IRON ORE, PIG IRON, FERRO-ALLOYS, AND STEEL

By O. E. Kiessling and H. W. Davis

In 1932 the American iron and steel industry experienced one of the most disastrous years in its history, and the production of steel and of pig iron required only 19 and 17 percent, respectively, of the potential productive capacities of steel mills and blast furnaces. The abnormally low rate of operation reflected a small volume of business which was accompanied by declining prices for iron and steel products. Wedged between sharply decreased total returns and the continuation of heavy fixed charges, producers effected drastic economies and rigorously checked controllable expenses. Savings achieved through this procedure, however, softened only in part the full effect of unfavorable market conditions, and at the end of the year the balance sheets of most companies showed large financial losses.

The main reason for depressed activity at iron and steel plants in 1932 can be understood from a brief review of the curtailed demand affecting the larger outlets for the principal iron and steel products. For example, railroad purchases, representing both steel rails and rolling stock, were at the lowest level in the present century. The automobile industry, which had enjoyed a steady growth for almost a decade and a half, produced the smallest number of cars since 1918. The overseas movement of goods was greatly curtailed due to uncertain world economic conditions, and shipping was sharply reduced; most shipyards were inactive, and there was little demand for steel to meet usual naval requirements.

Figure 6 shows trends in production of iron ore, pig iron, and steel in the United States for more than half a century.

The demand for pipe for long-distance transmission of both gas and oil was an important market factor in the 5 years prior to 1932; however, many of these long-distance lines have been completed, and work on lines under construction as well as on those projected was delayed pending improvement in the business situation. Farm-implement manufacturers required less metal as the reduced income of the farmer was directly reflected in his inability to purchase new farm machinery. The demand for steel forms and beams for buildings declined as the total volume of construction decreased. The sharp drop in the construction of large apartments and office buildings, the principal users of building steel, was particularly acute. Thus, all of the large users of iron and steel greatly reduced their purchases as part of the process of meeting their own severe business problems; in the same manner less iron and steel were required for most minor uses. This situation brought about an exceedingly weak market—a condition accentuated by stocks in the hands of consumers that had to be reduced before even small purchase commitments could be made.
In addition to low demand and production, generally lower prices prevailed than in 1931. The price of tin plate was dropped to $4.25 a base box in November, a reduction of 50 cents per box or $10 a ton; rails were quoted at $40 a ton in the last quarter of 1932, a reduction of $3. Although quotations on bars, plates, and shapes were advanced $2 a ton during the second quarter of 1932 the average quotation for the entire year was less than in 1931.

The prices for pig iron, ferromanganese, iron and steel scrap, and fluorspar reflected the downward trend in steel quotations. Compared with 1931 the average price of pig iron declined $1.21 per gross ton (from $16.01); ferromanganese dropped $9.80 a ton (from $81.67); heavy melting steel scrap at Pittsburgh, $1.86 a ton (from $11.28) and fluorspar, $1.81 a ton (from $12.64). Spiegelburin was an exception, and showed a small increase in price. General price decline; also were recorded for raw materials used in blast-furnace burdens.

Figure 7 shows trends in prices of iron ore, pig iron, finished steel, and steel scrap.

While exports of iron and steel products slumped sharply in 1932 imports compared more favorably with 1931 although substantially smaller in volume than in other recent years. Sheets, tin and terne plate, wire rods, and rails were imported in larger quantities than in 1931. Imports of pig iron increased 55 percent to 130,630 tons in 1932, this material coming chiefly from Netherlands, India, and the United Kingdom.

The pronounced curtailment in pig iron and steel outputs reacted to the detriment of several branches of the mining industry that depend upon the iron and steel furnaces as their principal market. Thus, in response to reduced demand, the shipments of iron ore, manganese ore, and fluorspar were the smallest since 1880, 1922, and 1901, respectively. The output of other materials, such as fluxing stone and coke, was similarly affected.
With iron mines and furnaces and steel plants utilizing less than one fifth of their potential capacity in 1932 the efforts of operators to ameliorate the effect of the business depression on labor are of interest. Many companies made a definite endeavor to distribute available work among as large a number of employees as practical, even though such a program resulted in some inefficiency, and production schedules were kept at levels somewhat above what was warranted by current market trends. Activity at Lake Superior iron-ore mines, for example, resulted in the production of 4,562,000 tons of ore in excess of shipments at a time when stocks at lower lake ports and furnaces were adequate to supply blast furnaces for about 7 months, even though the latter operated at 75 percent of capacity. Work at certain ore mines, blast furnaces, and steel plants was distributed by alternating employees. While the earnings per worker necessarily dropped sharply, according to Charles M. Schwab, the price of finished steel is an average composite computed by American Metal Market; that of steel scrap is an average at Pittsburgh of no. 1 heavy melting computed by Iron Age.

FIGURE 7.—Trends in prices of iron ore, pig iron, finished steel, and steel scrap. The prices of iron ore and pig iron are the averages f.o.b. mines and furnaces, respectively, as reported to the U.S. Bureau of Mines; the price of finished steel is an average composite computed by American Metal Market; that of steel scrap is an average at Pittsburgh of no. 1 heavy melting computed by Iron Age.

1 Iron Age, vol. 131, June 1, 1933, p. 852.
### Salient statistics of iron ore, pig iron, ferro-alloys, and steel in the United States, 1931–32

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<thead>
<tr>
<th></th>
<th>1931</th>
<th></th>
<th>1932</th>
<th></th>
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<td></td>
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<td>Value</td>
<td>Gross tons</td>
<td>Value</td>
</tr>
<tr>
<td><strong>Iron ore:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Production:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematite</td>
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<td>1,062,806</td>
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<td>Brown ore</td>
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<td>1,029,209</td>
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<tr>
<td>Magnetite</td>
<td>818</td>
<td></td>
<td>477</td>
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<tr>
<td>Carbonate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>31,133,592</td>
<td></td>
<td>9,846,916</td>
<td></td>
</tr>
<tr>
<td><strong>Open pit:</strong></td>
<td>31,133,592</td>
<td></td>
<td>9,846,916</td>
<td></td>
</tr>
<tr>
<td><strong>Underground:</strong></td>
<td>1,340,165</td>
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<td>3,413,486</td>
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<tr>
<td><strong>Undistributed:</strong></td>
<td>8,578,424</td>
<td></td>
<td>2,703,743</td>
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</tr>
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<td><strong>Total:</strong></td>
<td>31,133,592</td>
<td></td>
<td>9,846,916</td>
<td></td>
</tr>
<tr>
<td><strong>Shipping (exclusive of ore for paint)</strong></td>
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<td>$74,123,010</td>
<td>5,302,201</td>
<td>$12,895,011</td>
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<td>2.60</td>
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<td>Stocks at mines:</td>
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<td>17,983,873</td>
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<tr>
<td><strong>Imported:</strong></td>
<td>1,465,618</td>
<td>6,301,775</td>
<td>854,408</td>
<td>1,350,374</td>
</tr>
<tr>
<td>Exported:</td>
<td>455,965</td>
<td>1,627,932</td>
<td>83,057</td>
<td>2,458,522</td>
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<tr>
<td><strong>Total:</strong></td>
<td>17,822,613</td>
<td>6,301,775</td>
<td>854,408</td>
<td>1,350,374</td>
</tr>
<tr>
<td>Average value per ton at furnaces:</td>
<td>10.01</td>
<td></td>
<td>14.80</td>
<td></td>
</tr>
<tr>
<td><strong>Imported:</strong></td>
<td>8,411,570</td>
<td>93,896</td>
<td>130,830</td>
<td>1,301,625</td>
</tr>
<tr>
<td>Exported:</td>
<td>6,719</td>
<td>150,658</td>
<td>2,524</td>
<td>55,966</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>15,121,130</td>
<td>93,896</td>
<td>130,830</td>
<td>1,301,625</td>
</tr>
<tr>
<td><strong>Ferro-alloys:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Production:</strong></td>
<td>406,079</td>
<td></td>
<td>200,311</td>
<td></td>
</tr>
<tr>
<td><strong>Shipment:</strong></td>
<td>308,075</td>
<td>30,764,549</td>
<td>218,046</td>
<td>14,008,672</td>
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<tr>
<td>Ferromanganese:</td>
<td>156,168</td>
<td>12,999,329</td>
<td>70,470</td>
<td>5,061,029</td>
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<tr>
<td>Spiegelisen:</td>
<td>7,464</td>
<td>1,313,069</td>
<td>31,071</td>
<td>748,966</td>
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<tr>
<td>Ferrosilicon:</td>
<td>153,969</td>
<td>7,213,358</td>
<td>97,224</td>
<td>3,517,268</td>
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<tr>
<td>Other varieties:</td>
<td>30,737</td>
<td>9,238,887</td>
<td>19,894</td>
<td>4,679,409</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>308,075</td>
<td>30,764,549</td>
<td>218,046</td>
<td>14,008,672</td>
</tr>
<tr>
<td><strong>Imported for consumption:</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferromanganese:</td>
<td>24,664</td>
<td>1,751,646</td>
<td>18,470</td>
<td>1,091,026</td>
</tr>
<tr>
<td>Spiegelisen:</td>
<td>9,482</td>
<td>247,788</td>
<td>8,364</td>
<td>192,057</td>
</tr>
<tr>
<td>Ferrosilicon:</td>
<td>3,788</td>
<td>126,397</td>
<td>864</td>
<td>38,200</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>33,534</td>
<td>2,126,271</td>
<td>25,300</td>
<td>1,485,269</td>
</tr>
<tr>
<td><strong>Steel production:</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open hearth:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>22,130,398</td>
<td></td>
<td>11,742,682</td>
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<tr>
<td>Acid</td>
<td>379,163</td>
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<td>104,648</td>
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<tr>
<td>Bessemer:</td>
<td>3,032,461</td>
<td></td>
<td>1,532,076</td>
<td></td>
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<tr>
<td>Crucible:</td>
<td>1,947</td>
<td></td>
<td>945</td>
<td></td>
</tr>
<tr>
<td>Electric:</td>
<td>410,941</td>
<td></td>
<td>241,111</td>
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</tr>
<tr>
<td><strong>Total:</strong></td>
<td>25,945,501</td>
<td></td>
<td>13,681,162</td>
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</tr>
</tbody>
</table>

1 Some hematite included with magnetite.
2 Some open pit included with underground.

**IRON ORE**

*Production and shipments.—* Iron-ore mining was again drastically curtailed in all producing States, only 129 mines in 10 States being worked in 1932 compared with 186 mines in 15 States in 1931. No iron-ore mine produced a million tons in 1932, and only 27 yielded 100,000 tons or more, whereas 4 mines produced a million tons or more in 1931, and 79 had an output of 100,000 tons or more. The production of iron ore in 1932 was 9,846,916 gross tons, a decrease of 68 percent from 1931 and 17 percent of the average for the 5-year period 1927–31. Shipments, however, were about 4,516,000 tons less than production, indicating the extent the mines were worked to provide employment for some of the many thousand men usually
employed. The greater part of the iron ore mined in the United States is sold for use in the manufacture of iron and steel; but some ore produced in 1932 in New York, Pennsylvania, and Utah was sold for use in making paint and some from Pennsylvania was also sold for use in purifying gas.

In the following tables the quantities of iron ore shown include ore that was beneficiated—that is, treated in any way—as well as ore not requiring treatment. Although included in the figures on production the iron ore sold for the manufacture of paint (1,567 gross tons in 1932 valued at $10,770—$6.87 a ton—compared with 5,514 tons in 1931 valued at $29,759—$5.40 a ton) is not included in the figures on shipments from mines. The output of manganiferous ore that contained 5 percent or more manganese is also not included; 25,434 gross tons valued at $92,135 were shipped in 1932 compared with 281,414 tons valued at $976,549 in 1931. In Arkansas one producer shipped 2 gross tons of loadstone, which is not included in the tabulated statistics of iron ore. Neither do the statistics include iron sinter recovered from copper sulphide ore mined in Tennessee.

Iron ore mined in the United States in 1932, by States and varieties, in gross tons

(Exclusive of ore containing 5 percent or more manganese)

<table>
<thead>
<tr>
<th>State</th>
<th>Number of active mines</th>
<th>Hematite</th>
<th>Brown ore</th>
<th>Magnetite</th>
<th>Carbonate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>8</td>
<td>1,332,975</td>
<td>41,559</td>
<td>925</td>
<td>1,374,334</td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>925</td>
</tr>
<tr>
<td>Michigan</td>
<td>44</td>
<td>2,554,996</td>
<td></td>
<td>894</td>
<td>2,554,996</td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td>42</td>
<td>5,154,291</td>
<td></td>
<td>5,154,291</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>2</td>
<td>10,632</td>
<td>1,365</td>
<td>1,365</td>
<td>23,367</td>
<td></td>
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<tr>
<td>New Jersey</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>30,944</td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>31,327</td>
<td></td>
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<tr>
<td>Pennsylvania</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>102,838</td>
<td></td>
</tr>
<tr>
<td>Utah</td>
<td>2</td>
<td>136,874</td>
<td>350</td>
<td>477</td>
<td>157,224</td>
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</tr>
<tr>
<td>Wisconsin</td>
<td>2</td>
<td>430,140</td>
<td></td>
<td></td>
<td>430,140</td>
<td></td>
</tr>
</tbody>
</table>

**Total, 1932**

| Alabama   | 128                     | 9,631,808| 61,739    | 477       | 9,846,916 |
| Georgia   | 186                     | 29,665,475| 359,960  | 818       | 31,181,302 |

1 In addition, an undetermined number of small pits was worked in Missouri. The output from these pits is included in the figures given.
2 Some hematite included with magnetite.

Iron ore mined in the United States in 1932, by States and mining methods, in gross tons

(Exclusive of ore containing 5 percent or more manganese)

<table>
<thead>
<tr>
<th>State</th>
<th>Open pit</th>
<th>Underground</th>
<th>Undistributed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>41,559</td>
<td>1,332,975</td>
<td></td>
<td>1,374,334</td>
</tr>
<tr>
<td>Georgia</td>
<td>215,291</td>
<td>2,339,782</td>
<td>2,554,996</td>
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</tr>
<tr>
<td>Michigan</td>
<td>2,921,484</td>
<td>2,283,807</td>
<td></td>
<td>5,154,291</td>
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<tr>
<td>Minnesota</td>
<td>26,947</td>
<td>2,060,787</td>
<td>757</td>
<td>30,944</td>
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<tr>
<td>Missouri</td>
<td>30,844</td>
<td>31,327</td>
<td></td>
<td>62,171</td>
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<tr>
<td>New Jersey</td>
<td>30,944</td>
<td>31,327</td>
<td></td>
<td>62,271</td>
</tr>
<tr>
<td>New York</td>
<td>30,944</td>
<td>31,327</td>
<td></td>
<td>62,271</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>70,856</td>
<td>32,432</td>
<td>102,838</td>
<td></td>
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<tr>
<td>Utah</td>
<td>136,874</td>
<td>430,140</td>
<td></td>
<td>566,014</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>430,140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total, 1932**

| Alabama   | 3,412,486| 6,432,673| 757           | 9,846,916 |
| Georgia   | 13,820,165| 17,270,424| 21,913       | 31,181,502 |

1 Some open pit included with underground.
## Iron ore mined in the United States, 1931–32, by States and counties

[Exclusive of ore containing 5 percent or more manganese]

<table>
<thead>
<tr>
<th>State and county</th>
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<th>1932</th>
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<tr>
<td></td>
<td>Active mines</td>
<td>Gross tons</td>
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<td></td>
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<tr>
<td><strong>Alabama:</strong></td>
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<tr>
<td>Blount</td>
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<tr>
<td>Cherokee</td>
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<td>35,963</td>
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<tr>
<td>Franklin</td>
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<tr>
<td>Jefferson</td>
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<td>Shelby</td>
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</tr>
<tr>
<td>Talladega</td>
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<td>301</td>
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<tr>
<td>Tuscaloosa</td>
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</tr>
<tr>
<td><strong>Total:</strong></td>
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<td>Saguache</td>
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<td><strong>Georgia:</strong></td>
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<td>Polk</td>
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<td><strong>Total:</strong></td>
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<td>Marquette</td>
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<td><strong>Total:</strong></td>
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<td>7,552,581</td>
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<td><strong>Minnesota:</strong></td>
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<td>Crow Wing</td>
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<td>Butler</td>
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<tr>
<td>Carter</td>
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<td>Crawford</td>
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<td>Dent</td>
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<td>Gasconade</td>
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<td>195</td>
</tr>
<tr>
<td>Oregon</td>
<td>(1)</td>
<td>1,513</td>
</tr>
<tr>
<td>Osage</td>
<td>(1)</td>
<td>4,997</td>
</tr>
<tr>
<td>Phelps</td>
<td>(1)</td>
<td>2,740</td>
</tr>
<tr>
<td>Pulaski</td>
<td>(1)</td>
<td>330</td>
</tr>
<tr>
<td>Reynolds</td>
<td>(1)</td>
<td>1,058</td>
</tr>
<tr>
<td>Ripley</td>
<td>(1)</td>
<td>2,758</td>
</tr>
<tr>
<td>St. Francois</td>
<td>(1)</td>
<td>2,738</td>
</tr>
<tr>
<td>Shannon</td>
<td>(1)</td>
<td>266</td>
</tr>
<tr>
<td>Texas</td>
<td>(1)</td>
<td>31,262</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>16</td>
<td>112,372</td>
</tr>
<tr>
<td><strong>New Jersey:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morris</td>
<td>3</td>
<td>232,071</td>
</tr>
<tr>
<td>Passaic</td>
<td>1</td>
<td>61,697</td>
</tr>
<tr>
<td>Warren</td>
<td>5</td>
<td>293,768</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>10</td>
<td>156,075</td>
</tr>
</tbody>
</table>

1 An undetermined number of small pits.
2 In addition, an undetermined number of small pits was worked. The output from these pits is included in the figures given.
Iron ore mined in the United States, 1931–32, by States and counties—Continued

[Exclusive of ore containing 5 percent or more manganese]

<table>
<thead>
<tr>
<th>State and county</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Gross</td>
</tr>
<tr>
<td>mines</td>
<td>tons</td>
<td></td>
</tr>
<tr>
<td>New York:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essex</td>
<td>1</td>
<td>205,376</td>
</tr>
<tr>
<td>Clinton</td>
<td>1</td>
<td>44,904</td>
</tr>
<tr>
<td>Oneida</td>
<td>1</td>
<td>24,795</td>
</tr>
<tr>
<td>Orange</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>275,075</td>
</tr>
<tr>
<td>Pennsylvania:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon</td>
<td>1</td>
<td>818</td>
</tr>
<tr>
<td>Lebanon</td>
<td>1</td>
<td>307,299</td>
</tr>
<tr>
<td>Venango</td>
<td></td>
<td>1,640</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>368,117</td>
</tr>
<tr>
<td>Tennessee:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawrence</td>
<td>1</td>
<td>8,717</td>
</tr>
<tr>
<td>Utah:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box Elder</td>
<td>1</td>
<td>400</td>
</tr>
<tr>
<td>Iron</td>
<td>1</td>
<td>183,668</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>184,068</td>
</tr>
<tr>
<td>Washington:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stevens</td>
<td>1</td>
<td>1,632</td>
</tr>
<tr>
<td>Wisconsin:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dodge</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>Iron</td>
<td>2</td>
<td>879,801</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>879,832</td>
</tr>
<tr>
<td>Wyoming:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platte</td>
<td>1</td>
<td>180,771</td>
</tr>
<tr>
<td>Total for United States</td>
<td>186</td>
<td>31,131,502</td>
</tr>
</tbody>
</table>

* In addition, an undetermined number of small pits was worked in Missouri. The output from these pits is included in the figures given.

Iron ore mined in the United States, by mining districts and varieties, in 1932, in gross tons

[Exclusive of ore containing 5 percent or more manganese]

<table>
<thead>
<tr>
<th>District</th>
<th>Hematite</th>
<th>Brown ore</th>
<th>Magnetite</th>
<th>Carbonate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Superior</td>
<td>8,139,427</td>
<td>3,336</td>
<td>7,936</td>
<td>31,327</td>
<td>8,139,427</td>
</tr>
<tr>
<td>Birmingham</td>
<td>1,332,975</td>
<td>7,170</td>
<td>7,170</td>
<td>31,327</td>
<td>1,332,975</td>
</tr>
<tr>
<td>Chattanooga</td>
<td></td>
<td>20,470</td>
<td>100,721</td>
<td>477</td>
<td>120,678</td>
</tr>
<tr>
<td>Adirondack</td>
<td></td>
<td></td>
<td>30,444</td>
<td>477</td>
<td>30,444</td>
</tr>
<tr>
<td>Northern New Jersey and southeastern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other districts</td>
<td>1,149,416</td>
<td>50,473</td>
<td>100,721</td>
<td>477</td>
<td>1,200,613</td>
</tr>
<tr>
<td>Total, 1932</td>
<td>9,621,305</td>
<td>61,736</td>
<td>106,202</td>
<td>477</td>
<td>9,846,916</td>
</tr>
<tr>
<td>Total, 1831</td>
<td>20,665,475</td>
<td>359,960</td>
<td>1,105,249</td>
<td>515</td>
<td>21,117,269</td>
</tr>
</tbody>
</table>

* Includes only those mines in Wisconsin that are in the true Lake Superior district.
* Some hematite from "Other districts" included with magnetite from Adirondack district.
* Some hematite included with magnetite.
### Iron ore shipped from mines in the United States, 1931–32, by States

[Exclusive of ore containing 5 percent or more manganese and ore sold for paint]

<table>
<thead>
<tr>
<th>State</th>
<th>1931</th>
<th></th>
<th>1932</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Value</td>
<td>Gross tons</td>
<td>Value</td>
</tr>
<tr>
<td>Alabama</td>
<td>3,629,997</td>
<td>$6,155,995</td>
<td>1,470,445</td>
<td>$2,428,227</td>
</tr>
<tr>
<td>Colorado</td>
<td>26,302</td>
<td>(1)</td>
<td>26,302</td>
<td>(1)</td>
</tr>
<tr>
<td>Georgia</td>
<td>20,745</td>
<td>18,951</td>
<td>998</td>
<td>(1)</td>
</tr>
<tr>
<td>Michigan</td>
<td>5,556,376</td>
<td>15,868,273</td>
<td>968,789</td>
<td>2,708,900</td>
</tr>
<tr>
<td>Minnesota</td>
<td>17,068,591</td>
<td>46,020,269</td>
<td>2,248,727</td>
<td>6,263,181</td>
</tr>
<tr>
<td>Missouri</td>
<td>112,965</td>
<td>337,144</td>
<td>25,418</td>
<td>72,144</td>
</tr>
<tr>
<td>New Jersey</td>
<td>239,722</td>
<td>984,021</td>
<td>14,966</td>
<td>(1)</td>
</tr>
<tr>
<td>New Mexico</td>
<td>116,075</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>New York</td>
<td>239,184</td>
<td>1,067,489</td>
<td>20,000</td>
<td>(1)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>436,920</td>
<td>913,163</td>
<td>74,420</td>
<td>157,400</td>
</tr>
<tr>
<td>Tennessee</td>
<td>5,717</td>
<td>36,156</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Utah</td>
<td>183,598</td>
<td>(1)</td>
<td>136,874</td>
<td>(1)</td>
</tr>
<tr>
<td>Washington</td>
<td>4,052</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>629,977</td>
<td>1,658,670</td>
<td>360,087</td>
<td>965,601</td>
</tr>
<tr>
<td>Wyoming</td>
<td>180,771</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Undistributed</td>
<td></td>
<td>913,217</td>
<td></td>
<td>1,367,588</td>
</tr>
<tr>
<td></td>
<td>28,516,082</td>
<td>74,123,910</td>
<td>5,331,201</td>
<td>12,898,011</td>
</tr>
</tbody>
</table>

1 Included under "Undistributed."

2 This figure includes value for States entered as "(1)" above.

**Beneficiated iron ore.—** Beneficiation of iron ore was reported at 17 mines in 5 States in 1932 and at 48 mines in 9 States in 1931. At many mines the ore is crushed and screened to improve its structure; ore so improved, however, is not included in the statistics of beneficiated ore. Some iron ore is recovered in the form of dust from blast furnaces, but no statistics on it have been gathered; ore so recovered, however, has been included originally in the statistics of shipments from the mines.

Beneficiated ore shipped from mines in the United States in 1932 amounted to 407,486 gross tons valued at $1,119,804, a decrease of 91 percent in both quantity and value compared with 1931.

The quantity of crude ore beneficiated in the Lake Superior district in 1932 amounted to 2,477,163 gross tons and the beneficiated ore recovered to 1,455,848—a ratio of 1.702:1. In 1931 the crude lake ore treated amounted to 5,923,349 tons and the beneficiated ore recovered therefrom to 3,612,244 tons—a ratio of 1.64:1.

### Beneficiated iron ore shipped from mines in the United States, 1931–32

[Exclusive of ore containing 5 percent or more manganese and of ore sold for paint]

<table>
<thead>
<tr>
<th>State</th>
<th>Variety</th>
<th>1931</th>
<th></th>
<th>1932</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gross tons</td>
<td>Value</td>
<td>Gross tons</td>
<td>Value</td>
</tr>
<tr>
<td>Alabama</td>
<td>Brown ore</td>
<td>309,379</td>
<td>$523,515</td>
<td>31,218</td>
<td>$70,241</td>
</tr>
<tr>
<td>Georgia</td>
<td></td>
<td>13,571</td>
<td>40,093</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Hematite</td>
<td>3,574,309</td>
<td>9,187,883</td>
<td>262,458</td>
<td>782,323</td>
</tr>
<tr>
<td>Missouri</td>
<td>Brown ore</td>
<td>4,914</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Magnetite</td>
<td>239,722</td>
<td>984,021</td>
<td>14,966</td>
<td>(1)</td>
</tr>
<tr>
<td>New Mexico</td>
<td></td>
<td>91,073</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>New York</td>
<td></td>
<td>239,184</td>
<td>1,067,489</td>
<td>30,000</td>
<td>(1)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td></td>
<td>275,385</td>
<td>984,000</td>
<td>38,244</td>
<td>72,663</td>
</tr>
<tr>
<td>Tennessee</td>
<td></td>
<td>8,717</td>
<td>36,156</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Undistributed</td>
<td></td>
<td>239,522</td>
<td>194,577</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,676,364</td>
<td>13,042,600</td>
<td>407,486</td>
<td>1,119,804</td>
</tr>
</tbody>
</table>

1 Included under "Undistributed."
The accompanying table gives the shipments of beneficiated iron ore and the percentage of beneficiated ore to the total ore shipped from 1928–32. Corresponding figures for 1914 (the first year for which statistics were gathered) to 1927 are given in Mineral Resources for 1930.

Iron ore shipped from mines in the United States, 1928–32, in gross tons, and percentage of beneficiated ore to the total shipped

<table>
<thead>
<tr>
<th>Year</th>
<th>Beneficiated</th>
<th>Total</th>
<th>Percentage of beneficiated to total</th>
<th>Year</th>
<th>Beneficiated</th>
<th>Total</th>
<th>Percentage of beneficiated to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>8,621,331</td>
<td>63,432,536</td>
<td>13.6</td>
<td>1931</td>
<td>4,676,364</td>
<td>28,516,032</td>
<td>16.4</td>
</tr>
<tr>
<td>1929</td>
<td>9,424,445</td>
<td>75,602,734</td>
<td>12.8</td>
<td>1932</td>
<td>407,486</td>
<td>5,381,201</td>
<td>7.6</td>
</tr>
<tr>
<td>1930</td>
<td>8,975,898</td>
<td>65,201,121</td>
<td>16.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average value of ore.**—The average value per ton of iron ore at the mines in 1932 was $2.42 compared with $2.60 in 1931.

The table that follows gives the average value at the mines of the different classes of iron ore in 1931–32 for each of the producing States or groups of States, except where there were less than three shippers of a certain variety of ore in a State and permission was not given to publish the value. These figures are taken directly from statements of producers and probably represent the commercial selling prices only approximately, as not all of the reports are comparable. Some of them evidently include mining costs only; others contain, in addition, the cost of selling and insuring the ore; others include an allowance for a sinking fund; and still others include only the costs charged against the blast furnaces. None of the reports, however, is supposed to include freight charges.

Average value per gross ton of iron ore at mines in the United States, 1931–32

<table>
<thead>
<tr>
<th>State</th>
<th>Hematite</th>
<th>Brown ore</th>
<th>Magnetite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1931</td>
<td>1932</td>
<td>1931</td>
</tr>
<tr>
<td>Alabama</td>
<td>$1.65</td>
<td>$1.64</td>
<td>$2.38</td>
</tr>
<tr>
<td>Georgia</td>
<td>2.88</td>
<td>2.79</td>
<td>2.48</td>
</tr>
<tr>
<td>Michigan</td>
<td>2.70</td>
<td>2.70</td>
<td>3.09</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2.92</td>
<td>3.21</td>
<td>( )</td>
</tr>
<tr>
<td>Missouri</td>
<td>3.09</td>
<td>3.09</td>
<td>2.65</td>
</tr>
<tr>
<td>New Jersey</td>
<td>4.10</td>
<td>4.12</td>
<td>( )</td>
</tr>
<tr>
<td>New York</td>
<td>2.09</td>
<td>2.09</td>
<td>1.99</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>4.15</td>
<td>4.15</td>
<td>( )</td>
</tr>
<tr>
<td>Tennessee</td>
<td>2.63</td>
<td>2.63</td>
<td>( )</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1.22</td>
<td>1.35</td>
<td>2.55</td>
</tr>
<tr>
<td>Other States</td>
<td>2.45</td>
<td>2.45</td>
<td>2.39</td>
</tr>
</tbody>
</table>

1 Less than 3 producers; permission to publish not given, therefore value may not be shown.

Iron ore consumed.—The production of 8,549,649 gross tons of pig iron in 1932 required 13,181,238 gross tons of iron ore and 1,954,710 tons of cinder, scale, and scrap, an average of 1.77 tons of metal-
liferous materials per ton of iron made. The average consumption of ore per ton of pig iron made declined from 1.70 in 1931 to 1.54 in 1932. The much lower consumption of ore in 1932 was due chiefly to the use of relatively larger quantities of flue dust in a year of exceedingly subnormal operations.

The greater part of the iron ore used in Alabama furnaces in 1932 was hematite from mines in Jefferson County, Ala.; small quantities of imported ore and of iron sinter from Tennessee were also used. The brown ore used was chiefly from mines in the Birmingham and Russellville districts, Alabama; the manganiferous iron ore was chiefly from mines in Alabama, Arkansas, and Georgia. The furnaces in Alabama in making 1 ton of pig iron consumed in 1932 an average of 2.538 tons of ore, the highest average for any State.

In 1932 the furnaces in Maryland used foreign ores obtained from Australia, Chile, Cuba, Russia, and Sweden. The Maryland furnaces consumed an average of only 1.168 tons of ore in making 1 ton of pig iron in 1932; however, they used proportionately more cinder, scale, and scrap than the furnaces in any other State.

The blast furnaces in Indiana, Kentucky, Michigan, Ohio, and West Virginia used Lake Superior iron ore and manganiferous iron ore exclusively in 1932. The consumption of ores per ton of iron made in this group of States ranged from 1.238 tons in Kentucky to 1.598 tons in Michigan.

The furnaces in the Chicago district, including Joliet, Ill., used iron ore and manganiferous iron ore from mines in the Lake Superior district; those at Granite City, Ill., used ore chiefly from mines in the Lake Superior district but also ore from various properties in Missouri. An average of 1.412 tons of ore was used to make 1 ton of pig iron in Illinois in 1932.

In New York the furnaces in the Buffalo district used ores from the Lake Superior district; the furnaces at Port Henry used magnetite from the mines at Mineville, N.Y., and a small quantity of manganese cinder from Canada; and the furnace at Standish used magnetite from the Chateaugay mine at Lyon Mountain, N.Y., and a small quantity of ferruginous manganese ore from Canada. In making 1 ton of pig iron the furnaces in New York used an average of 1.583 tons of ore in 1932.

The furnaces in western Pennsylvania used ore from the Lake Superior district. Those in the eastern part of the State used, in addition to some Lake ores, magnetite from the Cornwall mine in Pennsylvania, magnetites from mines in New Jersey and New York, and considerable quantities of ores from Africa, Australia, Chile, and Cuba. An average of 1.37 tons of ore was used to make 1 ton of pig iron in Pennsylvania in 1932.

The blast furnaces at Pueblo, Colo., used chiefly hematite from the Sunrise mine in Wyoming, brown ore from the Orient mine in Colorado, and rhodochrosite from the Emma mine in Montana.

The blast furnace at Provo, Utah, used iron ore chiefly from the Desert Mound mine in the Iron Springs district, Utah. The manganiferous iron ore used was obtained chiefly from Montana and Utah.
Iron ore and other metallic materials consumed and pig iron produced in 1932, by States, in gross tons

<table>
<thead>
<tr>
<th>State</th>
<th>Metalliferous materials consumed</th>
<th>Pig iron produced, exclusive of ferro-alloys</th>
<th>Materials consumed per ton of iron made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domestic</td>
<td>Foreign</td>
<td>Total</td>
</tr>
<tr>
<td>Alabama</td>
<td>1,648,998</td>
<td>8,205</td>
<td>44,817</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,297,571</td>
<td>1,162,145</td>
<td>393,207</td>
</tr>
<tr>
<td>Indiana</td>
<td>90,211</td>
<td>442,115</td>
<td>37,968</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,426,743</td>
<td>20,192</td>
<td>551,307</td>
</tr>
<tr>
<td>Michigan</td>
<td>291,610</td>
<td>143</td>
<td>40,731</td>
</tr>
<tr>
<td>New York</td>
<td>987,743</td>
<td>143</td>
<td>140,299</td>
</tr>
<tr>
<td>Ohio</td>
<td>3,737,513</td>
<td>143</td>
<td>565,620</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2,679,296</td>
<td>201,889</td>
<td>508,193</td>
</tr>
<tr>
<td>West Virginia</td>
<td>357,487</td>
<td>21,780</td>
<td>27,287</td>
</tr>
<tr>
<td>Undistributed</td>
<td>276,352</td>
<td>750,978</td>
<td>261,601</td>
</tr>
</tbody>
</table>

1 Includes Colorado, Iowa, Tennessee, and Utah.

Foreign iron and manganiferous iron ore consumed in the manufacture of pig iron in the United States, 1931–32, by sources of ore, in gross tons

<table>
<thead>
<tr>
<th>Source of ore</th>
<th>1931</th>
<th>1932</th>
<th>Source of ore</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>89,495</td>
<td>13,896</td>
<td>Russia</td>
<td>216,825</td>
<td>71,426</td>
</tr>
<tr>
<td>Asia</td>
<td>276</td>
<td></td>
<td>Spain</td>
<td>13,044</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>66,718</td>
<td>39,423</td>
<td>Sweden</td>
<td>21,475</td>
<td>31,187</td>
</tr>
<tr>
<td>Canada</td>
<td>4,473</td>
<td></td>
<td>Undistributed</td>
<td>17,977</td>
<td>8,066</td>
</tr>
<tr>
<td>Chile</td>
<td>680,042</td>
<td>395,732</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuba</td>
<td>105,699</td>
<td>92,697</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newfoundland</td>
<td>37,657</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,231,587</td>
<td>652,252</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stocks of ore at mines.—According to the reports of producers the total quantity of iron ore in stock at the mines at the end of 1932 amounted to 17,603,873 gross tons, an increase of 35 percent over 1931. These stocks (the largest ever accumulated) were about 7,642,000 tons above the average for the 5-year period 1927–31.

Stocks of iron ore at mines, December 31, 1931–32, by States, in gross tons

<table>
<thead>
<tr>
<th>State</th>
<th>1931</th>
<th>1932</th>
<th>State</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>589,645</td>
<td>798,734</td>
<td>New York</td>
<td>178,899</td>
<td>180,790</td>
</tr>
<tr>
<td>Iowa</td>
<td>12,155</td>
<td>12,155</td>
<td>North Carolina</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Michigan</td>
<td>8,469,145</td>
<td>10,260,532</td>
<td>Pennsylvania</td>
<td>33,254</td>
<td>60,635</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2,000,852</td>
<td>5,510,724</td>
<td>Virginia</td>
<td>3,473</td>
<td>3,473</td>
</tr>
<tr>
<td>Missouri</td>
<td>317</td>
<td>4,702</td>
<td>Wisconsin</td>
<td>551,649</td>
<td>630,930</td>
</tr>
<tr>
<td>New Jersey</td>
<td>119,109</td>
<td>134,988</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13,063,708</td>
<td>17,603,873</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Foreign trade in iron ore.—The iron ore imported into the United States amounted to 582,498 gross tons valued at $1,539,374 in 1932, a decrease of 60 percent in quantity and 61 percent in total value from 1931. Chile continued to be the chief source of imports, furnishing 38 percent of the total, while Cuba supplied 13 percent, Norway 17 percent, and Russia 28 percent.
Iron ore imported into the United States, 1930–32, by countries

<table>
<thead>
<tr>
<th>Country</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Value</td>
<td>Gross tons</td>
</tr>
<tr>
<td>Africa:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algeria and Tunisia</td>
<td>232,265</td>
<td>$536,333</td>
<td>70,471</td>
</tr>
<tr>
<td>Morocco</td>
<td>5,170</td>
<td>15,054</td>
<td></td>
</tr>
<tr>
<td>Mozambique</td>
<td>31</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Australia</td>
<td>219,926</td>
<td>659,246</td>
<td>20,979</td>
</tr>
<tr>
<td>Belgium</td>
<td></td>
<td></td>
<td>115</td>
</tr>
<tr>
<td>Brazil</td>
<td>24,607</td>
<td>65,768</td>
<td>25</td>
</tr>
<tr>
<td>Canada</td>
<td>396</td>
<td>2,767</td>
<td>4,508</td>
</tr>
<tr>
<td>Chile</td>
<td>1,698,671</td>
<td>4,857,301</td>
<td>750,702</td>
</tr>
<tr>
<td>Cuba</td>
<td>139,654</td>
<td>781,301</td>
<td>89,000</td>
</tr>
<tr>
<td>Egypt</td>
<td>6,925</td>
<td>44,885</td>
<td>25</td>
</tr>
<tr>
<td>Germany</td>
<td>295</td>
<td>5,748</td>
<td></td>
</tr>
<tr>
<td>India, British</td>
<td>7,170</td>
<td>24,425</td>
<td>8</td>
</tr>
<tr>
<td>Kwantung</td>
<td>157</td>
<td>286</td>
<td>1,456</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>48,771</td>
<td>222,006</td>
<td></td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>145</td>
<td>3,055</td>
<td>470</td>
</tr>
<tr>
<td>Norway</td>
<td>2,500</td>
<td>48,655</td>
<td>3</td>
</tr>
<tr>
<td>Persia</td>
<td>63,412</td>
<td>134,225</td>
<td>278,612</td>
</tr>
<tr>
<td>Soviet Russia in Europe</td>
<td>81,012</td>
<td>255,041</td>
<td>38,191</td>
</tr>
<tr>
<td>Spain</td>
<td>202,748</td>
<td>952,925</td>
<td>83,584</td>
</tr>
<tr>
<td>Sweden</td>
<td>145</td>
<td>3,055</td>
<td>470</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>20,442</td>
<td>20,438</td>
<td>3,681,949</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2,775,124 8,113,039 1,465,613 3,901,775 852,498 1,339,374

Exports of iron ore from the United States amounted to 83,449 gross tons valued at $219,852 ($2.63 a ton) in 1932 compared with 435,665 tons valued at $1,657,832 ($3.81 a ton) in 1931. Except for 30 tons shipped to Japan, all the iron ore exported in 1932 went to Canada.

Iron ore mining in Cuba.—Shipments of iron ore from Cuba to the United States amounted to 81,305 gross tons in 1932, a decrease of 11 percent from 1931, and were the smallest since 1885. They consisted of 20,893 tons of hematite carrying 56.07 percent iron (dried) and 48,977 tons of siliceous ore carrying 29.23 percent iron from the Daiquiri and Juragua mines on the southern coast, and 11,435 tons of nodulized brown ore carrying 55.22 percent iron from the Mayari mines near the northern coast.

The total stock of ore reported on hand was 684,933 gross tons at the end of 1932 compared with 577,899 tons at the end of 1931.

The following table shows the shipments of iron ore from Cuba since the mines were opened in 1884. The statistics of the shipments of Cuban iron ore are collected by the Bureau of Mines.

Iron ore shipped from mines in the Province of Oriente, Cuba, 1884–1932, in gross tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Juragua (hematite and magnetite)</th>
<th>Daiquiri (hematite and a little magnetite)</th>
<th>Sigua (hematite)</th>
<th>Mayari (brown ore)</th>
<th>Guaná (hematite)</th>
<th>El Cúbero (hematite)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1884–1930</td>
<td>1,020,286,454</td>
<td>20,438</td>
<td>3,662,466</td>
<td>41,241</td>
<td>903,103</td>
<td>24,916,702</td>
<td>1,339,374</td>
</tr>
<tr>
<td>1931</td>
<td>582,899</td>
<td></td>
<td>3,662,466</td>
<td>41,241</td>
<td>903,103</td>
<td>24,916,702</td>
<td>1,339,374</td>
</tr>
<tr>
<td>1932</td>
<td>69,370</td>
<td></td>
<td>3,681,949</td>
<td>41,241</td>
<td>903,103</td>
<td>25,088,954</td>
<td>1,339,374</td>
</tr>
</tbody>
</table>

1 Of this quantity, 5,932 tons sent to Pictou, Nova Scotia, and 64,228 tons sent to ports outside of the United States.
REVIEW OF LAKE SUPERIOR DISTRICT

Production.—The total quantity of iron ore mined in the Lake Superior district amounted to 8,139,427 gross tons in 1932, a decrease of 69 percent compared with 1931. The output of the several ranges is shown in the following table. After 1905 the figures do not include manganiferous iron ore containing 5 percent or more of manganese. The Mesabi Range produced 52 percent of the iron-ore output of the Lake Superior district (60 percent in 1931) and 43 percent of the total output of the United States (50 percent in 1931). The proportion contributed by this range has been remarkably uniform from 1915 to 1931; for the Lake Superior district the proportion from 1915 to 1931 ranged from 60 to 71 percent and averaged 66 percent, and for the United States it ranged from 50 to 60 percent and averaged 56 percent.

Iron ore mined in the Lake Superior district, 1854–1932, in gross tons

[Exclusive after 1905 of ore containing 5 percent or more manganese]

<table>
<thead>
<tr>
<th>Year</th>
<th>Marquette</th>
<th>Menominee</th>
<th>Gogebic</th>
<th>Vermilion</th>
<th>Mesabi</th>
<th>Cuyuna</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1854-1930</td>
<td>175,295,700</td>
<td>172,887,122</td>
<td>186,110,718</td>
<td>58,764,191</td>
<td>890,027,602</td>
<td>22,281,938</td>
<td>1,505,088,296</td>
</tr>
<tr>
<td>1931</td>
<td>2,650,996</td>
<td>2,083,157</td>
<td>5,668,229</td>
<td>1,181,224</td>
<td>15,356,787</td>
<td>665,012</td>
<td>25,877,885</td>
</tr>
<tr>
<td>1932</td>
<td>750,692</td>
<td>809,401</td>
<td>1,425,043</td>
<td>362,137</td>
<td>4,255,495</td>
<td>556,659</td>
<td>8,139,427</td>
</tr>
<tr>
<td></td>
<td>178,698,388</td>
<td>175,479,600</td>
<td>191,233,985</td>
<td>60,307,552</td>
<td>909,881,864</td>
<td>23,483,629</td>
<td>1,539,085,108</td>
</tr>
</tbody>
</table>

The average number of men employed in iron-ore mines in the Lake Superior district declined from about 15,200 in 1931 to about 8,000 in 1932.

The average daily wage in Michigan declined from $4.96 in 1931 to $4.29 in 1932, and in St. Louis and Itasca Counties, Minn., it declined from about $5.29 in 1931 to about $4.55 in 1932.

The operators' gross loss at underground mines in Michigan, according to the State mine assayer, was $1.89 a ton in 1932 (6 cents gross profit in 1931). According to the Minnesota Tax Commission, the average cost per ton of developing and mining iron ore at open-pit operations in Minnesota in 1931 was $1.135 and at underground or mixed operations $1.971.

Shipments.—The shipments of ore from the Lake Superior district amounted to 3,588,534 gross tons (3,577,553 tons of iron ore and 10,981 tons of manganiferous iron ore containing 5 percent or more manganese) in 1932, compared with 23,495,348 tons (23,249,212 tons of iron ore and 246,136 tons of manganiferous iron ore) in 1931.

Iron-ore analyses.—The iron content of the ore shipped from the Lake Superior district in 1932 averaged 52.16 percent (natural) compared with 51.53 percent in 1931 and 51.33 percent in 1930, showing how closely these ores are graded.

The following table, compiled by the Lake Superior Iron Ore Association, summarizes the average analyses of the total tonnages of all grades of ore shipped and shows the remarkable uniformity maintained during the past 5 years. This uniformity does not, of course, mean that the average grade of the available Lake Superior iron ore is not declining. The grade of shipments has been maintained by methods of beneficiation and by mixing ores from different deposits.
Average analyses of total tonnages of all grades of iron ore from all ranges of Lake Superior district, 1928–32

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross tons</th>
<th>Iron (natural)</th>
<th>Phosphorus</th>
<th>Silica</th>
<th>Manganese</th>
<th>Moisture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percent</td>
<td>Percent</td>
<td>Percent</td>
<td>Percent</td>
<td>Percent</td>
</tr>
<tr>
<td>1928</td>
<td>54,045,941</td>
<td>51.15</td>
<td>0.096</td>
<td>8.43</td>
<td>0.85</td>
<td>11.37</td>
</tr>
<tr>
<td>1929</td>
<td>65,443,546</td>
<td>51.13</td>
<td>0.100</td>
<td>8.48</td>
<td>0.80</td>
<td>11.24</td>
</tr>
<tr>
<td>1930</td>
<td>66,606,554</td>
<td>51.33</td>
<td>0.065</td>
<td>8.70</td>
<td>0.82</td>
<td>10.92</td>
</tr>
<tr>
<td>1931</td>
<td>20,281,333</td>
<td>51.53</td>
<td>0.067</td>
<td>8.50</td>
<td>0.80</td>
<td>10.84</td>
</tr>
<tr>
<td>1932</td>
<td>5,552,576</td>
<td>52.16</td>
<td>0.099</td>
<td>9.05</td>
<td>0.88</td>
<td>9.92</td>
</tr>
</tbody>
</table>

Stocks of ore at Lake Erie ports.—According to the Lake Superior Iron Ore Association, at the close of navigation in 1932, 5,191,114 gross tons of iron ore were in stock at Lake Erie ports compared with 6,048,327 tons on the corresponding date in 1931. At the opening of navigation in May 1933, 4,969,363 tons were in stock at these ports, indicating a withdrawal of only 221,751 tons during the winter of 1932–33. The average quantity withdrawn each winter during the preceding 5 years was about 1,658,000 tons.

Prices of Lake Superior ore.—The unit prices established June 3, 1932 for the four standard grades of Lake Superior ore are the same as those for 1929–31, as follows: Old-range Bessemer, 9.32 cents; Mesabi Bessemer, 9.029 cents; old-range non-Bessemer, 9.029 cents; and Mesabi non-Bessemer, 8.738 cents. The prices per ton that correspond to these prices are, respectively, $4.80, $4.65, $4.65, and $4.50. The base of Bessemer ore, old-range and Mesabi, for 1925–32 is a metallic iron content of 51.5 percent (natural), instead of 55 percent, as for 1924 and many earlier years. The base of non-Bessemer ore, old-range and Mesabi, remains as heretofore at 51.5 percent (natural).

Iron-ore reserves.—Estimates of ore reserves for Minnesota, furnished by the Minnesota Tax Commission, and for Michigan, furnished by the Michigan Board of State Tax Commissioners, cover developed and prospective ore in the ground and ore in stock piles. These estimates show an increase from the previous year of 29,910,000 in Minnesota but a decrease of 2,437,000 tons in Michigan.

Iron-ore reserves in Minnesota May 1, 1928–32, in gross tons

<table>
<thead>
<tr>
<th>Range</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesabi</td>
<td>1,100,480,901</td>
<td>1,178,855,601</td>
<td>1,154,434,081</td>
<td>1,162,776,979</td>
<td>1,190,295,183</td>
<td></td>
</tr>
<tr>
<td>Vermilion</td>
<td>14,463,283</td>
<td>14,639,704</td>
<td>14,255,540</td>
<td>14,709,137</td>
<td>14,287,637</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,258,233,624</td>
<td>1,242,059,884</td>
<td>1,235,227,510</td>
<td>1,244,322,726</td>
<td>1,274,232,780</td>
<td></td>
</tr>
</tbody>
</table>

Iron-ore reserves in Michigan Jan. 1, 1929–33, in gross tons

<table>
<thead>
<tr>
<th>Range</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gogebic</td>
<td>48,587,126</td>
<td>51,347,176</td>
<td>51,143,511</td>
<td>50,793,057</td>
<td>50,473,546</td>
</tr>
<tr>
<td>Marquette</td>
<td>57,920,862</td>
<td>55,655,383</td>
<td>57,065,310</td>
<td>56,335,788</td>
<td>56,894,039</td>
</tr>
<tr>
<td>Menominee (including Iron River and Crystal Falls districts)</td>
<td>62,922,410</td>
<td>61,347,264</td>
<td>62,178,324</td>
<td>59,940,058</td>
<td>58,264,532</td>
</tr>
<tr>
<td></td>
<td>160,430,407</td>
<td>168,349,823</td>
<td>170,987,345</td>
<td>167,068,903</td>
<td>164,632,117</td>
</tr>
</tbody>
</table>
IRON ORE, PIG IRON, FERRO-ALLOYS, AND STEEL

IRON-ORE MINING, BY STATES

Alabama.—The production of iron ore in Alabama in 1932 was 1,874,534 gross tons (1,332,975 tons of hematite and 41,559 tons of brown ore), a decrease of 62 percent from 1931. The hematite, much of which contains enough lime to make it self-fluxing or nearly so, was produced at the Sloss nos. 1 & 2, Raimund nos. 1 & 2, Red Mountain group, and Woodward nos. 1 & 3 mines, all in Jefferson County. The iron content of that shipped in 1932 ranged from 33.1 to 40.31 percent (natural) and averaged 37.19 percent; the manganese content averaged 0.14 percent and the phosphorus content 0.31 percent. As in 1931, the Red Mountain group (819,299 tons) was the largest producing mine in the United States. The brown ore was obtained chiefly from the Russellville mine in Franklin County, the Tecumseh mine in Cherokee County, and the Doxsey mine in Tuscaloosa County. The content (dried) averaged 50.7 percent iron, 0.75 percent manganese, and 0.62 percent phosphorus.

Georgia.—Brown ore amounting to 925 gross tons was produced in Georgia from the Tecumseh mine in Floyd County, Ga., and Cherokee County, Ala. The ore averaged 50.5 percent iron (dried), 1.5 percent manganese, and 0.61 percent phosphorus.

Michigan.—Mining activity on the Michigan ranges in 1932 was again sharply curtailed, as is shown by a production of 2,554,996 gross tons compared with 7,552,581 tons in 1931. Of the 44 active mines in Michigan in 1932 (55 in 1931), only 6 (27 in 1931) yielded more than 100,000 tons each. The Norrie-Aurora mine in Gogebic County again had the largest output of any mine in Michigan in 1932—177,869 tons. The average production per mine in Michigan was 58,068 tons in 1932 compared with 137,320 tons in 1931.

The ore reserves in Michigan on January 1, 1933, amounted to 164,682,117 gross tons, a decrease of 2,436,786 tons from the previous year.

A report on the iron-ore mines of Michigan for 1932, published by the geological survey division of the Michigan Department of Conservation, shows that the average number of men employed per day was 3,529 (6,112 in 1931), the average number of days worked 88 (172 in 1931), the average daily wage $4.294 ($4.963 in 1931), the average yearly earning $377.89 ($843.71 in 1931), and the average tons of ore mined per man per day 4.06 (5.3 in 1931).

The data in the following table on average per ton costs of mining ore at underground mines have been abstracted from statistics published in much greater detail by the geological survey division.

---

**Minerals Yearbook**

**Average per-ton costs of mining iron ore at underground mines in Michigan in 1932, by counties**

<table>
<thead>
<tr>
<th>Item</th>
<th>Gogebic</th>
<th>Marquette</th>
<th>Dickinson and Iron</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of mining</td>
<td>$2,1316</td>
<td>$2,2490</td>
<td>$1,9760</td>
<td>$2,1107</td>
</tr>
<tr>
<td>Deferred mining cost</td>
<td>1.609</td>
<td>1.128</td>
<td>.0964</td>
<td>1.111</td>
</tr>
<tr>
<td>Taxes</td>
<td>1.2945</td>
<td>1.0631</td>
<td>.8126</td>
<td>1.114</td>
</tr>
<tr>
<td>General overhead</td>
<td>.0404</td>
<td>.6111</td>
<td>.4755</td>
<td>.4869</td>
</tr>
<tr>
<td>Transportation</td>
<td>1.7193</td>
<td>1.4474</td>
<td>1.5656</td>
<td>1.6044</td>
</tr>
<tr>
<td>Marketing</td>
<td>.6418</td>
<td>.0703</td>
<td>.0715</td>
<td>.0733</td>
</tr>
<tr>
<td>Idle mine cost (excluding royalty)</td>
<td>.4306</td>
<td>.1943</td>
<td>.3329</td>
<td>.3659</td>
</tr>
<tr>
<td>Royalty</td>
<td>.3340</td>
<td>.5438</td>
<td>.3277</td>
<td>.3655</td>
</tr>
<tr>
<td>Interest on borrowed money</td>
<td>.2092</td>
<td>.0523</td>
<td>.1267</td>
<td>.2882</td>
</tr>
<tr>
<td>Total ore cost</td>
<td>7.1830</td>
<td>6.3441</td>
<td>5.9377</td>
<td>6.3381</td>
</tr>
<tr>
<td>Lake Erie value per ton</td>
<td>4.7960</td>
<td>4.7622</td>
<td>4.4387</td>
<td>4.6487</td>
</tr>
<tr>
<td>Gross ore loss†</td>
<td>2.3870</td>
<td>1.6419</td>
<td>1.5040</td>
<td>1.8894</td>
</tr>
</tbody>
</table>

† This figure does not represent true loss, as much ore is sold below the Lake Erie price.

**Minnesota.**—Mining in Minnesota was more sharply curtailed than in Michigan in 1932. The production of 5,154,291 represented a decrease of 70 percent from 1931. Of the 42 active mines in Minnesota in 1932 (67 in 1931), only 15 (41 in 1931) yielded more than 100,000 tons each. The Orwell mine, an open-pit operation in St. Louis County, which yielded 798,787 tons, was the largest producing mine in Minnesota; it was the only mine in the Lake Superior district that yielded over half a million tons in 1932. The average production per mine in Minnesota was 122,721 tons in 1932 compared with 260,373 tons in 1931.

The reserves of ore in Minnesota on May 1, 1932 amounted to 1,274,232,780 gross tons, an increase of 29,910,054 tons over the previous year.

According to the annual report of the mine inspector of St. Louis County an average of 2,243 men was employed in iron-ore mines in 1932 (4,824 in 1931), and the average daily wage was $4.53 ($5.31 in 1931).

According to the annual report of the mine inspector of Itasca County an average of 1,201 men was employed in iron-ore mines in 1932 (2,940 in 1931), and the average daily wage was $4.59 ($5.26 in 1931).

The data in the following table on costs of developing and mining iron ore have been abstracted from statistics published in greater detail by the Minnesota Tax Commission.

**Average per-ton costs of developing and mining iron ore at open-pit and underground operations in Minnesota, 1927–31**

<table>
<thead>
<tr>
<th>Year</th>
<th>Developing Labor</th>
<th>Developing Supplies</th>
<th>Developing Other items</th>
<th>Developing Total</th>
<th>Mining Labor</th>
<th>Mining Supplies</th>
<th>Mining Other Items</th>
<th>Mining Total</th>
<th>Royalty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1927</td>
<td>$0.305</td>
<td>$0.146</td>
<td>$0.148</td>
<td>$0.265</td>
<td>$0.043</td>
<td>$1.202</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>.276</td>
<td>.121</td>
<td>.126</td>
<td>.135</td>
<td>.456</td>
<td>1.114</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>.260</td>
<td>.112</td>
<td>.124</td>
<td>.113</td>
<td>.459</td>
<td>1.115</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>.267</td>
<td>.113</td>
<td>.122</td>
<td>.124</td>
<td>.459</td>
<td>1.115</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>.254</td>
<td>.111</td>
<td>.121</td>
<td>.221</td>
<td>.428</td>
<td>1.135</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground operations (including two milling operations):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1927</td>
<td>.089</td>
<td>.947</td>
<td>.428</td>
<td>.290</td>
<td>.466</td>
<td>2.150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>.068</td>
<td>.896</td>
<td>.424</td>
<td>.190</td>
<td>.447</td>
<td>2.625</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>.055</td>
<td>.862</td>
<td>.416</td>
<td>.189</td>
<td>.447</td>
<td>1.969</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>.046</td>
<td>.852</td>
<td>.429</td>
<td>.201</td>
<td>.432</td>
<td>1.990</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>.031</td>
<td>.747</td>
<td>.410</td>
<td>.253</td>
<td>.490</td>
<td>1.971</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Missouri.—The production of iron ore in Missouri dropped to 29,797 gross tons in 1932 from 112,372 tons in 1931. The output in 1932 consisted of 12,532 tons of hematite chiefly from the Iron Mountain, Ruepple, Christy, Wiggins, Hinck, St. James, Silver Hollow, and Crisp mines, and 17,265 tons of brown ore chiefly from properties in Butler, Carter, Madison, Reynolds, Shannon, and Wayne Counties. The iron content (natural) of the ore shipped in 1932 averaged 53.44 percent.

New Jersey.—The only active mine in New Jersey in 1932 was the Mt. Hope mine in Morris County, which yielded 30,844 gross tons of magnetite concentrates averaging about 62 percent iron. The production in New Jersey in 1931 was 293,768 tons.

New York.—The production of iron ore in New York declined to 31,327 tons gross in 1932 from 275,075 tons in 1931. The output in 1932 was chiefly from the Chateaugay mine in Clinton County. Shipments from stock were made from the Old Bed, Harmony, and New Bed mines in Essex County in 1932. Shipments from New York in 1932 consisted of 17,950 tons of sinter and concentrates averaging 67.88 percent iron, 0.074 percent manganese, and 0.048 percent phosphorus; and 12,650 tons of lump ore averaging 62.25 percent iron, 0.1 percent manganese, and 0.85 percent phosphorus.

Pennsylvania.—Pennsylvania, the most important source of magnetite in the United States, produced 102,838 gross tons of ore in 1932 compared with 368,117 tons in 1931. The production consisted chiefly of 100,721 tons of magnetite from the Cornwall mines in Lebanon County; it averaged 37.83 percent iron (natural). Some hydrated iron ore for use in gas purification was mined in Venango County, and some carbonate ore for use in paint was mined in Carbon County in 1932.

Utah.—The production of iron ore in Utah in 1932 was 137,224 tons compared with 184,068 tons in 1931. It was chiefly hematite, averaging 52.6 percent iron (natural), from the Desert Mound mine in Iron County. A small quantity of iron ore for use in paint was produced at the Tecoma mine in Box Elder County.

Wisconsin.—The production of iron ore in Wisconsin declined to 430,140 gross tons in 1932 from 879,832 tons in 1931. The Montreal mine (402,732 tons) and Cary mine (27,408 tons), both in Iron County, were the only productive operations. The stock pile of ore at the Plumer mine, also in Iron County, was shipped during 1932.

WORLD PRODUCTION

The following table shows the production of iron ore by countries from 1928 to 1932, so far as figures are obtainable. Figures for preceding years appear in earlier volumes of Mineral Resources. Complete returns for 1932 are not yet available, but the world production of pig iron suggests a total of about 83 million metric tons, of which the United States furnished about one eighth. In 1931 the United States contributed a little more than one fourth of the world total, which was almost 120,000,000 metric tons.
<table>
<thead>
<tr>
<th>Country</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuba</td>
<td>400,700</td>
<td>652,005</td>
<td>190,270</td>
<td>92,407</td>
<td>82,610</td>
</tr>
<tr>
<td>Mexico</td>
<td>20,290</td>
<td>112,749</td>
<td>108,979</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>Newfoundland</td>
<td>1,572,726</td>
<td>1,541,334</td>
<td>1,190,856</td>
<td>716,579</td>
<td>150,967</td>
</tr>
<tr>
<td>United States</td>
<td>63,195,351</td>
<td>74,199,815</td>
<td>59,346,123</td>
<td>31,631,163</td>
<td>10,004,959</td>
</tr>
<tr>
<td>South America:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>30,000</td>
<td>30,000</td>
<td>30,400</td>
<td>30,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Chile</td>
<td>1,515,203</td>
<td>1,812,343</td>
<td>1,695,089</td>
<td>741,650</td>
<td>172,681</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>1,928,182</td>
<td>1,891,381</td>
<td>1,180,451</td>
<td>511,945</td>
<td>(7)</td>
</tr>
<tr>
<td>Belgium</td>
<td>194,420</td>
<td>155,670</td>
<td>139,990</td>
<td>125,820</td>
<td>(7)</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>1,779,176</td>
<td>1,907,663</td>
<td>1,652,920</td>
<td>1,225,678</td>
<td>(7)</td>
</tr>
<tr>
<td>France</td>
<td>49,121,250</td>
<td>50,731,100</td>
<td>45,703,820</td>
<td>28,784,290</td>
<td>(7)</td>
</tr>
<tr>
<td>Germany</td>
<td>6,296,261</td>
<td>6,191,232</td>
<td>5,658,574</td>
<td>2,574,049</td>
<td>(7)</td>
</tr>
<tr>
<td>Greece</td>
<td>106,868</td>
<td>233,025</td>
<td>235,161</td>
<td>235,967</td>
<td>(7)</td>
</tr>
<tr>
<td>Hungary</td>
<td>190,547</td>
<td>251,711</td>
<td>157,421</td>
<td>84,033</td>
<td>(7)</td>
</tr>
<tr>
<td>Italy</td>
<td>625,488</td>
<td>715,171</td>
<td>718,124</td>
<td>500,833</td>
<td>458,362</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>7,026,583</td>
<td>7,571,206</td>
<td>6,649,372</td>
<td>4,764,926</td>
<td>(7)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1,100</td>
<td></td>
<td></td>
<td></td>
<td>(7)</td>
</tr>
<tr>
<td>Norway</td>
<td>530,608</td>
<td>746,112</td>
<td>772,423</td>
<td>764,887</td>
<td>(7)</td>
</tr>
<tr>
<td>Poland</td>
<td>736,738</td>
<td>469,586</td>
<td>476,846</td>
<td>284,653</td>
<td>(7)</td>
</tr>
<tr>
<td>Portugal</td>
<td>14,000</td>
<td>8,267</td>
<td>(7)</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>Rumania</td>
<td>83,869</td>
<td>90,014</td>
<td>92,917</td>
<td>61,907</td>
<td>(7)</td>
</tr>
<tr>
<td>Russia</td>
<td>8,911,458</td>
<td>7,849,009</td>
<td>10,425,000</td>
<td>10,615,000</td>
<td>(7)</td>
</tr>
<tr>
<td>Spain</td>
<td>5,771,207</td>
<td>4,446,648</td>
<td>5,171,211</td>
<td>3,190,203</td>
<td>1,847,000</td>
</tr>
<tr>
<td>Sweden</td>
<td>4,468,981</td>
<td>11,467,551</td>
<td>5,866,428</td>
<td>7,076,866</td>
<td>(7)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>65,702</td>
<td>88,445</td>
<td>101,925</td>
<td>42,239</td>
<td>(7)</td>
</tr>
<tr>
<td>United Kingdom:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Britain</td>
<td>11,443,063</td>
<td>13,427,043</td>
<td>11,813,389</td>
<td>7,748,255</td>
<td>(7)</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>519</td>
<td>700</td>
<td></td>
<td></td>
<td>(7)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>439,481</td>
<td>427,946</td>
<td>431,187</td>
<td>133,112</td>
<td>(7)</td>
</tr>
<tr>
<td>Asia:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>2,000,000</td>
<td>2,672,400</td>
<td>2,261,208</td>
<td>2,242,200</td>
<td>(7)</td>
</tr>
<tr>
<td>China                  11</td>
<td>594,375</td>
<td>551,614</td>
<td>532,497</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>India, British.</td>
<td>2,056,091</td>
<td>2,467,033</td>
<td>1,870,311</td>
<td>1,650,962</td>
<td>(7)</td>
</tr>
<tr>
<td>Japan</td>
<td>157,706</td>
<td>177,557</td>
<td>246,952</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>Russia</td>
<td>12,970</td>
<td>(7)</td>
<td>(7)</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>Unfederated Malay States</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johore</td>
<td>654,981</td>
<td>755,138</td>
<td>714,081</td>
<td>496,723</td>
<td>(7)</td>
</tr>
<tr>
<td>Trengganu</td>
<td>26,343</td>
<td>55,693</td>
<td>76,187</td>
<td>306,369</td>
<td>171,182</td>
</tr>
<tr>
<td>Africa:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algeria</td>
<td>1,985,626</td>
<td>2,196,182</td>
<td>2,231,868</td>
<td>1,016,957</td>
<td>(7)</td>
</tr>
<tr>
<td>Belgian Congo</td>
<td>51,000</td>
<td>50,000</td>
<td>14,000</td>
<td>19,000</td>
<td>(7)</td>
</tr>
<tr>
<td>Morocco, Spanish</td>
<td>1,000,739</td>
<td>1,061,424</td>
<td>722,715</td>
<td>500,669</td>
<td>171,182</td>
</tr>
<tr>
<td>Rhodesia:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>4,588</td>
<td>3,613</td>
<td>10</td>
<td>771</td>
<td>722</td>
</tr>
<tr>
<td>Southern</td>
<td>5,112</td>
<td>3,408</td>
<td>2,324</td>
<td>355</td>
<td>(7)</td>
</tr>
<tr>
<td>South-West Africa</td>
<td>29,929</td>
<td>28,977</td>
<td>39,069</td>
<td>22,214</td>
<td>(7)</td>
</tr>
<tr>
<td>Tunisia</td>
<td>906,000</td>
<td>977,000</td>
<td>828,000</td>
<td>446,600</td>
<td>209,000</td>
</tr>
<tr>
<td>Union of South Africa</td>
<td>20,588</td>
<td>38,270</td>
<td>51,662</td>
<td>15,447</td>
<td>16,024</td>
</tr>
<tr>
<td>Oceania:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New South Wales</td>
<td>85,558</td>
<td>11,680</td>
<td>(7)</td>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>Queensland</td>
<td>62,240</td>
<td>861,420</td>
<td>942,225</td>
<td>283,830</td>
<td>546,562</td>
</tr>
<tr>
<td>South Australia</td>
<td>12,929</td>
<td>8,172</td>
<td>16,409</td>
<td>7,031</td>
<td>(7)</td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>174,076,000</td>
<td>201,175,000</td>
<td>179,000,000</td>
<td>119,532,000</td>
<td>(7)</td>
</tr>
</tbody>
</table>

1 Shipment.
2 Data not available; estimate included in total for 1931.
3 Shipments from Wabana mines.
4 Approximate production.
5 Production of Tofo mines.
6 Exclusive of manganeseiferous iron ore carrying 12 to 30 percent manganese.
7 Less than 1 ton.
8 Year ended Sept. 30.
9 Russia in Asia included with Russia in Europe.
10 Exports.
11 Exclusive of bog ore, which is used mainly for the purification of gas.
12 Exclusive of iron oxide used for paint.
13 Quantity smelted; production not available.
PIG IRON

Production and shipments.—The total production of pig iron, exclusive of ferro-alloys, reported by manufacturers to the Bureau of Mines, was 8,549,649 gross tons in 1932 compared with 17,952,613 tons in 1931. The production in 1932 consisted of 8,534,594 tons made with coke as fuel and 15,055 tons made with charcoal. Of the pig iron manufactured in 1932, it is calculated that 391,522 gross tons valued at $5,255,688 were made from 652,352 gross tons of foreign ore from Africa, Australia, Canada, Chile, Cuba, Russia, and Sweden, indicating an average pig-iron yield of 60.02 percent from imported ore. Domestic ore and 1,954,710 gross tons of cinder, scale, and scrap, amounting in all to 14,483,596 tons, were reported as used in making 8,158,127 tons of pig iron, indicating an average pig-iron yield of 56.33 percent from domestic materials.

Pig iron manufactured in the United States, 1931-32, by States, in gross tons

<table>
<thead>
<tr>
<th>State</th>
<th>1931</th>
<th>1932</th>
<th>State</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>1,640,851</td>
<td>652,958</td>
<td>New York</td>
<td>1,060,935</td>
<td>624,169</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,965,469</td>
<td>919,347</td>
<td>Ohio</td>
<td>4,117,884</td>
<td>2,387,028</td>
</tr>
<tr>
<td>Indiana</td>
<td>1,790,409</td>
<td>852,776</td>
<td>Pennsylvania</td>
<td>5,006,306</td>
<td>2,106,170</td>
</tr>
<tr>
<td>Kentucky</td>
<td>100,290</td>
<td>72,855</td>
<td>West Virginia</td>
<td>665,534</td>
<td>224,032</td>
</tr>
<tr>
<td>Maryland</td>
<td>676,735</td>
<td>378,739</td>
<td>Undistributed</td>
<td>389,001</td>
<td>152,710</td>
</tr>
<tr>
<td>Michigan</td>
<td>537,350</td>
<td>192,935</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td>1,569</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17,952,613</td>
<td>8,549,649</td>
</tr>
</tbody>
</table>

1931: Colorado, Iowa, Massachusetts, Tennessee, and Utah; 1932: Colorado, Iowa, Tennessee, and Utah.

The number of furnaces in blast on June 30 and December 31 and the total number of stacks recorded for 1931 and 1932, exclusive of electric reduction furnaces, were as follows:

Blast furnaces (including ferro-alloy blast furnaces) in the United States, 1931-32

<table>
<thead>
<tr>
<th>State</th>
<th>In blast June 30, 1931</th>
<th>Dec. 31, 1931</th>
<th>In blast June 30, 1932</th>
<th>Dec. 31, 1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
<td>In</td>
</tr>
<tr>
<td>Alabama</td>
<td>12</td>
<td>6</td>
<td>19</td>
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<tr>
<td>Colorado</td>
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<td>Illinois</td>
<td>7</td>
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<td>Indiana</td>
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<td>13</td>
<td>15</td>
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<td>New Jersey</td>
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<td>New York</td>
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<td>23</td>
<td>12</td>
<td>45</td>
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<td>Pennsylvania</td>
<td>27</td>
<td>17</td>
<td>81</td>
<td>98</td>
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<tr>
<td>Tennessee</td>
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<td>12</td>
<td>12</td>
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<td>Utah</td>
<td>1</td>
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<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Virginia</td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>West Virginia</td>
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<td>2</td>
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<tr>
<td></td>
<td>93</td>
<td>61</td>
<td>227</td>
<td>288</td>
</tr>
</tbody>
</table>

1American Iron and Steel Institute.

182217—33—14
The total shipments of pig iron, exclusive of ferro-alloys, reported by manufacturers to the Bureau of Mines, amounted to 8,518,400 gross tons in 1932, valued at $126,032,714, a decrease of 52 percent in quantity and 56 percent in total value from 1931. The values given represent the approximate amounts received for the iron f.o.b. furnaces and do not include freight costs, selling commissions, and other items that are figured in some of the market prices of pig iron published in trade journals.

**Pig iron shipped from blast furnaces in the United States, 1931–32, by States**

<table>
<thead>
<tr>
<th>State</th>
<th>1931 Gross tons</th>
<th>1931 Value</th>
<th>1932 Gross tons</th>
<th>1932 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>1,617,351</td>
<td>$20,034,541</td>
<td>733,774</td>
<td>$8,076,727</td>
</tr>
<tr>
<td>Colorado</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,727,884</td>
<td>29,175,100</td>
<td>731,872</td>
<td>11,544,298</td>
</tr>
<tr>
<td>Indiana</td>
<td>1,721,925</td>
<td>28,458,609</td>
<td>718,415</td>
<td>11,019,875</td>
</tr>
<tr>
<td>Iowa</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>125,194</td>
<td>(1)</td>
<td>74,431</td>
<td>(1)</td>
</tr>
<tr>
<td>Maryland</td>
<td>677,076</td>
<td>(1)</td>
<td>357,614</td>
<td>(1)</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Michigan</td>
<td>619,643</td>
<td>8,664,439</td>
<td>280,536</td>
<td>4,209,526</td>
</tr>
<tr>
<td>Minnesota</td>
<td>17,878</td>
<td>(1)</td>
<td>1,571</td>
<td>(1)</td>
</tr>
<tr>
<td>New York</td>
<td>1,014,330</td>
<td>15,568,275</td>
<td>594,230</td>
<td>5,546,837</td>
</tr>
<tr>
<td>Ohio</td>
<td>1,290,269</td>
<td>19,091,692</td>
<td>2,505,288</td>
<td>57,885,811</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>6,865,816</td>
<td>56,777,965</td>
<td>2,069,533</td>
<td>32,764,148</td>
</tr>
<tr>
<td>Tennessee</td>
<td>13,994</td>
<td>255,111</td>
<td>4,623</td>
<td>(1)</td>
</tr>
<tr>
<td>Utah</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Virginia</td>
<td>26,519</td>
<td>(1)</td>
<td>1,710</td>
<td>(1)</td>
</tr>
<tr>
<td>West Virginia</td>
<td>569,321</td>
<td>(1)</td>
<td>245,455</td>
<td>(1)</td>
</tr>
<tr>
<td>Undistributed</td>
<td>$ 960,249</td>
<td>$ 26,786,524</td>
<td>$ 163,814</td>
<td>$ 11,624,490</td>
</tr>
<tr>
<td></td>
<td>17,812,579</td>
<td>285,147,156</td>
<td>8,518,400</td>
<td>126,032,714</td>
</tr>
</tbody>
</table>

1 Included under “Undistributed.”
2 Includes figures for States entered as “(1)” above.

**Pig iron shipped from blast furnaces in the United States, 1931–32, by grades**

<table>
<thead>
<tr>
<th>Grade</th>
<th>1931 Gross tons</th>
<th>1931 Value</th>
<th>1932 Gross tons</th>
<th>1932 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Average</td>
<td>Total</td>
<td>Average</td>
</tr>
<tr>
<td>Charcoal</td>
<td>62,195</td>
<td>$1,200,496</td>
<td>$20.27</td>
<td>23,822</td>
</tr>
<tr>
<td>Foundry</td>
<td>2,021,859</td>
<td>28,812,509</td>
<td>14.25</td>
<td>972,630</td>
</tr>
<tr>
<td>Basic</td>
<td>40,367,377</td>
<td>162,890,061</td>
<td>15.71</td>
<td>5,144,905</td>
</tr>
<tr>
<td>Bessemer</td>
<td>4,371,206</td>
<td>74,900,066</td>
<td>17.16</td>
<td>1,919,325</td>
</tr>
<tr>
<td>Low-phosphorus</td>
<td>209,856</td>
<td>2,851,899</td>
<td>21.79</td>
<td>67,684</td>
</tr>
<tr>
<td>Malleable</td>
<td>770,359</td>
<td>12,773,283</td>
<td>16.42</td>
<td>364,234</td>
</tr>
<tr>
<td>Forge</td>
<td>47,729</td>
<td>753,907</td>
<td>16.01</td>
<td>8,425</td>
</tr>
<tr>
<td>All other (not ferro-alloys)</td>
<td>32,994</td>
<td>792,820</td>
<td>24.07</td>
<td>17,444</td>
</tr>
<tr>
<td></td>
<td>17,812,579</td>
<td>285,147,156</td>
<td>8,518,400</td>
<td>126,032,714</td>
</tr>
</tbody>
</table>

**Values at blast furnaces.**—The average value of all kinds of pig iron given in the accompanying table is based on the reports of the manufacturers to the Bureau of Mines. The figures represent the approximate values f.o.b. blast furnaces and do not include the values of ferro-alloys. The general average value for all grades of pig iron at the furnaces was $14.80 a gross ton in 1932—$1.21 less than in 1931 and $2.66 less than the average for 1927–31.
IRON ORE, PIG IRON, FERRO-ALLOYS, AND STEEL

Average value per gross ton of pig iron at blast furnaces in the United States, 1928-32

<table>
<thead>
<tr>
<th>State</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>$16.71</td>
<td>$16.19</td>
<td>$15.55</td>
<td>$12.38</td>
<td>$11.01</td>
</tr>
<tr>
<td>Illinois</td>
<td>17.96</td>
<td>18.46</td>
<td>17.80</td>
<td>16.89</td>
<td>15.77</td>
</tr>
<tr>
<td>Indiana</td>
<td>16.56</td>
<td>16.69</td>
<td>16.64</td>
<td>16.53</td>
<td>15.45</td>
</tr>
<tr>
<td>Michigan</td>
<td>19.00</td>
<td>16.76</td>
<td>18.08</td>
<td>17.21</td>
<td>15.22</td>
</tr>
<tr>
<td>New York</td>
<td>16.38</td>
<td>17.30</td>
<td>17.90</td>
<td>17.35</td>
<td>14.30</td>
</tr>
<tr>
<td>Ohio</td>
<td>16.83</td>
<td>16.29</td>
<td>18.13</td>
<td>17.04</td>
<td>15.83</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>18.70</td>
<td>18.46</td>
<td>10.64</td>
<td>22.39</td>
<td>(1)</td>
</tr>
<tr>
<td>Tennessee</td>
<td>16.72</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Virginia</td>
<td>17.10</td>
<td>16.83</td>
<td>16.85</td>
<td>14.81</td>
<td>13.40</td>
</tr>
<tr>
<td>Other States</td>
<td>17.27</td>
<td>17.61</td>
<td>17.13</td>
<td>16.01</td>
<td>14.80</td>
</tr>
</tbody>
</table>

1 Included under "Other States."
1928: Colorado, Kentucky, Maryland, Massachusetts, Minnesota, Utah, West Virginia, and Wisconsin; 1929-30: Colorado, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, Utah, Virginia, and West Virginia; 1931: Colorado, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Utah, Virginia, and West Virginia; 1932: Colorado, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Tennessee, Utah, Virginia, and West Virginia.

Commercial quotations.—The average monthly prices, according to published market quotations of foundry, basic, and Bessemer pig iron at Valley furnaces and of foundry pig iron at Birmingham furnaces, are summarized in the following table.

Average monthly prices per ton of chief grades of pig iron, 1931-32

<table>
<thead>
<tr>
<th>Month</th>
<th>Foundry pig iron at Valley furnaces</th>
<th>Foundry pig iron at Birmingham furnaces</th>
<th>Bessemer pig iron at Valley furnaces</th>
<th>Basic pig iron at Valley furnaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1931</td>
<td>1932</td>
<td>1931</td>
<td>1932</td>
</tr>
<tr>
<td>January</td>
<td>$17.00</td>
<td>$15.50</td>
<td>$13.96</td>
<td>$11.64</td>
</tr>
<tr>
<td>February</td>
<td>16.79</td>
<td>15.18</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>March</td>
<td>16.50</td>
<td>15.00</td>
<td>12.67</td>
<td>11.00</td>
</tr>
<tr>
<td>April</td>
<td>16.50</td>
<td>15.00</td>
<td>12.10</td>
<td>11.00</td>
</tr>
<tr>
<td>May</td>
<td>16.44</td>
<td>14.78</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>June</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>July</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>August</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>September</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>October</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>November</td>
<td>16.00</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>December</td>
<td>15.75</td>
<td>14.50</td>
<td>12.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Average</td>
<td>16.25</td>
<td>14.75</td>
<td>12.31</td>
<td>11.05</td>
</tr>
</tbody>
</table>

1 Metal Statistics, 1933.

Foreign trade in pig iron.—Imports of pig iron into the United States in 1932 were 130,630 gross tons—55 percent more than in 1931 and 2 percent more than the average for 1927-31. Netherlands (74,372 tons), India (28,820 tons), and the United Kingdom (23,378 tons) were the chief sources of supply.
Pig iron imported into the United States, 1928–32, by countries, in gross tons

<table>
<thead>
<tr>
<th>Country</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>1,015</td>
<td>7,382</td>
<td>664</td>
<td>2,789</td>
<td>2,113</td>
</tr>
<tr>
<td>Mexico</td>
<td>423</td>
<td>387</td>
<td>41</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>Europe:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>272</td>
<td>284</td>
<td>669</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>France</td>
<td>30</td>
<td>101</td>
<td>50</td>
<td>25</td>
<td>97</td>
</tr>
<tr>
<td>Germany</td>
<td>696</td>
<td>103</td>
<td>60</td>
<td>502</td>
<td>391</td>
</tr>
<tr>
<td>Netherlands</td>
<td>26,989</td>
<td>24,189</td>
<td>6,243</td>
<td>7,209</td>
<td>74,372</td>
</tr>
<tr>
<td>Norway</td>
<td>1,186</td>
<td>3,400</td>
<td>2,610</td>
<td>227</td>
<td>140</td>
</tr>
<tr>
<td>Sweden</td>
<td>2,720</td>
<td>3,534</td>
<td>4,092</td>
<td>1,800</td>
<td>561</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>50,944</td>
<td>39,140</td>
<td>14,239</td>
<td>2,656</td>
<td>23,378</td>
</tr>
<tr>
<td>Asia:</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>56,420</td>
<td>60,243</td>
<td>106,261</td>
<td>67,930</td>
<td>26,820</td>
</tr>
<tr>
<td>India, British</td>
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<td></td>
<td></td>
<td>102</td>
<td>20</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td>60</td>
<td>1,095</td>
</tr>
<tr>
<td>Kwantung</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Oceania: Australia</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>140,694</td>
<td>147,763</td>
<td>137,031</td>
<td>84,411</td>
<td>130,630</td>
</tr>
<tr>
<td>Value</td>
<td>$2,252,064</td>
<td>$2,308,488</td>
<td>$1,806,764</td>
<td>$978,583</td>
<td>$1,301,655</td>
</tr>
</tbody>
</table>

Exports of pig iron from the United States in 1932 were 2,324 gross tons—65 percent less than in 1931 and 94 percent below the average for 1927–31. Exports to Canada declined from 3,408 tons in 1931 to 322 tons in 1932.

Pig iron exported from the United States, 1931–32, by countries, in gross tons

<table>
<thead>
<tr>
<th>Country</th>
<th>1931</th>
<th>1932</th>
<th>Country</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>3,466</td>
<td>322</td>
<td>Europe—Continued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuba</td>
<td>2,450</td>
<td>65</td>
<td>Italy</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Mexico</td>
<td>192</td>
<td>322</td>
<td>United Kingdom</td>
<td>714</td>
<td>136</td>
</tr>
<tr>
<td>Panama</td>
<td>101</td>
<td>60</td>
<td>Asia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other countries</td>
<td>32</td>
<td>1</td>
<td>China</td>
<td>142</td>
<td>100</td>
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<tr>
<td>South America:</td>
<td></td>
<td></td>
<td>Japan</td>
<td>637</td>
<td>200</td>
</tr>
<tr>
<td>Chile</td>
<td>56</td>
<td>15</td>
<td>Philippine Islands</td>
<td>48</td>
<td>253</td>
</tr>
<tr>
<td>Colombia</td>
<td>85</td>
<td>96</td>
<td>Oceania:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>350</td>
<td>203</td>
<td>Australia</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Other countries</td>
<td>50</td>
<td>155</td>
<td>New Zealand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe:</td>
<td></td>
<td></td>
<td>Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>261</td>
<td>396</td>
<td></td>
<td>$150,658</td>
<td>$33,966</td>
</tr>
<tr>
<td>France</td>
<td>396</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

World production of pig iron.—World production of pig iron (including ferro-alloys) in 1932 was approximately 39,200,000 metric tons, a decrease of 30 percent from 1931 and 52 percent below the average for 1927–31. In 1932 the output of the United States represented about 23 percent (33 percent in 1931) of the world output, and it was about 67 percent (44 percent in 1931) less than that of the producing countries of Europe combined. The production of pig iron decreased 21 percent in Europe in 1932 compared with a decrease of 52 percent in the United States.
Iron Ore, Pig Iron, Ferro-Alloys, and Steel

Pig iron (including ferro-alloys) produced, 1928–32, by countries, in metric tons

<table>
<thead>
<tr>
<th>Country</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>417,468</td>
<td>337,975</td>
<td>1,447,000</td>
<td>1,366,000</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Austria</td>
<td>438,451</td>
<td>458,973</td>
<td>296,924</td>
<td>145,016</td>
<td>94,466</td>
</tr>
<tr>
<td>Belgium</td>
<td>3,836,990</td>
<td>4,940,530</td>
<td>3,365,340</td>
<td>3,197,790</td>
<td>2,782,800</td>
</tr>
<tr>
<td>Brazil</td>
<td>25,763</td>
<td>35,708</td>
<td>37,177</td>
<td>33,500</td>
<td>33,500</td>
</tr>
<tr>
<td>Canada</td>
<td>1,095,578</td>
<td>1,180,037</td>
<td>825,440</td>
<td>474,294</td>
<td>362,170</td>
</tr>
<tr>
<td>China</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Czechoslovakia</td>
<td>140,625</td>
<td>155,514</td>
<td>151,378</td>
<td>150,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Finland</td>
<td>8,470</td>
<td>6,608</td>
<td>3,444</td>
<td>12,229</td>
<td>10,000</td>
</tr>
<tr>
<td>France</td>
<td>10,072,100</td>
<td>10,363,072</td>
<td>10,071,080</td>
<td>8,300,000</td>
<td>5,518,000</td>
</tr>
<tr>
<td>Germany (exclusive of the Saar)</td>
<td>11,885,556</td>
<td>13,239,455</td>
<td>9,688,421</td>
<td>6,061,068</td>
<td>3,983,026</td>
</tr>
<tr>
<td>Saar</td>
<td>1,386,184</td>
<td>2,104,940</td>
<td>1,912,444</td>
<td>1,515,429</td>
<td>1,549,483</td>
</tr>
<tr>
<td>Great Britain</td>
<td>6,717,400</td>
<td>7,705,300</td>
<td>6,205,269</td>
<td>5,815,418</td>
<td>3,630,000</td>
</tr>
<tr>
<td>Hungary</td>
<td>285,461</td>
<td>367,861</td>
<td>207,726</td>
<td>128,630</td>
<td>110,000</td>
</tr>
<tr>
<td>India, British</td>
<td>1,072,052</td>
<td>1,417,563</td>
<td>1,198,802</td>
<td>1,089,019</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Italy</td>
<td>554,118</td>
<td>736,544</td>
<td>387,594</td>
<td>582,582</td>
<td>485,381</td>
</tr>
<tr>
<td>Japan</td>
<td>1,540,465</td>
<td>1,561,443</td>
<td>1,657,435</td>
<td>1,408,394</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>2,770,066</td>
<td>2,906,033</td>
<td>2,743,714</td>
<td>2,083,168</td>
<td>1,958,930</td>
</tr>
<tr>
<td>Mexico</td>
<td>49,422</td>
<td>60,290</td>
<td>57,526</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Netherlands</td>
<td>688,224</td>
<td>233,778</td>
<td>272,718</td>
<td>256,717</td>
<td>229,426</td>
</tr>
<tr>
<td>New Zealand</td>
<td>6,464</td>
<td>4,464</td>
<td>8,205</td>
<td>3,616</td>
<td>4,000</td>
</tr>
<tr>
<td>Norway</td>
<td>126,596</td>
<td>153,355</td>
<td>144,838</td>
<td>118,537</td>
<td>119,000</td>
</tr>
<tr>
<td>Philippines Islands</td>
<td>206</td>
<td>197</td>
<td>159</td>
<td>150</td>
<td>130</td>
</tr>
<tr>
<td>Poland</td>
<td>683,951</td>
<td>705,522</td>
<td>477,949</td>
<td>347,114</td>
<td>198,700</td>
</tr>
<tr>
<td>Rumaniia</td>
<td>70,123</td>
<td>72,346</td>
<td>68,843</td>
<td>55,894</td>
<td>56,000</td>
</tr>
<tr>
<td>Russia</td>
<td>3,261,977</td>
<td>4,015,701</td>
<td>4,902,200</td>
<td>5,067,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Spain</td>
<td>362,821</td>
<td>752,618</td>
<td>621,891</td>
<td>479,215</td>
<td>289,000</td>
</tr>
<tr>
<td>Sweden</td>
<td>437,512</td>
<td>529,829</td>
<td>496,410</td>
<td>417,206</td>
<td>400,000</td>
</tr>
<tr>
<td>Union of South Africa</td>
<td>9,817</td>
<td>10,510</td>
<td>9,736</td>
<td>8,940</td>
<td>9,000</td>
</tr>
<tr>
<td>United States</td>
<td>38,780,655</td>
<td>43,315,279</td>
<td>32,279,283</td>
<td>18,715,218</td>
<td>8,920,878</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>29,303</td>
<td>30,866</td>
<td>35,011</td>
<td>37,733</td>
<td>38,000</td>
</tr>
</tbody>
</table>

88,622,000 | 98,462,000 | 80,530,000 | 56,302,000 | 39,200,000

1 Approximate production.
2 Includes pig iron produced at Government and other steel works for conversion into steel.
3 Year ended Sept. 30.

Ferro-Alloys

Production and shipments.—The production of ferro-alloys was 230,311 gross tons in 1932 compared with 466,969 tons in 1931, a decrease of 51 percent. Ferro-alloys were made in 1932 at 9 blast furnaces, 12 electric furnaces, and 2 alumino-thermic plants; in addition, 1 plant made ferrophosphorus as a byproduct.

The shipments of ferro-alloys of all classes in 1932 were 218,646 gross tons valued at $14,003,672, a decrease of 45 percent in quantity and 54 percent in total value compared with 1931.

Ferro-alloys shipped from furnaces in the United States, 1931–32, by varieties

<table>
<thead>
<tr>
<th>Variety of alloy</th>
<th>1931 Gross tons</th>
<th>1931 Value</th>
<th>1932 Gross tons</th>
<th>1932 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferromanganese</td>
<td>159,158</td>
<td>$12,903,329</td>
<td>70,417</td>
<td>$5,061,029</td>
</tr>
<tr>
<td>Spiegeleisen</td>
<td>55,327</td>
<td>1,311,069</td>
<td>31,671</td>
<td>741,946</td>
</tr>
<tr>
<td>Ferromanganese (ferro or more silicon)</td>
<td>188,063</td>
<td>7,213,235</td>
<td>97,234</td>
<td>3,517,268</td>
</tr>
<tr>
<td>Ferrotungsten</td>
<td>870</td>
<td>1,690,288</td>
<td>295</td>
<td>625,229</td>
</tr>
<tr>
<td>Ferrovanadium</td>
<td>616</td>
<td>1,615,381</td>
<td>293</td>
<td>625,229</td>
</tr>
<tr>
<td>Other varieties 1</td>
<td>29,251</td>
<td>5,635,268</td>
<td>19,356</td>
<td>3,450,132</td>
</tr>
</tbody>
</table>

386,265 | 30,764,949 | 218,646 | 14,003,672

1 Ferrochromium, ferromolybdenum and calcium-molybdenum compounds, ferrophosphorus, ferrotitanium, ferrotungsten, siliconmanganese and siliconspiegeleisen, and siliconromont–ferrochromium.
Ferromanganese.—The shipments of ferromanganese in 1932 were 70,417 gross tons, a decrease of 56 percent from 1931. The average value per ton f.o.b. furnaces reported for ferromanganese was $71.87 in 1932 compared with $81.67 in 1931.

Ferromanganese was made at 5 furnaces by 5 producers in both 1931 and 1932.

The production of ferromanganese in 1932 was 56,350 gross tons containing 43,760 tons of manganese (metal), an average of 77.66 percent manganese. In the production of ferromanganese in 1932 there were used 90,677 gross tons of foreign manganese ore, 91 tons of foreign ferruginous manganese ore, 10,666 tons of domestic manganese ore, 1,642 tons of domestic ferruginous manganese ore, 3,537 tons of iron ore, and 1,499 tons of cinder, scale, and scrap. The quantity of manganese ore used per ton of ferromanganese made in 1932 was 1.798 tons; in 1931 it was 1.799 tons; and in 1930 it was 1.792 tons. Of the foreign manganese ore used in 1932, Russia supplied 46,596 gross tons; Brazil, 25,279 tons; India, 11,541 tons; Africa, 5,135 tons; and Cuba, 2,126 tons. The quantity of domestic manganese ore used in the manufacture of ferromanganese in 1932 represented 10.5 percent of the total manganese ore used, compared with 4.1 percent in 1931.

Ferromanganese produced in the United States and metalliferous materials consumed in its manufacture, 1932–32

<table>
<thead>
<tr>
<th>Year</th>
<th>Ferromanganese produced</th>
<th>Materials consumed (gross tons)</th>
<th>Manganese ore used per ton of ferromanganese made (gross tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Manganese contained</td>
<td>Manganese ore</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>Gross tons</td>
<td>Foreign</td>
</tr>
<tr>
<td>1928</td>
<td>319,770</td>
<td>78.62</td>
<td>251,400</td>
</tr>
<tr>
<td>1929</td>
<td>330,235</td>
<td>79.30</td>
<td>260,000</td>
</tr>
<tr>
<td>1930</td>
<td>274,830</td>
<td>78.69</td>
<td>216,000</td>
</tr>
<tr>
<td>1931</td>
<td>166,937</td>
<td>78.59</td>
<td>131,200</td>
</tr>
<tr>
<td>1932</td>
<td>36,350</td>
<td>77.66</td>
<td>43,760</td>
</tr>
</tbody>
</table>

Quantity and tenor of manganese ore used in manufacture of ferromanganese in the United States, 1931–32

<table>
<thead>
<tr>
<th>Source of ores</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross tons</td>
<td>Manganese content (percent, natural)</td>
<td>Gross tons</td>
</tr>
<tr>
<td>Africa</td>
<td>26,133</td>
<td>49.79</td>
</tr>
<tr>
<td>Brazil</td>
<td>62,630</td>
<td>43.42</td>
</tr>
<tr>
<td>Chile</td>
<td>4,363</td>
<td>46.64</td>
</tr>
<tr>
<td>Cuba</td>
<td>2,126</td>
<td>50.76</td>
</tr>
<tr>
<td>India</td>
<td>168,580</td>
<td>61.29</td>
</tr>
<tr>
<td>Russia</td>
<td>12,277</td>
<td>39.31</td>
</tr>
<tr>
<td>United States</td>
<td>300,250</td>
<td>47.79</td>
</tr>
</tbody>
</table>
Spiegeleisen.—The shipments of spiegeleisen in 1932 amounted to 31,071 gross tons (44 percent less than in 1931). The average value per ton at the furnaces was $24.01 in 1932 and $23.73 in 1931.

The production of spiegeleisen in 1932 was 37,317 tons, averaging about 20 percent manganese. Spiegeleisen was made at 4 furnaces by 3 producers in 1932.

Ferrosilicon.—The shipments of ferrosilicon were 97,224 gross tons containing 21,255 tons of silicon in 1932 compared with 153,063 tons containing 38,520 tons of silicon in 1931.

The production of ferrosilicon amounted to 116,593 gross tons in 1932, of which 65,084 tons were made by the blast-furnace process and 51,509 tons by the electric-furnace process.

Ferrotungsten.—The shipments of ferrotungsten in 1932 were 295 gross tons containing 527,356 pounds of tungsten, and the average value per pound of contained tungsten was $1 f.o.b. furnaces ($1.10 in 1931).

The production of ferrotungsten in 1932 was 246 gross tons averaging 79.88 percent tungsten. The ferrotungsten produced in 1932 was made chiefly from ores from China and Nevada.

Ferrovanadium.—The shipments of ferrovanadium in 1932 were 283 gross tons containing 235,118 pounds of vanadium and were valued at the furnaces at an average of $2.99 per pound of contained vanadium compared with $3.13 in 1931.

The production of ferrovanadium in 1932 was 109 gross tons averaging 36.73 percent vanadium. It was reduced chiefly from vanadium oxide made from roscoelite-carnotite ores mined in Colorado and Utah.

Other ferro-alloys.—Although substantially less than in 1931 the shipments of silicomanganese, silicospiegel, ferrophosphorus, ferrochromium, and ferromolybdenum in 1932 did not decline as much as the shipments of ferromanganese, spiegeleisen, ferrotungsten, and ferrovanadium. The shipments of silicomanganese and silicospiegel decreased 39 percent from 1931; ferrophosphorus 36 percent; ferrochromium 33 percent; and ferromolybdenum and calcium-molybdenum compounds 43 percent. The shipments of ferrotitanium in 1932, however, increased 5 percent over those in 1931.

Foreign trade in ferro-alloys.—Imports of all alloys of the rarer metals are not recorded separately but are grouped as shown in the next table. Ferromanganese and spiegeleisen constituted the bulk of the imports in 1932.

The imports for consumption of ferromanganese in 1932 (chiefly from Canada and Norway) were 18,470 gross tons, a decrease of 25 percent from 1931. The imports from Norway in 1932 increased about 67 percent and those from the United Kingdom decreased about 73 percent compared with 1931.

The imports for consumption of spiegeleisen in 1932 (chiefly from Canada and the United Kingdom) were 8,364 gross tons, a decrease of 12 percent from 1931.
## MINERALS YEARBOOK

### Ferro-alloys and ferro-alloy metals imported for consumption in the United States, 1931–32, by varieties

<table>
<thead>
<tr>
<th>Variety of alloy</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross weight (gross tons)</td>
<td>Content (gross tons)</td>
</tr>
<tr>
<td>Ferromanganese:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Containing over 1 percent carbon</td>
<td>24,234</td>
<td>19,488</td>
</tr>
<tr>
<td>Containing not over 1 percent carbon</td>
<td>430</td>
<td>348</td>
</tr>
<tr>
<td>Manganese boron, manganese metal, and spiegeleisen, n.e.s.</td>
<td>(1)</td>
<td>431</td>
</tr>
<tr>
<td>Spiegeleisen</td>
<td>9,482</td>
<td>247,788</td>
</tr>
<tr>
<td>Ferrochrome or ferrochromium containing less than 3 percent carbon</td>
<td>135</td>
<td>91</td>
</tr>
<tr>
<td>Ferrophosphorus</td>
<td>1,589</td>
<td>134,775</td>
</tr>
<tr>
<td>Ferrosilicon:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Containing 8 percent and less than 60 percent silicon</td>
<td>3,758</td>
<td>924</td>
</tr>
<tr>
<td>Containing 60 percent and less than 80 percent silicon</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Chromium and zirconium silicicon and calcium silicide</td>
<td>40</td>
<td>(1)</td>
</tr>
<tr>
<td>Silicon aluminum, aluminum silicon</td>
<td>13</td>
<td>(1)</td>
</tr>
<tr>
<td>Ferrosilicon aluminum and ferroaluminum silicicon and aluminum</td>
<td>16</td>
<td>(1)</td>
</tr>
<tr>
<td>Ferromolybdenum, molybdenum metal and powder, calcium molybdate, and other compounds and alloys of molybdenum</td>
<td>(1)</td>
<td>94</td>
</tr>
<tr>
<td>Ferrotitanium</td>
<td>1</td>
<td>(1)</td>
</tr>
<tr>
<td>Tungsten and combinations, in lump, grains, or powder:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tungsten metal</td>
<td>(1)</td>
<td>9</td>
</tr>
<tr>
<td>Combinations containing tungsten or tungsten carbide</td>
<td>(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>Tungstic acid and other compounds of tungsten, n.s.p.f.</td>
<td>(1)</td>
<td>1</td>
</tr>
<tr>
<td>Ferrozirconium and zirconium-ferrosilicon</td>
<td>(1)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

1 Not recorded.  
2 131 pounds.  
3 44 pounds.  
4 3 pounds of tungsten.

### Ferromanganese and ferrosilicon imported into the United States, 1931–32, by countries

[General imports]

<table>
<thead>
<tr>
<th>Country</th>
<th>1931 (Gross tons)</th>
<th>Value</th>
<th>1932 (Gross tons)</th>
<th>Value</th>
<th>1931 (Gross tons)</th>
<th>Value</th>
<th>1932 (Gross tons)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferromanganese (manganese content)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferrosilicon (silicon content)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>8,321</td>
<td>$865,891</td>
<td>6,747</td>
<td>$603,934</td>
<td>442</td>
<td>$71,924</td>
<td>54</td>
<td>$9,969</td>
</tr>
<tr>
<td>France</td>
<td>180</td>
<td>21,970</td>
<td>500</td>
<td>26,689</td>
<td>9</td>
<td>1,867</td>
<td>3</td>
<td>1,105</td>
</tr>
<tr>
<td>Germany</td>
<td>410</td>
<td>20,611</td>
<td>675</td>
<td>23,948</td>
<td>30</td>
<td>4,588</td>
<td>46</td>
<td>6,317</td>
</tr>
<tr>
<td>Italy</td>
<td>590</td>
<td>82,312</td>
<td>327</td>
<td>15,851</td>
<td>30</td>
<td>4,588</td>
<td>46</td>
<td>6,317</td>
</tr>
<tr>
<td>Japan</td>
<td>13</td>
<td>13</td>
<td>500</td>
<td>26,689</td>
<td>9</td>
<td>1,867</td>
<td>3</td>
<td>1,105</td>
</tr>
<tr>
<td>Norway</td>
<td>2,712</td>
<td>285,963</td>
<td>4,542</td>
<td>235,746</td>
<td>244</td>
<td>26,800</td>
<td>65</td>
<td>9,366</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5,185</td>
<td>515,842</td>
<td>1,452</td>
<td>72,618</td>
<td>1,011,218</td>
<td>14,566</td>
<td>1,011,218</td>
<td>14,566</td>
</tr>
<tr>
<td>Yugoslavia and Albania</td>
<td>436</td>
<td>14,860</td>
<td>393</td>
<td>14,452</td>
<td>738</td>
<td>1,066,058</td>
<td>14,566</td>
<td>1,011,218</td>
</tr>
</tbody>
</table>

1 Includes small quantities of other manganese alloys.  
2 Includes small quantities of chromium and zirconium-silicon and calcium silicide.
The exports of ferro-alloys are relatively unimportant. Ferromanganese and spiegelieisen usually constitute the greater part of the total exports, but in 1932 only 33 gross tons (probably ferromanganese) were exported compared with 1,306 tons in 1931. Tungsten and ferrotungsten, the exports of which increased from 13 gross tons in 1930 to 472 tons in 1931, amounted to 63 tons in 1932.

**Ferro-alloys and ferro-alloy metals exported from the United States, 1930–32, by varieties**

<table>
<thead>
<tr>
<th>Variety of alloy</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross</td>
<td>Value</td>
<td>Gross</td>
</tr>
<tr>
<td></td>
<td>tons</td>
<td></td>
<td>tons</td>
</tr>
<tr>
<td>Ferromanganese</td>
<td>6,189</td>
<td>$145,629</td>
<td>1,306</td>
</tr>
<tr>
<td>Spiegelieisen</td>
<td>13</td>
<td>221,934</td>
<td>472</td>
</tr>
<tr>
<td>Tungsten and ferrotungsten (including tungsten wire)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Not separately classified.

**STEEL**

*Production.*—The following tables covering the production of steel were compiled by the American Iron and Steel Institute. No data whatever are available on the value of the output of crude steel at the mills, but the weekly issues and annual statistical reviews of Iron Age give market quotations of prices of steel billets and some of the leading forms of finished steel. The price of both open-hearth and Bessemer steel billets at Pittsburgh in 1932 ranged from $26 to $27.75 a gross ton; in 1931 it ranged from $28.80 to $30 a ton. Tank plates at Pittsburgh ranged from 1.5 to 1.6 cents a pound in 1932 and from 1.54 to 1.65 cents a pound in 1931. Structural shapes at Pittsburgh ranged from 1.5 to 1.6 cents a pound in 1932 and from 1.5 to 1.65 cents a pound in 1931. Hot-rolled annealed sheets, no. 24 gage, at Pittsburgh ranged from 2.1 to 2.22 cents a pound in 1932 and from 2.15 to 2.4 cents a pound in 1931.

The production of steel in 1932 was 13,681,162 gross tons, of which 11,907,330 tons were open-hearth, 1,532,076 tons Bessemer, 645 tons crucible, and 241,111 tons electric steel. In 1931 the production was 25,945,501 tons, of which 22,509,566 tons were open-hearth, 3,023,446 tons Bessemer, 1,547 tons crucible, and 410,942 tons electric steel.

**Bessemer steel ingots and castings manufactured in the United States, 1928–32 by States, in gross tons**

<table>
<thead>
<tr>
<th>State</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>2,577,728</td>
<td>2,724,564</td>
<td>1,992,021</td>
<td>1,393,875</td>
<td>939,228</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2,263,085</td>
<td>2,427,490</td>
<td>1,732,545</td>
<td>786,767</td>
<td>233,215</td>
</tr>
<tr>
<td>Illinois</td>
<td>978,511</td>
<td>1,073,790</td>
<td>715,104</td>
<td>420,569</td>
<td>290,963</td>
</tr>
<tr>
<td>Other States</td>
<td>770,671</td>
<td>896,365</td>
<td>665,789</td>
<td>422,255</td>
<td>185,650</td>
</tr>
<tr>
<td></td>
<td>6,530,195</td>
<td>7,122,509</td>
<td>5,035,459</td>
<td>3,023,446</td>
<td>1,532,076</td>
</tr>
</tbody>
</table>
According to these tables there was a decrease of 49 percent in the production of Bessemer steel and of 47 percent in that of open-hearth steel in 1932 compared with 1931; the total production of steel decreased 47 percent also. Of the total output in 1932, 87.03 percent was open-hearth, 11.2 percent Bessemer, and 1.77 percent other classes of steel.

Of the total output of open-hearth steel 11,742,682 gross tons were made by the basic process and 164,648 tons by the acid process compared with 22,130,398 tons of basic steel and 379,168 tons of acid steel in 1931.

The production of steel by the electric process decreased 41 percent compared with 1931.

Figures for the total production of electric steel in 1932 include 140,877 tons of alloy-steel ingots and castings that were alloyed with nickel, vanadium, tungsten, chromium, molybdenum, and other metals (116,765 tons of ingots and 24,112 tons of castings) compared with 232,113 tons (186,027 tons of ingots and 46,086 tons of castings) so alloyed in 1931.

The number of completed plants equipped for the manufacture of steel by the electric process was 247 on December 31, 1932 compared with 250 at the end of 1931.

*Foreign trade in steel.*—The imports of steel, though substantially smaller than in 1931, declined relatively less than exports. The imports of some steel products (rails, sheets, tin and terne plates, nails, and wire rods) in 1932 were larger than in 1931. The imports of steel ingots declined from 20,023 tons in 1931 to 2,396 tons in 1932.
## Iron and steel imported into the United States, 1930-32

<table>
<thead>
<tr>
<th>Article</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Value</td>
<td>Gross tons</td>
<td>Value</td>
</tr>
<tr>
<td>Bar iron</td>
<td>1,376</td>
<td>$101,624</td>
<td>854</td>
<td>$45,323</td>
</tr>
<tr>
<td>Boiler and other plate of iron and steel</td>
<td>1,392</td>
<td>59,537</td>
<td>755</td>
<td>33,249</td>
</tr>
<tr>
<td>Castings and forgings</td>
<td>1,528</td>
<td>244,905</td>
<td>1,771</td>
<td>259,472</td>
</tr>
<tr>
<td>Steel ingots, blooms, slabs, and sheet bars</td>
<td>11,874</td>
<td>319,294</td>
<td>6,641</td>
<td>183,010</td>
</tr>
<tr>
<td>Other pipes and tubes</td>
<td>21,453</td>
<td>3,351,012</td>
<td>15,791</td>
<td>1,721,624</td>
</tr>
<tr>
<td>Hoop, or band iron or steel, cut to length</td>
<td>5,267</td>
<td>189,555</td>
<td>8,630</td>
<td>251,181</td>
</tr>
<tr>
<td>Iron and steel scrap</td>
<td>9,779</td>
<td>396,492</td>
<td>10,371</td>
<td>657,811</td>
</tr>
<tr>
<td>Nails</td>
<td>27,482</td>
<td>365,161</td>
<td>16,279</td>
<td>117,954</td>
</tr>
<tr>
<td>Rails for railways</td>
<td>6,014</td>
<td>545,454</td>
<td>5,105</td>
<td>653,022</td>
</tr>
<tr>
<td>Sheets of iron or steel, skelp, saw plates, and</td>
<td>8,307</td>
<td>240,331</td>
<td>5,007</td>
<td>96,607</td>
</tr>
<tr>
<td>steel, n.e.s.</td>
<td>26,594</td>
<td>1,247,891</td>
<td>16,152</td>
<td>600,637</td>
</tr>
<tr>
<td>Steel bars</td>
<td>148,265</td>
<td>2,302,594</td>
<td>39,832</td>
<td>815,766</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>22,313</td>
<td>749,010</td>
<td>22,383</td>
<td>518,568</td>
</tr>
<tr>
<td>Structural iron and steel</td>
<td>301</td>
<td>67,102</td>
<td>196</td>
<td>42,704</td>
</tr>
<tr>
<td>Wire and articles made from wire</td>
<td>2,800</td>
<td>2,861,009</td>
<td>1,720,673</td>
<td>2,145</td>
</tr>
<tr>
<td>Wire rods</td>
<td>8,843</td>
<td>585,191</td>
<td>7,114</td>
<td>472,240</td>
</tr>
<tr>
<td>Other advanced manufactures</td>
<td>2,216,581</td>
<td>569,908</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The export trade in steel slumped greatly in 1932, and except for a few items all products were affected more or less. Some of the larger decreases in tonnage were recorded for steel bars, wire rods, both galvanized and black sheets, tin and terne plates, unfabricated plates, structural shapes, and rails.

## Iron and steel exported from the United States, 1931-32

<table>
<thead>
<tr>
<th>Article</th>
<th>1931</th>
<th>1932</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Value</td>
<td>Gross tons</td>
</tr>
<tr>
<td>Semimanufactures:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel ingots, blooms, billets, slabs, and sheet</td>
<td>7,965</td>
<td>$331,707</td>
<td>1,627</td>
</tr>
<tr>
<td>bars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron and steel bars and rods:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron bars</td>
<td>1,017</td>
<td>95,254</td>
<td>617</td>
</tr>
<tr>
<td>Steel bars</td>
<td>42,513</td>
<td>2,328,632</td>
<td>15,548</td>
</tr>
<tr>
<td>Alloy steel bars</td>
<td>2,998</td>
<td>445,506</td>
<td>1,622</td>
</tr>
<tr>
<td>Wire rods</td>
<td>32,125</td>
<td>1,267,110</td>
<td>14,818</td>
</tr>
<tr>
<td>Iron and steel plates, sheets, skelp, and strips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler plates</td>
<td>500</td>
<td>32,468</td>
<td>818</td>
</tr>
<tr>
<td>Other plates, not fabricated</td>
<td>41,973</td>
<td>1,878,301</td>
<td>9,477</td>
</tr>
<tr>
<td>Steel ingots, blooms, slabs, and sheet bars</td>
<td>56,498</td>
<td>2,939,260</td>
<td>20,466</td>
</tr>
<tr>
<td>Iron or steel sheets, galvanized</td>
<td>51,533</td>
<td>4,294,442</td>
<td>26,924</td>
</tr>
<tr>
<td>Steel sheets, black</td>
<td>91,786</td>
<td>6,917,787</td>
<td>35,277</td>
</tr>
<tr>
<td>Iron sheets, black</td>
<td>5,233</td>
<td>444,569</td>
<td>2,461</td>
</tr>
<tr>
<td>Strip steel, cold rolled</td>
<td>8,897</td>
<td>739,545</td>
<td>5,558</td>
</tr>
<tr>
<td>Hoop, band, and coil iron or steel</td>
<td>19,333</td>
<td>1,084,950</td>
<td>12,219</td>
</tr>
<tr>
<td>Tin plate, terne plate, and tagsger tin</td>
<td>84,453</td>
<td>7,541,189</td>
<td>30,668</td>
</tr>
<tr>
<td>Manufactures—steel mill products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural iron and steel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural shapes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not fabricated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufactured</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship and tank plates, punched or shaped</td>
<td>1,525</td>
<td>84,269</td>
<td>1,072</td>
</tr>
<tr>
<td>Metal Iath</td>
<td>2,408</td>
<td>350,064</td>
<td>1,371</td>
</tr>
<tr>
<td>Other structural shapes</td>
<td>5,745</td>
<td>358,140</td>
<td>7,365</td>
</tr>
<tr>
<td>Railway track material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rails for railways</td>
<td>33,108</td>
<td>1,288,811</td>
<td>11,320</td>
</tr>
<tr>
<td>Rail joints, splice bars, fishplates, and tie-</td>
<td>4,397</td>
<td>377,723</td>
<td>1,969</td>
</tr>
<tr>
<td>plates</td>
<td>1,285</td>
<td>269,557</td>
<td>745</td>
</tr>
<tr>
<td>Railroad spikes</td>
<td>1,183</td>
<td>742,341</td>
<td>663</td>
</tr>
<tr>
<td>Railroad bolts, nuts, washers, and nut locks</td>
<td>769</td>
<td>154,634</td>
<td>336</td>
</tr>
</tbody>
</table>
### Iron and steel exported from the United States, 1931–32—Continued

<table>
<thead>
<tr>
<th>Article</th>
<th>1931</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross tons</td>
<td>Value</td>
</tr>
<tr>
<td><strong>Manufactures—steel-mill products—Continued</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tubular products:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler tubes</td>
<td>7,070</td>
<td>$885,816</td>
</tr>
<tr>
<td>Casing and oil-line pipe</td>
<td>21,973</td>
<td>2,468,788</td>
</tr>
<tr>
<td>Welded black pipe</td>
<td>34,309</td>
<td>2,800,851</td>
</tr>
<tr>
<td>Welded galvanized pipe</td>
<td>26,129</td>
<td>2,371,674</td>
</tr>
<tr>
<td>Malleable-iron screwed pipe fittings</td>
<td>4,510</td>
<td>1,400,764</td>
</tr>
<tr>
<td>Cast-iron screwed pipe fittings</td>
<td>2,142</td>
<td>526,544</td>
</tr>
<tr>
<td>Cast-iron pressure pipe and fittings</td>
<td>12,966</td>
<td>633,795</td>
</tr>
<tr>
<td>Cast-iron soil pipe and fittings</td>
<td>6,049</td>
<td>480,678</td>
</tr>
<tr>
<td><strong>Wire and manufactures:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barred</td>
<td>21,459</td>
<td>1,049,145</td>
</tr>
<tr>
<td>All other</td>
<td>25,114</td>
<td>3,944,517</td>
</tr>
<tr>
<td><strong>Nails and bolts (except railroad):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut nails</td>
<td>137</td>
<td>16,186</td>
</tr>
<tr>
<td>Horseshoe nails</td>
<td>619</td>
<td>147,331</td>
</tr>
<tr>
<td>Wire nails</td>
<td>8,838</td>
<td>484,800</td>
</tr>
<tr>
<td>All other nails, including tacks and staples</td>
<td>3,059</td>
<td>444,559</td>
</tr>
<tr>
<td>Bolts, nuts, rivets, and washers (except railroad)</td>
<td>4,855</td>
<td>1,048,532</td>
</tr>
<tr>
<td><strong>Casting and forgings:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horseshoes</td>
<td>153</td>
<td>21,128</td>
</tr>
<tr>
<td>Iron and steel, including car wheels and axles</td>
<td>21,141</td>
<td>2,858,663</td>
</tr>
<tr>
<td><strong>Advanced manufactures:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House-heating boilers and radiators</td>
<td>455</td>
<td>201</td>
</tr>
<tr>
<td>Tools:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axes</td>
<td>293</td>
<td>277</td>
</tr>
<tr>
<td>Hammers and hatchets</td>
<td>100</td>
<td>118</td>
</tr>
<tr>
<td>Saws, wood and metal cutting</td>
<td>1,141</td>
<td>896</td>
</tr>
<tr>
<td>Shovels and spades</td>
<td>113</td>
<td>372</td>
</tr>
<tr>
<td>All other tools</td>
<td>6,456</td>
<td>128</td>
</tr>
</tbody>
</table>