel	Commercial	121	5,206,212	2,322,395	.45
" "	Gov.-Contr.	37	633,014	253,967	.40
" "	Both	158	5,839,226	2,576,362	.44
Total sand and gravel, and silica sand	Commercial	151	10,103,214	5,578,309	.55
Total sand and gravel	Gov.-Contr.	40	650,234	259,816	.40
Grand total—sand and gravel, and silica sand	Both	191	10,753,448	$5,838,125	$0.54

† Compiled from joint canvass made by U. S. Bur. Mines and Ill. Geol. Survey.
[1] Number of plants reporting production during year indicated.
[2] For melting only.
[3] Excluding sand ground for silica flour, see Table 35, "Ground Silica."

Sold or Used by Producers in Illinois, 1940-1942.†

1941				1942				
Plants[1]	Amount Tons	Value at plants		Plants[1]	Amount Tons	Value at plants		Per cent change in value from 1941
		Total	Av.			Total	Av.	
3	754,799	$1,029,217	$1.36	3	833,460	$1,206,598	$1.45	+17.2
7	959,254	1,047,468	1.09	14	1,914,491	2,070,436	1.08	+97.7
4	57,519	84,776	1.47	3	25,915	41,626	1.61	—51.0
3	141,479	438,625	3.11	4	173,500	524,964	3.03	+20.0
3	56,548	60,956	1.08	3	36,016	56,222	1.56	—7.8
3	10,133	28,187	2.78	4	52,507	45,238	.86	+60.5
2	112,968	183,732	1.62	2	68,008	110,518	1.63	—39.8
7	2,092,700	2,872,961	1.37	14	3,103,897	4,055,602	1.31	+41.2
14	138,973	163,310	1.17	14	107,263	135,391	1.26	—17.1
68	2,691,167	1,240,567	.46	67	2,687,659	1,224,723	.46	—1.3
2	2,638	500	.19	7	20,089	11,893	.59	
59	1,384,910	554,310	.40	47	1,694,948	914,809	.54	+65.0
6	26,846	13,777	.51	6	6,360	2,369	.37	—82.8
10	78,016	36,974	.47	12	131,841	62,039	.47	+67.8
5	538,112	168,817	.31	8	576,180	172,923	.30	+2.4
14	177,370	70,836	.40	11	246,041	103,963	.42	+46.8
104	5,008,548	2,234,814	.45	97	5,443,932	2,613,848	.48	+17.0
8	29,484	14,277	.49	9	26,449	14,262	.54	—0.1
112	5,038,032	2,249,091	.45	106	5,470,381	2,628,110	.48	+16.8
66	2,985,019	1,579,731	.52	72	2,617,433	1,305,769	.50	—17.3
3	12,927	13,170	1.02	6	23,300	15,921	.68	+20.9
85	1,711,802	762,960	.45	94	2,737,685	1,331,549	.49	+74.5
36	1,525,055	646,920	.42	32	1,618,634	1,045,455	.65	+61.4
20	1,933,312	734,703	.38	23	2,531,171	1,061,133	.42	+44.4
15	62,132	27,460	.44	11	165,860	85,561	.52	+211.5
118	6,692,265	3,104,854	.47	125	8,052,149	3,784,012	.47	+21.9
36	1,537,982	660,090	.43	32	1,641,934	1,061,376	.65	+60.8
154	8,230,247	3,764,944	.46	157	9,694,083	4,845,388	.50	+28.7
149	13,793,513	8,212,629	.60	165	16,599,978	10,453,462	.63	+27.3
36	1,567,466	674,367	.43	32	1,668,383	1,075,638	.64	+59.6
185	15,360,979	$8,886,996	$ .58	197	18,268,361	$11,529,100	$ .63	+29.7

[4] Excluding highway structures.
[5] This does not include novaculite gravel—see Table 46, "Other Minerals."
[6] Included in "Other silica sand" for 1940.

TABLE 35.—GROUND SILICIA
SOLD OR USED BY PRODUCERS IN ILLINOIS, 1940-1942.[1]

Use	1940			1941			1942			
	Amount tons	Value at plants		Amount tons	Value at plants		Amount tons	Value at plants		Per cent change in value from 1941
		Total	Av.		Total	Av.		Total	Av.	
Abrasive	35,604	$191,406	$5.37	47,211	$287,274	$6.07	51,686	$352,345	$6.81	+22.6
Enamel and glass	9,966	53,838	5.40	4,902	29,218	5.95	2,760	19,182	6.90	—34.4
Foundry and filler	28,100	174,038	6.20	43,734	266,019	6.10	82,277	550,443	6.69	+107.0
Pottery, porcelain and tile	23,680	154,272	6.53	32,049	198,143	6.20	20,677	136,738	6.61	—31.0
Other uses	9,047	54,934	6.08	11,220	68,955	6.12	8,903	64,048	7.19	—7.1
Total	106,397	$628,488	$5.88	139,116	$849,609	$6.10	166,303	$1,122,756	$6.79	+32.1

[1] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

TABLE 36.—TRIPOLI (AMORPHOUS SILICIA)
SOLD OR USED BY PRODUCERS IN ILLINOIS, 1940-1942.[1]

Use	1940			1941			1942			
	Amount tons	Value at mills		Amount tons	Value at mills		Amount tons	Value at mills		Per cent change in value from 1941
		Total	Av.		Total	Av.		Total	Av.	
Abrasive	3,300	$44,200	$13.40	4,001	$57,893	$14.42	4,000	$64,150	$16.04	+10.8
Filler and other uses	8,221	111,376	13.52	9,832	142,807	14.50	8,575	139,240	16.24	—2.5
Total	11,521	$155,576	$13.45	13,833	$200,700	$14.45	12,575	$203,390	$16.17	+1.3

[1] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

sand, produced during 1942 in Illinois, in order of their value, were for structural purposes, for paving and highway-structures, and for railroad-ballast.

Gravel.—Production of gravel in Illinois during 1942 increased 29 per cent in value over that of the previous year. A total of 9,694,000 tons, valued at the pits at $4,845,000, was produced. The largest use of gravel during the year was for paving and highway-structures, with structural gravel, and railroad-ballast gravel next in importance.

Commercial and Government-and-contractor operations. — Over 1,600,000 tons, or 9 per cent, of sand and gravel produced in Illinois during 1942 came from government-and-contractor operations: The State of Illinois, counties, townships, municipalities, and the Work Projects Administration, produced either by themselves or by contractors expressly for their use. Purchases by government agencies from commercial producers are included in commercial operations.

GROUND SILICA

Ground silica, or silica flour, is made by fine grinding of washed silica sand (see pp. 67, 70). During 1942 the production of this material in Illinois amounted to 166,000 tons, valued at the plants at $1,123,000. As shown in table 35, this was an increase in value of 32 per cent over that for the previous year. Illinois continued to rank first among the states in the value of ground silica produced.

The principal uses for ground silica were in the foundry, abrasive, filler, and ceramic fields. In the ceramic industry, ground silica is known as "silica flour" or "potter's flint."

TRIPOLI (AMORPHOUS SILICA)

Production of tripoli (amorphous silica) in Illinois during 1942 amounted to 12,500 tons, valued at mills at $203,000, as shown in table 36. Illinois continued to rank first among the states in the value of tripoli (amorphous silica) produced.

This material was used as an abrasive, polish, filler, and for numerous other purposes.

TABLE 37.—CLAY AND CLAY PRODUCTS (INCLUDING SILICIA REFRACTORIES AND

Kind and use	1940			
	Plants[1]	Amount	Value at plants	
			Total	Av.
Clays		*tons*		
Fire clay—laying and daubing refractories	6	108,139	$190,411	$1.76
Bonding foundry sands	3	22,900	90,700	3.95
Making ceramic products[2]	3	9,335	15,270	1.64
Other uses	—	—	—	—
Total fire clay	9	140,374	296,381	2.11
Stoneware clay—stoneware, art pottery, saggers	3	[9] 5,886	[9] 10,110	1.72
Kaolin—crucibles, glass works, foundries, white ware, etc	—	—	—	—
Shale and surface clay—fillers and other uses[3]	[r] 3	14,406	33,885	2.35
	15	160,666	340,376	2.12
Fuller's earth—oil refining and other uses	1	24,974	205,494	8.24
Total clays	16	185,640	545,870	2.94
Structural Clay Products		*thous.*		
Common brick	41	260,497	2,605,220	10.00
Face brick	26	121,885	1,802,787	14.81
Paving block	5	2,053	55,233	26.90
		tons		
Total in equivalent tons	41	965,200	4,463,240	4.62
Drain tile	21	65,311	426,299	6.53
Structural tile	27	159,820	820,092	5.14
Sewer pipe, wall coping, flue lining	4	27,957	466,214	16.70
Terra cotta and glazed block[4]	3	9,020	603,156	67.00
Other structural products[5]	4	45,346	272,299	6.01
Total structural clay products	64	1,272,654	7,051,300	5.55
White Wares and Pottery				
Flowerpots	4	.....	175,710	.....
Stoneware and kitchenware	5	.....	670,246	.....
Dinnerware and art china	3	.....	237,824	.....
Art pottery	6	.....	755,714	.....
Vitreous-china plumbing fixtures	3	.....	2,449,307	.....
Porcelain and other whiteware[6]	6	.....	676,573	.....
Total white wares	19	.....	4,965,374	.....
Refractory Products—Clay and Silica		*tons*		
Fire brick and shapes[7]	7	175,500	3,301,468	18.82
Plastic and castable refractories	3	7,479	204,092	26.80
Cements and mortars	7	6,062	207,149	34.10
Other refractories[8]	5	9,302	159,336	17.10
Total refractories	12	198,343	$3,872,045	$19.50
Total clay and clay products	104		$16,434,589	

† Compiled from canvass made by Illinois Geol. Survey.

[1] Number of plants reporting production during year indicated.

[2] Includes clays sold for manufacture of fire brick, face brick, sewer pipe, flue lining, wall coping, saggers, art pottery, and stoneware.

[3] Includes clays sold for manufacture of flowerpots and ceramic-glazed brick.

[4] Includes ceramic-glazed and salt-glazed brick and block.

FULLERS'S EARTH) SOLD AND SHIPPED BY PRODUCERS IN ILLINOIS, 1940-1942†

1941				1942				
Plants[1]	Amount	Value at plants		Plants[1]	Amount	Value at plants		Per cent change in value from 1941
		Total	Av.			Total	Av.	
	tons				*tons*			
4	117,685	$231,119	$ 1.97	3	113,781	$ 233,416	$ 2.05	+1.0
3	28,798	131,016	4.55	3	[10] 34,713	[10] 142,283	4.12	+1.7
4	28,600	36,550	1.28	4	16,655	24,194	1.45	—33.5
1	12,000	16,400	1.36	.....	.....	.....	.....	.....
7	187,083	415,085	2.22	9	165,149	399,893	2.42	—3.7
4	13,549	21,834	1.61	4	11,317	19,726	1.74	—9.7
3	1,415	14,251	10.10	3	1,011	9,360	9.26	—34.3
3	20,358	39,355	1.93	3	19,282	39,857	2.07	+1.3
17	222,405	490,525	2.20	15	196,759	468,836	2.38	—4.4
1	26,676	209,577	7.87	1	30,421	264,611	8.70	+26.3
18	249,081	700,102	2.81	16	227,180	733,447	3.23	+4.8
	thous.				*thous.*			
42	403,338	3,787,863	9.40	35	298,181	3,096,717	10.39	—18.3
24	97,541	1,569,395	16.10	18	55,045	861,004	15.64	—45.2
5	2,160	53,024	24.60	3	2,079	50,682	24.38	—4.4
	tons				*tons*			
42	1,259,758	5,410,282	4.29	39	890,342	4,008,403	4.50	—26.1
20	68,060	448,176	6.58	16	72,607	578,834	7.97	+29.8
24	129,464	800,448	6.20	17	88,870	524,144	5.90	—34.5
3	34,806	618,702	17.70	4	27,964	549,592	19.65	—11.2
4	11,027	608,940	55.00	3	3,451	293,837	85.15	—51.8
5	53,305	361,966	6.78	7	51,933	371,700	7.15	+2.7
64	1,556,420	8,248,514	5.32	54	1,135,167	6,326,510	5.57	—23.3
4	.....	189,597	.....	4	.....	183,628	.....	—3.2
4	.....	1,028,715	.....	4	.....	984,303	.....	—4.4
3	.....	360,948	.....	3	.....	431,190	.....	+19.4
8	.....	1,596,302	.....	8	.....	1,790,714	.....	+12.2
3	.....	2,640,406	.....	3	.....	3,204,601	.....	+21.4
7	.....	739,504	.....	6	.....	786,781	.....	+6.3
20	.....	6,555,472	.....	20	.....	7,381,217	.....	+12.6
	tons				*tons*			
7	217,247	4,075,282	18.80	7	239,603	4,912,744	20.50	+20.5
4	9,274	312,488	33.70	3	12,360	529,367	42.83	+69.4
5	3,871	258,507	66.80	6	12,355	331,392	26.90	+28.2
5	13,960	145,022	10.40	3	11,138	144,615	12.98	—0.3
12	244,352	4,791,299	$19.61	10	275,456	5,918,118	21.48	+23.3
106		$20,295,387		93		$20,359,292		+0.3

[5] Includes facing block, light weight aggregate, roofing granules, and grog.
[6] Includes chemical porcelain, electrical porcelain, saggers, clay pipes, garden pottery.
[7] Includes fire-clay, high-alumina, and silica brick and shapes.
[8] Includes retorts, condensers, stove lining, daubing mix, grog, and silica cement.
[9] Includes kaolin.
[10] Includes other uses.

CLAY AND CLAY PRODUCTS

Including Silica Refractories and Fuller's Earth

Clay and clay products.—Clay and clay products (including silica refractories and fuller's earth) comprise the fourth largest mineral industry in Illinois in value of products, being next to petroleum, coal, and stone (including cement and lime). The value of clay and clay products sold and shipped by producers in Illinois in 1942, as reported to the Illinois State Geological Survey, amounted to $20,359,000, approximately the same as the previous year, as shown in table 37.

Clays (including fuller's earth).—The production of clays (including fuller's earth) which were sold as such by producers in Illinois during 1942, amounted to 227,000 tons, valued at the mines or pits at $733,000. Clays, which were used by their producers in manufacturing clay products, are not included in the clay section of table 37, but are reported in terms of finished products in other sections of that table. The value of the fire clay sold in 1942 was 54 per cent of the total for all clays, fuller's earth accounted for 36 per cent, and shale and surface clay, stoneware clay, and kaolin made up the balance. The principal uses for each kind of clay are given in the table. The total value of clays as stated above shows an increase of 5 per cent over the previous year, fuller's earth having the largest increase.

Structural clay products.—The various structural clay products sold and shipped by producers in Illinois during 1942 amounted to 1,135,000 tons, valued at the plants at $6,326,000, as shown in table 37. Common brick, face brick, and paving block are given in thousands, then the equivalent tons are given for the total of these three kinds of clay products. All other kinds of structural clay products are given in tons.

The structural clay products in 1942 were 23 per cent less in value than those of the previous year. Terra cotta and glazed block showed the largest decline, 52 per cent, followed in order by face brick, 45 per cent; structural tile, 34 per cent; common brick, 18 per cent; and sewer pipe, wall coping, and flue lining, 11 per cent. Drain tile was the only kind of structural clay product to show a decided increase in value over that of the previous year, 30 per cent more. This sweeping decrease in sales of nearly every type of structural clay product was caused by the great reduction in all kinds of building construction and the nearly complete cessation of all civilian building in order to divert labor and materials into production of war equipment and supplies. The increase in use of drain tile was caused by extensive drainage requirements for military areas and new plants for war needs.

Demand for structural materials, as reflected in the value of building permits issued, is shown in table 38, classified by type of structure and by months. The usual data for individual cities are not available this year. The number of dwelling units included in the permits is given for each month. During 1942 the total value of structures covered by the permits issued in Illinois amounted to $72,707,000. This was a decrease of 50 per cent from the previous year. New residential construction showed the largest decline, 57 per cent, while nonresidential decreased 44 per cent, and repairs and additions showed a reduction of 36 per cent.

TABLE 38.—VALUE OF BUILDING PERMITS ISSUED IN ILLINOIS BY MONTHS AND BY TYPE, IN 1942[1]

Month	Number of dwelling units	New residential	New non-residential	Repairs and additions	Total
January	1,482	$6,255,997	$2,325,963	$1,109,953	$9,691,913
February	650	3,514,575	2,176,121	711,382	6,402,078
March	992	5,480,873	1,426,007	1,380,302	8,287,182
April	1,120	5,060,846	3,463,416	1,343,667	9,867,929
May	493	1,959,705	3,822,304	1,268,684	7,050,693
June	344	1,377,172	1,661,249	760,977	3,799,398
July	537	2,251,107	2,568,175	1,360,784	6,180,066
August	718	2,819,289	628,321	1,357,454	4,805,064
September	451	1,825,144	1,403,400	1,335,627	4,564,171
October	827	3,403,058	589,252	617,641	4,609,951
November	690	2,708,194	1,098,702	486,637	4,293,533
December	109	465,268	2,163,581	526,219	3,155,068
Total 1942	8,413	$37,121,228	$23,326,491	$12,259,327	$72,707,046
Total 1941	[2]	$86,639,495	$41,443,457	$19,058,550	$147,141,502
Per cent change, 1942 from 1941	[2]	—57.2	—43.7	—35.7	—50.6

[1] As reported to U. S. Dept. of Labor, Bur. of Labor Statistics. See "Monthly Reports on Building Construction" for 1942. Data for individual cities not available.
[2] Not available.

White wares and pottery.—The value of these products in Illinois during 1942 for the first time exceeded that of clays, structural clay products, or refractory products. The total value of white wares amounted to $7,381,000, which showed an increase of 13 per cent over that for 1941 and of 48 per cent over the corresponding total for 1940. Vitreous china plumbing fixtures showed the largest value for any type of whiteware, amounting to $3,204,000, which was an increase of 21 per cent over the previous year. Art pottery was the second largest group in value, amounting to $1,790,000 whereas the other groups, in order of value, were stoneware and kitchenware, porcelain and other white ware, dinnerware and art china, and flowerpots. Dinnerware and art china showed an increase of 19 per cent over the previous year, art pottery showed a corresponding increase of 12 per cent.

Refractory products—clay and silica.—This group of clay products is most closely related to the production of metals for war equipment and supplies. Therefore, the production of refractories has rapidly increased with the intensity of the war effort. During 1942 Illinois producers sold and shipped refractories amounting to 275,000 tons, valued at the plants at $5,918,000. This showed an increase of 23 per cent over 1941, and an increase of 53 per cent over 1940. The special importance of plastic and castable refractories is shown by the 69 per cent increase in the value of their production for 1942 over that for the previous year.

FLUORSPAR

Fluorspar is one of the critical war minerals needed in the production of open-hearth steel, in the preparation of a flux for the reduction of alumina in the aluminum industry, and in the preparation of a catalyst used in the production of aviation gasoline. The rapidly expanding war production program in 1942, with its demands for steel, also affected the fluorspar industry. Despite labor supply and other difficulties, production and shipments of fluorspar in 1942 were 8 and 12 per cent greater than in 1941, the previous record year. Production in the United States totaled 337,000 tons as compared with 313,000 tons in 1941. The Illinois-Kentucky district accounted for 79 per cent of the total in 1942 as compared with 86 per cent in 1941. Illinois established a new all-time high record of 161,949 tons, surpassing that of 1917 (156,676 tons) by 3 per cent.

Shipments of fluorspar from Illinois mines in 1939 to 1942 are shown in table 39. Figure 10 shows graphically the effect of two world wars on the fluorspar industry in Illinois.

Table 39.—Fluorspar Shipped from Illinois Mines, 1939-1942 [1]

Year	Tons	Value at mines	
		Total	Average
1939	75,257	$1,638,693	$21.77
1940	104,698	2,313,747	22.10
1941	133,333	3,047,247	22.85
1942	161,949	4,306,750	26.59

[1] U. S. Bur. Mines, Minerals Yearbooks, and Mineral Market Report, M.M.S. 1041.

The classification of fluorspar shipments into gravel, lump, and ground spar, reported in previous years, has been discontinued and has been superseded by a classification into metallurgical, ceramic, and acid spar. These three groups are the principal commercial grades, the uses and characteristics of which are described in table 40.

Shipments of fluorspar from Illinois mines, in the new form of reporting by commercial classification, in 1942, is given in table 41.

Fluorspar shipped from mines in 1941 and 1942, by states and by uses, is shown in tables 42 and 43.

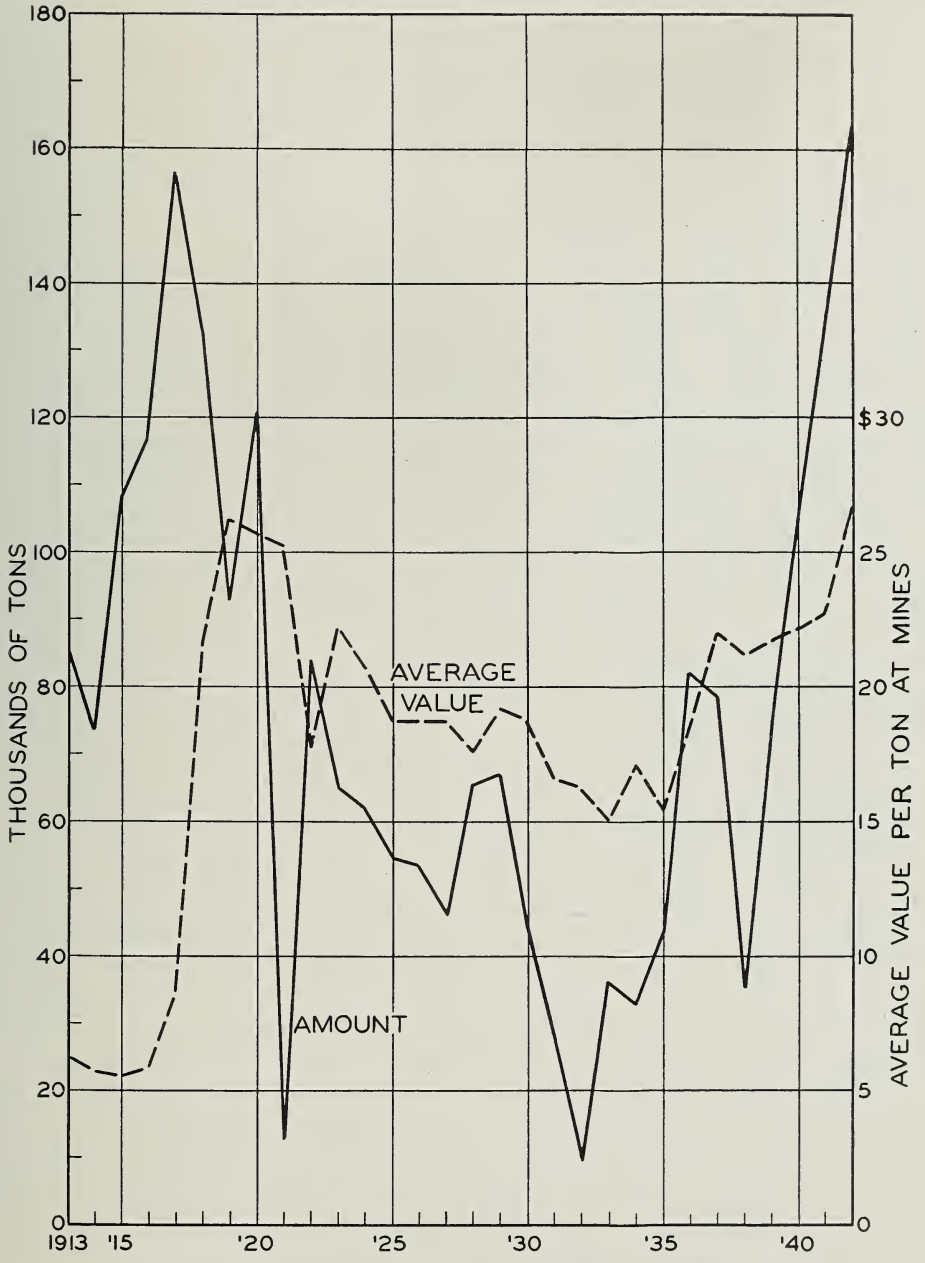

Fig. 10.—Fluorspar, annual shipments and average value, from Illinois mines, 1913-1942.

TABLE 40.—CHIEF COMMERCIAL GRADES OF FLUORSPAR[1]

Name	Chief use	Form	Specifications, in per cent		
			CaF_2 (minimum)	SiO_2 (maximum)	Fe_2O_3 (maximum)
Metallurgical	Basic open-hearth steel	Washed gravel, less than 1'' and not more than 15 per cent of fines	85	5	.....
Ceramic	Glass and enamel	Ground: coarse, fine, and extra fine	95	3	0.12
Acid	Hydrofluoric acid	Lump, gravel, and ground.	98	1	.....

[1] U. S. Bur. Mines, Minerals Yearbook, 1940, p. 1301.

TABLE 41.—FLUORSPAR SHIPPED FROM ILLINOIS MINES, BY GRADES, 1942[1]

Kind	Shipped to consumers		
	Short tons	Value at mines	
		Total	Av. per ton
Metallurgical	82,919	$2,022,783	$24.39
Ceramic	9,278	297,427	32.05
Acid	69,752	1,986,540	28.48
Total	161,949	$4,306,750	$26.59

[1] U. S. Bur. Mines, Canvass.

TABLE 42.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1941-1942, by States[1]

State	1941			1942		
	Short tons	Value		Short tons	Value	
		Total	Av.		Total	Av.
Colorado	15,566	$ 225,069	$14.46	31,743	$ 640,938	$20.19
Illinois	133,333	3,047,247	22.85	161,949	4,306,750	26.59
Kentucky	142,862	2,957,982	20.71	134,133	3,266,257	24.35
Arizona, New Mexico, Texas	19,089	355,951	18.65	23,291	530,025	22.76
Nevada	8,967			8,020		
Utah	748	138,533	14.11	1,018	153,779	16.72
Washington	104			48		
Tennessee				114		
	320,669	$6,724,782	$20.97	360,316	$8,897,749	$24.69

[1] U. S. Bur. Mines, Minerals Yearbooks and Mineral Market Report, M.M.S. 1041.

TABLE 43.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1941-1942, BY USES[1]

Use	1941			1942		
	Short tons	Value		Short tons	Value	
		Total	Av.		Total	Av.
Steel	214,120	$4,048,454	$18.91	225,233	$5,085,037	$22.58
Iron foundry	2,724	53,044	19.47	3,408	65,073	19.09
Glass	32,051	839,547	26.19	20,890	576,363	27.59
Enamel				1,923	56,723	29.50
Hydrofluoric acid	52,674	1,359,623	25.81	88,083	2,540,766	28.85
Miscellaneous	6,916	146,332	21.16			
Foreign consumption	12,184	277,782	22.80	20,779	573,787	27.61
	320,669	$6,724,782	$20.97	360,316	$8,897,749	$24.69

[1] U. S. Bureau Mines, Mineral Market Report, M.M.S. 1041.

Consumption and stocks of fluorspar in the United States, 1941 and 1942, by industries, is shown in table 44.

TABLE 44.—FLUORSPAR (DOMESTIC AND FOREIGN) CONSUMED AND IN STOCK IN THE UNITED STATES, 1941-1942, BY INDUSTRIES[1]
(In short tons)

Industry	1941		1942	
	Consumption	Stocks at consumers' plants Dec. 31*	Consumption	Stocks at consumers' plants Dec. 31
Steel	210,400	86,800	242,600	63,400
Iron foundry	2,600	1,300	3,600	1,100
Ferro-alloy	2,500	1,000	4,200	1,000
Hydrofluoric acid	56,000	10,200	81,600	19,000
Glass	27,600	5,300	18,500	7,200
Enamel		2,300	3,100	1,100
Miscellaneous	4,500	2,000	7,200	3,200
Total	303,600	108,900	360,800	96,000

[1] U. S. Bureau Mines, Mineral Market Report, M.M.S. 1041.
* Revised figures.

ZINC, LEAD AND SILVER

According to the United States Bureau of Mines, and as shown in table 45, Illinois produced 2,344 tons of recoverable lead in 1942, nearly all from the zinc-lead-fluorspar mine of the Mahoning Mining Company in Hardin County. This mine also produced 9,389 tons of recoverable zinc.

Production of zinc, lead, and silver in Illinois for the past three years is shown in table 45. Total value of recoverable metals produced in 1942 was $2,060,000, which was an increase of 23 per cent over that for the previous year.

TABLE 45.—ZINC, LEAD, AND SILVER RECOVERED FROM ORES MINED IN ILLINOIS IN 1940-1942.[1]

Metal	1940			1941			1942		
	Amount	Value[2]		Amount	Value[2]		Amount	Value[2]	
		Total	Av.		Total	Av.		Total	Av.
Zinc	4,818 tons	$607,068	$126.00	9,198 tons	$1,379,700	$150.00	9,389 tons	$1,746,354	$182.00
Lead	1,508 tons	150,800	100.00	2,376 tons	270,864	114.00	2,344 tons	314,096	134.00
Silver	4,766 fine ounces	3,389	0.71	20,340 fine ounces	14,464	0.71	104 fine ounces	74	0.71
Total value		$761,257			$1,665,028			$2,060,524	

[1] U. S. Bur. Mines, Minerals Yearbooks and Mineral Market Report M. M. S. 1060.
[2] Value for zinc and lead based on yearly average price received by producers, as determined by U. S. Bur. Mines. Value for silver based on U. S. Treasury buying price.

OTHER MINERALS

Included in this group are several mineral materials produced in Illinois by less than three producers for each material, so that details of production cannot be published without revealing individual operations. These materials are:

Ganister, a siliceous material found in Union and Alexander counties, of southern Illinois.

Novaculite gravel, a chert gravel resulting from the disintegration of a bedrock chert formation in Alexander and Union counties, and used for road construction.

Peat, produced in northern Mason County for mixed fertilizer and other purposes (Illinois ranks first among the states in the production of peat).

Pyrites (coal brasses), produced in Henry County from coal-cleaning operations.

Sandstone and *miscellaneous stone,* produced in various parts of the State for riprap and road work, by government-contractor operations.

The total amount and value of these mineral materials just described, which were produced in Illinois during the past four years, are given in table 46. The total value for 1942 amounted to $149,737.

TABLE 46.—OTHER MINERALS[1]—SOLD OR USED BY PRODUCERS IN ILLINOIS, 1939-1942.[2]

Year	Amount tons	Value
1939	278,764	$354,862
1940	279,724	242,526
1941	137,053	171,177
1942	57,489	149,737

[1] Minerals included: ganister; novaculite gravel, peat, pyrites, sandstone, miscellaneous stone.
[2] Compiled from joint canvass made by U. S. Bur. Mines and Illinois Geol. Survey.

MINERALS PROCESSED, BUT NOT MINED, IN ILLINOIS

Included in this group are mineral materials which are processed in Illinois, but are mined in other states. Production of these materials in Illinois during the past three years is given in table 47, as far as the data are available.

Coke and byproducts.—All coke produced in Illinois is made in by-product ovens, most of it from coal mined in the eastern bituminous fields. Coke produced from Illinois coal is not differentiated from the other, so table 47 gives the entire amount of coke made in Illinois. Details of coke manufacture are given in this report in the section on "Coke and Byproducts" (see pp. 41-43).

Packaged fuel.—This material is processed in Illinois from the fines resulting from storage and handling of eastern coal. Details are given in

TABLE 47.—MINERALS PROCESSED, BUT NOT MINED, IN ILLINOIS, SOLD OR USED BY PRODUCERS IN ILLINOIS IN 1940-1942.[1]

Kind	1940			1941			1942			Per cent change in value from 1941
	Amount tons	Value	Av.	Amount tons	Value	Av.	Amount tons	Value	Av.	
Coke (byproduct)[2]	3,014,840	$18,217,939	$ 6.04	3,660,878	$25,214,769	$6.89	3,690,155	$27,364,122	$7.42	+8.0
Coke breeze	253,055	577,525	2.27	326,085	782,171	2.40	289,000	655,000	2.27	—16.0
Byproducts	—	8,156,000	—	—	[3] 7,658,000	—	—	[3] 7,018,932	—	—8.2
	—	26,951,464	—	—	33,654,940	—	—	35,038,054	—	+4.1
Packaged fuel[4]	3,813	36,531	9.60	8,924	95,431	10.60	4,980	60,001	12.05	—37.2
Iron, pig	4,093,623	73,882,065	18.05	5,461,459	113,558,606	20.79	5,871,858	125,662,134	21.30	+10.6
Sulfuric acid[5]	188,355	1,721,565	9.15	*213,749	*1,814,729	*8.49	215,494	2,036,418	9.45	+12.2
Zinc, slab, from Illinois ore[6]	4,818	607,068	126.00	9,198	1,379,700	150.00	9,389	1,746,354	182.00	+26.2
From other ore	97,001	12,222,126	126.00	112,723	16,908,450	150.00	[7]	[7]	—	—
Total zinc	101,819	12,829,194	126.00	121,921	18,288,150	150.00	—	—	—	—
Miscellaneous minerals[8]	—	—	—	—	—	—	—	[8] 31,390,781	—	—
Total processed, but not mined, in Illinois		$114,813,751			*$166,032,156			$194,187,388		+16.9

[1] Complied from U. S. Bur. Mines, Minerals Yearbooks, Canvass, and Mineral Market Report, M.M.S. 1004 (Slab Zinc).
[2] See table 18—Production of coke and byproducts.
[3] Figures for some byproducts not available, due to war censorship.
[4] See table 17—Production of packaged fuel.
[5] 60° Baumé—from zinc smelting and sulfur.
[6] Value for zinc based on yearly average price received by producers, as determined by U. S. Bur. Mines.
Figures for zinc smelted from Illinois ore are not included in "Total processed" in this table—see table 45.
[7] Included in "Miscellaneous Minerals," in this table for 1942.
[8] Includes ground feldspar; magnesium compounds; mineral pigments; slab zinc from out-of-state ore.
* Final revision.

the section on "Fuel Briquets and Packaged Fuel" (see pp. 40-41). Data cannot be published on the production of *fuel briquets* in Illinois without revealing individual operations.

Pig iron.—This basic product in the steel industry is produced in Illinois from iron ore mined in the Lake Superior district and shipped in by water. During 1942 there was produced in Illinois 5,872,000 tons of pig iron, valued at the furnaces at $125,662,000. This was an increase of 10 per cent over the previous year and established an all-time high record for the second successive year. This was the result of the great demand for iron and steel for manufacturing war materials.

Sulfuric acid.—This material is produced in Illinois as a byproduct of the smelting of zinc ores and is also produced from sulfur at zinc plants.

Slab zinc.—This basic product in the zinc industry is produced in Illinois from ores mined in Illinois and in other states. See table 45 for details of zinc recovered from Illinois ores. That recovered from out-of-state ores is included in "Miscellaneous Minerals" in table 47 for 1942.

Ground feldspar is made in Illinois from crude feldspar which is mined in South Dakota. It is used in the manufacture of whiteware and enamels and for other purposes. Data cannot be published on feldspar grinding in Illinois without revealing individual operations, but are included in "Miscellaneous Minerals".

Magnesium compounds are processed in Illinois from out-of-state dolomite. Data on these are included in "Miscellaneous Minerals" to avoid revealing individual operations.

Mineral pigments are produced in Illinois from crude mineral earth pigments from various sources. Data on these are included in "Miscellaneous Minerals".

Pig lead is made in Illinois by smelting lead ores; that obtained from ores mined in Illinois is given in table 45. Data on pig lead produced in Illinois from ores mined in other states are not available.

Mineral wool is made in Illinois from blast-furnace slag and from natural rock materials. Data on production in Illinois are not available.

Expanded vermiculite is produced in Illinois by heat-treating crude vermiculite which is mined in the West. Production figures are not available.

Alumina, phosphates, and other processed mineral materials are produced in Illinois in large amounts, but data for them are not available.

The total 1942 value of mineral materials which were processed in Illinois but mined in other states, as given in table 47, amounted to $194,187,000. This was an increase of 17 per cent from the previous year.

The values of pig lead, mineral wool, expanded vermiculite, alumina, phosphates, and other mineral materials, data for which are not available, would greatly increase the total given in table 47.