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STEEL

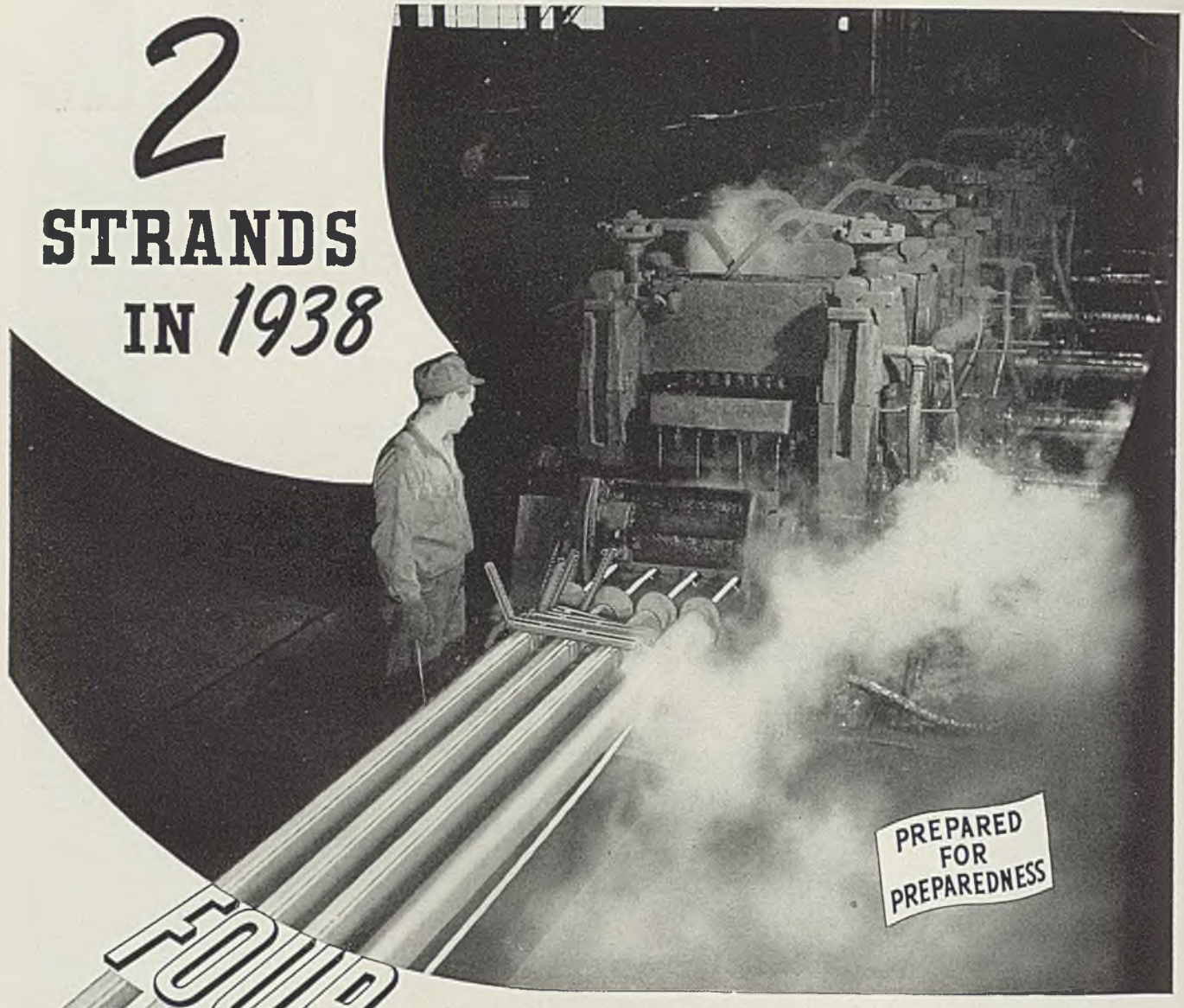
ESTABLISHED 1882

Contents

Volume 108—No. 10 March 10, 1941

PRODUCTION • PROCESSING • DISTRIBUTION • USE

2 STRANDS IN *1938*



FOUR STRANDS IN 1941

This roughing train and flying shear operated as a *two* strand mill for approximately two years. In 1940 a second finishing train was installed, and the entire mill resumed operation *with four strands.*

This was possible because the reheating furnace, roughing train, flying shear, intermediate and looping stands had been built for four-strand operation. There were problems, of course—this four-strand flying shear was the first ever installed in America. But the problems were solved *in the plans.*

Looking ahead is a Morgan habit. That's why Morgan Mills are Prepared for Preparedness.

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R-85

HIGHLIGHTING THIS ISSUE OF STEEL

■ PRESIDENT ROOSEVELT's conclusion of Feb. 28 that there will be no priorities in steel for the present last week brought about a discontinuance in the naming of preference ratings for steel. It develops **(p. 109)** that the previous issuance of preference ratings on steel was a mistake, for preference ratings are issued only on items on the critical list—and steel at no time has been considered a critical material. Last Friday the President mentioned possible shortages of certain "special" steels. Later that day **(p. 22)** nickel became subject to mandatory priorities. Volunteer co-operation will continue the rule in the steel industry so that steel will be delivered when and as needed.

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Strikes Scrutinized

Increase in the number of defense plants closed by strikes brought demands in high places for action. President Roosevelt intimated that a defense labor board with broad powers will be named soon. This, he said, is no time for jurisdictional strikes. At the very time of his statement **(p. 21)** SWOC officials at Pittsburgh were considering a drive for higher wages for steelworkers. . . . The Boy Scouts may collect discarded aluminum utensils **(p. 35)** from house to house. The President says a tin can collection campaign **(p. 22)** is a possibility. . . . A feature of Gano Dunn's report **(p. 49)** is its reference to "hoarding" of steel stocks, a practice recently referred to at Washington as unpatriotic.

• • •

Differentials On Steel Scrap

Do not give your customer of yesterday silent treatment because you cannot take his order today, advises Fred C. Dull. He warns **(p. 25)** that tomorrow is coming and you will need him then. . . . Suggested price differentials on iron and steel scrap **(p. 39)** have been issued by the price stabilization division of the National Defense Advisory Commission. . . . Charles J. Koebel has written a booklet **(p. 38)** on how to reduce the amount of damage when it becomes necessary to entrust tools to inexperienced men. . . . STEEL sets forth complete instructions **(p. 40)** on how to go about obtaining preference ratings on defense work. . . . Prices paid by the steel industry on mechanical equipment **(p. 46)** have climbed 15 per cent.

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New Series on Cold Riveting

This issue **(p. 56)** presents the first of a series of three articles by Raymond S. Osborne on cold riveting, a method that has gained increasing application. Mr. Osborne will explain why many who have tried cold riveting have failed to get best results. . . . Effects of silicon and phosphorus on galvanized zinc coatings **(p. 94)** are potent. . . . For the benefit of the designer STEEL **(p. 89)** publishes a selection chart listing the properties of the various die-casting alloys. . . . Fred B. Jacobs **(p. 83)** describes the materials handling system in Lincoln Electric Co.'s plant. . . . Newly available are an automatic unit **(p. 97)** for painting shells and a rivet **(p. 103)** for blind attachment.

• • •

Ingot Defects Photographed

One of the recent ingenious wrinkles in the steel industry **(p. 75)** is the Alan Wood Steel Co.'s method of recording ingot surface defects photographically, thus simplifying the task of grading them; equipment is simple and inexpensive. . . . In this week's article in his series on production of high-explosive shell, Prof. Arthur F. Macconochie **(p. 58)** discusses the low-cost, single-purpose lathe designed by the National Machine Tool Builders' association for automatic machining of shells. . . . Corrosion sharply reduces the endurance limit of aluminum; A. G. Cordy **(p. 66)** tells what Curtiss-Wright did about this problem. . . . By installing capacitors National Acme Co **(p. 89)** has cut its power costs.

FOR almost a century—through wars, panics, depressions and other crises. Industry has come to Ryerson for steel. Ryerson stocks have been ample, deliveries prompt. Today you can be sure of the same dependable service and in addition, under the Ryerson Certified Steel Plan you are assured high uniform quality. With Ryerson selected Certified Alloy Steels you get complete data (chemical, physical and heat treatment properties) on every bar shipped. 10 large Ryerson plants, carrying more than 10,000 sizes, kinds and shapes of steel stand ready to meet both your regular and emergency requirements. If you do not have the current Ryerson Stock List, we shall be glad to send a copy.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: CHICAGO, MILWAUKEE, ST. LOUIS, CINCINNATI, DETROIT. CLEVELAND, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY

President Hints Defense Labor Board;

SWOC Discusses Demands

More than a mediation agency suggested at White House conference, as labor leaders meet in Pittsburgh . . . Chief Executive hits jurisdictional disputes affecting aramament production . . . CIO petitions for collective bargaining election at Bethlehem . . . Shortage of skilled workmen becoming more critical

■ WHILE President Roosevelt was considering the establishment of a defense labor board last week, 150 regional, subregional directors and other officials of the Steel Workers Organizing Committee in Pittsburgh were considering a drive for higher steel wages.

The President's suggestion for a top labor board to deal with defense problems was offered at his Friday press conference. While details were not given, it was indicated the board would be more than a mediation agency and that it would have wider powers than the Taft-Walsh labor board of the World war period. It would consider long range labor problems such as plant locations and labor migration.

Mr. Roosevelt declared it would be desirable, if possible, to do away with jurisdictional strikes, saying he did not think the country as a whole can approve of a strike like the one at Wright Field.

The President defended his earlier statement that defense strikes have not held up more than one quarter of one per cent of defense production at any one time. A reporter asked whether this was the proper basis for measuring defense interruptions, pointing out that the Allis-Chalmers Mfg. Co. strike delayed the whole powder program. The President replied that individual strikes might be serious but that no generalizations about the entire defense program could be based on single instances.

The President denied that Philip Murray, SWOC chairman, had mentioned the possibility of an industry-wide strike in steel when the union official lunched at the White House, nor had he opposed creation of the proposed top labor board.

At the Pittsburgh meeting, Mr. Murray was believed to have reported the United States Steel Corp.'s reply to SWOC demands for a wage increase, changes in the grievance machinery set up in SWOC's contract, extension of vacation plans and a "union" shop. Most observers believed demands to be made on other steel companies will depend to large extent on the agreement reached between U. S. Steel and the union.

SWOC last week filed a petition with the Buffalo office of the National Labor Relations Board for a collective bargaining election at Bethlehem Steel Co.'s Lackawanna plant. This is one of the steps prescribed in the settlement of the recent strike. The company already has reinstated about 600 suspended employes.

Knudsen Asks "Cool-Off" Period

Legislative restrictions on strikes in defense industries were advocated by William S. Knudsen, director general, Office of Production Management, in a report to the house judiciary committee. Only three weeks ago Mr. Knudsen testified before the same committee that he did not believe legislation to curb defense strikes would be necessary. Since that time, however, a wave of stoppages in defense industries —including the brief shutdown at Bethlehem Steel Co.'s Lackawanna, N. Y., plant—have threatened to seriously disrupt defense production. The increase in strikes is believed to have caused Mr. Knudsen to reverse his stand on the question.

The OPM director's suggestions for a law to curb strikes are similar to those proposed by Col. William Frew Long, general manager, Associated Industries of Cleveland, in STEEL, Jan. 27, page 13. Colonel Long's plan was mailed to all congressmen in reprints from STEEL.

Mr. Knudsen proposed: 1. That notice of intent to strike shall be given only after 60 per cent of all employes have voted by secret ballot for such action; 2. ten days be allowed OPM to study the issue and give a report; 3. strike must be deferred 30 days after the report is given; 4. failure to comply will make strikes unauthorized and will forfeit the manufacturer's and the union's rights before the National Labor Relations Board.

Re-creation of the World war strike-prevention machinery was advocated last week by Undersecretary of War Robert P. Patterson before the house judiciary committee. The World war labor board established by President Wilson comprised 12 members, with five representing labor, five representing industry and two public representatives.

Mr. Patterson, in support of his recommendations, cited 22 strikes in defense plants during the preceding week. These had caused a

loss of 120,000 man-hours on armament production.

Skilled Labor Shortage To Become Increasingly Critical

Obtaining an adequate supply of skilled labor for defense industries promises to become an increasingly serious problem during coming months, surveys made last week indicated. During the past year there has been an increase of nearly 800,000 in number of workers employed in manufacturing industries.

Data collected by the labor division of the National Defense Advisory Commission indicate the aircraft industry alone will need more than 200,000 additional workers during the next few months. Shipbuilding will require more than another 250,000 by the later part of 1942.

A survey by the Ohio State Bureau of Unemployment Compensation indicated a critical shortage of skilled labor in that state. In 134 selected occupations fewer than ten workmen each were registered with the bureau.

Supreme Court Limits Powers Of National Labor Board

National Labor Relations Board must confine its orders to unfair labor practices actually found to exist, the United States Supreme Court ruled last week in a case involving the Express Publishing Co., San Antonio, Tex. Court held the board was in error in handing down a blanket order directing the company to comply with all provisions of the labor law when in fact only collective bargaining was in controversy.

Priorities Control Placed on Nickel, Magnesium

■ NICKEL and magnesium last week were placed under formal priorities control by the priorities division, Office of Production Management. Both metals will be subject to the same controls imposed Feb. 24 on producers of aluminum and machine tools.

E. R. Stettinius Jr., director of priorities, said all defense contracts not already bearing a higher rating will be assigned a preference rating of A-2 in order to insure delivery of materials on the required dates.

As in the case of aluminum, it is understood the priorities division will make a monthly check of all magnesium and nickel orders.

A few hours before nickel priorities were imposed, President Roosevelt reported he had been informed the supply of nickel was insufficient for all Army, Navy and civilian needs, but said he did not believe it would be necessary to cut off all civilian supplies.

Referring to Gano Dunn's report on steelmaking capacity, the President said the fact the report showed a surplus in supply of steel available did not obviate possible shortages in special types of steel.

Mr. Roosevelt also said the government has plans for a tin can collection campaign if this should become necessary. Such a campaign has not yet become necessary, he said.

By setting aside monthly quantities of zinc to be used for defense work, zinc producers hope to avoid formal priorities. An arrangement was worked out last week by the priorities division and producers to create a pool which will be distributed by the Office of Production Management to ease shortages whenever necessary.

Plan will become effective in April when 5 per cent of slab zinc production will go into the pool. The arrangement will be temporary and OPM officials said that although production will increase later this year "the present situation cannot be entirely met by a rearrangement of shipping schedules."

■ Block of 203,127 common shares of United States Steel Corp., New York, offered after the close of the stock market March 4, was reported oversubscribed 50 per cent in about 30 minutes.

130 Consumers' Earnings Up 51 Per Cent

■ AGGREGATE net income earned in 1940 by 130 iron and steel consumers was $190,075,954. This was an increase of more than 51 per cent over $125,722,349, combined net income of the same companies in 1939. Four companies reported a loss last year; in 1939, net deficits were incurred by 12 companies. Previous tabulations in STEEL, Feb. 17, p. 26, and Feb. 24, p. 28, included 81 consumers; the following lists 49. All figures are net earnings except where asterisk denotes loss:

	Fourth Quarter 1940	Fourth Quarter 1939	1940	1939
American Stamping Co., Cleveland	$ . . .	$ . . .	$68,011	$80,876
Bower Roller Bearing Co., Detroit	291,553	341,890	1,118,122	969,421
Briggs & Stratton Corp., Milwaukee	207,540	227,399	1,041,134	943,800
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	196,744	293,975	589,220	321,379
Checker Cab Mfg. Corp., Kalamazoo, Mich.	134,525	*143,999	650,713	*375,684
Clark Equipment Co., Buchanan, Mich.	403,925§	478,432§	1,536,933	1,182,067
Clearing Machine Corp., Chicago	. . .	. . .	1,038,454	275,067
Cleveland Graphite Bronze Co., Cleveland	307,800§	636,920§	1,322,258	1,745,123
Cutler-Hammer Inc., Milwaukee	355,666§	404,220§	1,280,894	814,700
Douglas Aircraft Co. Inc., Santa Monica, Calif.	3,543,636§	502,038§	10,831,971	2,884,197
Eagle Lock Co., Terryville, Conn.	. . . . .	. . . . .	*21,593	45,254
Easy Washing Machine Corp., Syracuse, N. Y.	. . .	. . .	25,302	25,089
Eaton Mfg. Co., Cleveland	1,479,807§	1,070,310§	2,994,657	2,707,340
Electric Auto-Lite Co., Toledo, O.	2,053,039§	1,803,105§	6,001,718	5,653,839
Electromaster Inc., Detroit	*12,876	*44,232	8,041	*117,985
Ex-Cell-O Corp., Detroit	594,828	341,868	1,982,555	872,382
Fairbanks, Morse & Co., Chicago	. . . . .	. . . . .	2,749,699	2,469,884
Ferro Enamel Corp., Cleveland	. . . . .	. . . . .	440,443	457,495
Gabriel Co., Cleveland	. . . . .	. . . . .	*105,704	*27,732
General Steel Castings Corp., Eddystone, Pa.	603,833§	341,167§	1,106,196	5,661
Greenfield Tap & Die Corp., Greenfield, Mass.	. . . . .	. . . . .	412,925	202,390
Harnischfeger Corp., Milwaukee	. . . . .	. . . . .	561,111	172,934
Hayes Mfg. Corp., Grand Rapids, Mich.	*39,220	*87,153	*361,982	*362,099
Hoskins Mfg. Co., Detroit	167,447§	167,804	558,302	483,259
Kingston Products Corp., Kokomo, Ind.	. . . . .	. . . . .	7,747	161,373
Landis Machine Co., Waynesboro, Pa.	. . . . .	. . . . .	1,002	56,153
LeTourneau, R. G., Inc., Peoria, Ill.	399,236	282,238	1,858,228	1,816,471
McKay Machine Co., Youngstown, O.	. . . . .	. . . . .	81,468	90,427
Mack Trucks Inc., Long Island City, N. Y.	637,969§	436,796§	1,805,821	682,987
Micromatic Hone Co. Inc., Detroit	. . . . .	. . . . .	180,020	103,014
Minneapolis Honeywell Regulator Co., Minneapolis	960,240§	1,023,960§	2,528,602	2,158,582
National Acme Co., Cleveland	108,763	390,873	2,199,148	578,994
National Supply Co., Pittsburgh	640,648§	1,390,233§	1,630,297	1,190,787
New York Air Brake Co., New York	172,179§	374,238	1,046,656	747,858
Nicholson File Co., Providence, R. I.	. . . . .	. . . . .	1,160,915	1,134,864
Remington Arms Co. Inc., Bridgeport, Conn.	. . . . .	. . . . .	1,945,563	1,392,646
Reynolds Spring Co., Jackson, Mich.	249,272	281,111	759,253§	265,905
Savage Arms Corp., New York	450,537§	119,929§	1,028,401	349,307
Square D Co., Detroit	760,201§	472,282§	2,023,203	1,038,491
Sundstrand Machine Tool Co., Rockford, Ill.	. . . . .	. . . . .	953,763	303,858
Thatcher Mfg. Co., Elmira, N. Y.	107,296	130,937	502,172	787,867
Twin Coach Co., Kent, O.	178,202§	223,479§	558,554	660,818
United Aircraft Products Inc., Dayton, O.	. . . . .	. . . . .	381,089	104,712
United Stove Co., Ypsilanti, Mich.	. . . . .	. . . . .	188,492	251,346
Valley Mould & Iron Corp., Hubbard, O.	. . . . .	. . . . .	761,660	846,760
Walworth Co., New York	617,486§	247,222§	1,123,156	205,900
Willys-Overland Motors Inc., Toledo, O.	*47,991	36,291	*957,397§	*1,419,263§
Youngstown Steel Car Corp., Niles, O.	. . . . .	. . . . .	75,891	68,791
Youngstown Steel Door Co., Cleveland	. . . . .	. . . . .	1,398,629	801,741

*Less; §indicated; †period ends Nov. 30.

Highlights from Bethlehem's Reports

	1940	1939
Wages and salaries	$212,232,884	$158,489,941
Taxes	41,345,349	21,191,492
Earnings	48,677,524	24,638,384
Per common share	14.04	5.75
Bookings	1,519,300,000	538,368,398
Billings	602,202,618	414,141,087
Unfilled orders (at year-end)	1,204,100,000	287,002,024
Surplus (at year-end)	96,252,049	78,141,087
Property account (at year-end)	459,278,980	462,877,996
Working capital (at year-end)	195,702,104	187,299,745
Cash (at year-end)	84,037,279	75,554,356
Inventories (at year-end)	135,065,177	116,498,566
Average number of workers	118,439	95,029
*Ingot capacity (at year-end)	11,850,000	11,468,800
*Ingot output	10,704,741	7,958,636
*Pig iron and ferromanganese output	7,104,522	5,348,629
*Finished steel output	7,703,917	5,661,776
*Coke output	5,952,843	4,771,196

*Net tons.

Bethlehem's Defense Contracts 50 Per Cent Greater Than in World War

■ BETHLEHEM STEEL CO.'s orders under the current national defense program aggregate $1,300,000,000, or approximately 50 per cent greater than the $884,000,000 total produced for the government and the Allies during World war 1. These figures are contained in the company's annual report to employes issued last week.

President E. G. Grace points out that while defense orders are 50 per cent greater than in World war, steel capacity is now nearly four times as great. Steel capacity in 1918 was 3,228,000 net tons; capacity now, including the present expansion program, is 12,700,000 net tons.

Bethlehem's facilities were expanded considerably during 1940. Ingot capacity was increased from 11,468,800 net tons to 11,850,000 tons, and construction under way will add another 860,000 tons. Coke capacity is being increased by 785,000 net tons and pig iron by 780,000 net tons.

Reflecting the importance Bethlehem has assumed in shipbuilding, it was reported the company will have 47 ways available for constructing ships when the present program is complete. Bethlehem has orders for 179 ships of which 76 are naval vessels and 103 are merchant ships.

Money spent and earmarked to be spent by Bethlehem since the beginning of the war for facilities contributing directly and indirectly to the national defense is in excess of $70,000,000. In addition facilities costing approximately $58,000,000 are to be built at company's steel and shipbuilding plants for the United States government.

Calling employes' attention to the fact that Bethlehem rates No. 1 among manufacturers supplying the materials of national defense, President Grace emphasizes the importance of keeping production flowing and avoiding stoppages.

"It goes without saying that there should be no interruption in the national defense program in our plants. There is no cause for it. Our house is in order. Wages and working conditions are at the highest levels. As we have said before, it is our policy to pay wages at least as high and to provide as favorable working conditions as those prevailing in the same industry in the district in which our operations are conducted. That policy will continue to apply for all employes, no matter to what organization they belong or if they belong to none at all."

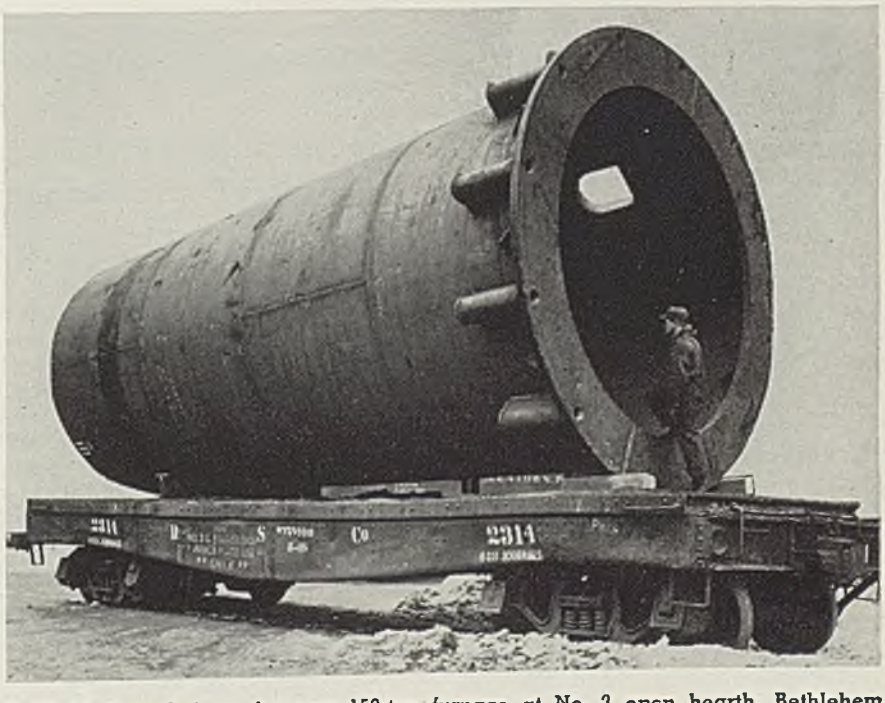
In a letter to stockholders, an amended pension plan to be voted upon at the annual meeting April 8 is outlined. The plan is designed to provide more adequate retirement allowances for certain employes and would cover officers and directors.

American Rolling Mill Co.'s Profit $7,642,713; Up 91 Per Cent

Consolidated net income earned in 1940 by American Rolling Mill Co., Middletown, O., totaled $7,642,713 after provision for interest, depreciation, depletion, federal income taxes and other charges. Profit was equal to $1.96 per share on common after preferred dividend requirements, and was nearly 91 per cent greater than net earnings of $4,011,908 or 69 cents per share on common in 1939.

Calvin Verity, vice president and general manager, declared improvement in earnings was achieved despite low prices for steel products and the largest income taxes in the

Stack Base for Bethlehem



■ Welded stack base for new 150-ton furnace at No. 3 open hearth, Bethlehem Steel Co.'s Bethlehem plant, Bethlehem, Pa. Remainder of stack, which is to be 175 feet high, will be riveted. This section, 26 feet 6 inches long, has an outside diameter of 12 feet at the base, tapering to 9 feet 11 inches at the top. Outside diameter of lip at base is 13 feet 9 inches. Weight of section is 28,500 pounds

company's history. No liability was incurred for federal excess profits tax.

Sales for the period, Mr. Verity reported, were exceeded only in 1937. Total shipments last year, however, were largest on record.

Regular dividend of $1.12½ per share on the company's 4½ per cent cumulative convertible preferred stock was declared, payable April 15 to record of March 15. Mr. Verity also announced a dividend of 35 cents per share on Armco common stock, payable April 5 to record of March 15. Dividend of 25 cents per share was paid on common in December.

Granite City Steel 1940 Net Profit $315,259; Less Than in 1939

Granite City Steel Co., Granite City, Ill., reports total net profit earned in 1940 was $315,259 after depreciation, interest, federal income taxes and other charges. Equal to 82 cents per share on the company's no par capital stock, this compared with net income of $347,940 or 91 cents per capital share in 1939.

The company's net sales last year were greater than in 1939, although net income was 9 per cent smaller. Aggregate of net sales in 1940 was $11,671,885, against a total of $10,212,476 in the prior year. In 1938, when a net deficit of $330,230 was incurred, net sales totaled $6,359,472.

Laclede Steel's 1940 Gross Sales Highest; Net Income $273,485

Laclede Steel Co., St. Louis, reports 1940 net profit totaled $273,485 after depreciation, normal federal and state income taxes and other charges. It was equal to $1.33 per share on the company's par $20 capital stock, and compared with net income of $210,053 or $1.02 per share in 1939.

The company reported gross sales last year were highest on record, with current operations at near-capacity. Laclede, it was declared, has been manufacturing steel for the defense program, but no munitions steel.

Vanadium-Alloys Earned $608,609 Net Profit in Latter Half of 1940

Consolidated net income earned in the six months ended Dec. 31, 1940, by Vanadium-Alloys Steel Co., Latrobe, Pa., and its subsidiary, Anchor Drawn Steel Co., Latrobe, was $608,609 after provision for interest, depreciation, federal and state income taxes and excess profits tax. It was equal to $3.04 per share on capital stock. In the corresponding period in 1939, net income aggregated $434,995 or $2.17 per share. Vanadium-Alloys' fiscal year ends June 30.

Pittsburgh Coke & Iron Co.'s Net Profit $1,000,624

Pittsburgh Coke & Iron Co., Pittsburgh, pig iron, cement, coke and coke by-products producer, reports net income in 1940 totaled $1,000,624. This was nearly twice $542,759 net profit earned in the preceding year. Earnings last year, the company reports, began to reflect income from the 1939-40 plant additions providing larger number of chemical and other products.

Regular dividends of $1.25 per share on Pittsburgh Coke & Iron $5 preferred stock were paid each quarter last year. Initial dividend of 25 cents per share was paid on common Dec. 30.

Wheeling Steel Files $30,000,000 3½% Bond Registration Statement

Wheeling Steel Corp., Wheeling, W. Va., last week filed with the Securities and Exchange Commission a registration statement for $30,000,000 of 3½ per cent first mortgage sinking fund bonds, series B, due March 1, 1966.

Net proceeds from the bonds, together with such portion of the proceeds of a $6,000,000 bank loan which Wheeling proposes to make as may be necessary, will be applied to redemption at 105 of $31,500,000 of 4½ per cent first mortgage sinking fund bonds, series A. The series A bonds are to be called not later than 60 days after issue and delivery of the new bonds. Balance of proceeds from the bank loan will be added to working capital.

Kuhn, Loeb & Co. head the underwriters.

Exports of Industrial Machinery Off in January

■ Exports of industrial machinery in January were valued at $42,931,123, a 7 per cent decline from the December record shipments which amounted to $46,273,141, the machinery division of the Department of Commerce reports. The most important factor was a decrease of more than $4,000,000 in power-driven metalworking machinery.

Machine tool exports to England in January amounted to $16,902,862, lowest since last September and considerably below the December shipments which totaled $19,574,246. January exports to that country accounted for 77 per cent of total machine tool shipments.

Consignments to Japan dropped to $217,268 from $664,849 in December. Shipments to Russia declined to $95,238 from $459,960. Exports to Canada continued to advance and reached the record total of $3,806,043 in January, compared with $3,006,449 in December. All of Latin America took shipments valued at $181,898 in January, compared with $277,203 in December.

Valued at $24,400,387, January exports of power-driven, metalworking machinery were 15 per cent below the record figure of $28,753,334 in December. Shipments of lathes dropped to $4,827,926 from 5,260,999 in the previous month and exports of milling machines declined to $5,804,191 from $6,692,144.

Decreased shipments were also recorded for grinders, down to $3,391,971 from $4,588,667, and gear-cutting machines to $420,118 from $679,808. Exports of drilling machines were larger in January, amounting to $1,775,048, compared with $1,705,017 in December. Shipments of rolling mill equipment also increased to $1,400,676 from $1,193,597 in December. Shipments of metalworking machinery other than power-driven advanced to $1,039,620 from $815,718 in December.

National Metal Trades Convention May 8-9

■ National Metal Trades Association will hold its forty-third annual convention in Palmer House, Chicago, May 8-9.

Canadian Ingot Output At Record in January

■ January production of steel ingots and castings in Canada reached a new high record, 186,303 gross tons, of which 180,563 tons was ingots. Pig iron and ferroalloy output was slightly less in January than in December, 103,085 tons, compared with 110,477 tons. Of 85,469 tons of basic made in January all but 4128 tons was for maker's use. Comparisons follow:

	Steel ingots, castings	Pig iron	Ferro-alloys
Jan., 1941 ...	186,303	103,085	15,231
Dec., 1940 ...	185,420	110,477	18,378
Jan., 1940 ...	166,496	104,703	8,065

Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., has blown out a 450-ton blast furnace for relining, leaving eight stacks in production, 82 per cent of capacity. Algoma now has two idle stacks, the only ones not producing in Canada.

Iron ore production from the Wabana, Newfoundland, mines of Dominion Steel & Coal Corp., will be curtailed to three days per week, as a surplus has been put in stock piles, for which there is no outlet. Previous to the war Great Britain and Germany absorbed more than 60 per cent of the Wabana output. Capacity of the mines is about 2,000,000 tons annually, of which Dominion Steel & Coal Corp. uses about 820,000 tons.

"Maintain Advertising Programs," Machine Tool Executive Advises

■ URGING manufacturers not to abandon selling or advertising programs because their plants are booked to capacity, Fred C. Dull, vice president, Monarch Machine Tool Co., Sidney, O., speaking before the Industrial Marketers of Detroit, March 6, outlined thinking of the machine tool industry in the current emergency.

"Today customers come in to the machine tool builder and beg to be allowed to buy," he said. "And the machine tool builder must say to the customer: 'We're awfully sorry, but we can't let you buy all that you want to buy today. However, if you can supply us with information showing the urgency of your need, we'll see how soon we can fill a part of your requirements.'

"Of course, as far as machine tool builders are concerned, this is a most extraordinary and abnormal situation, and one which has been brought about purely because of sudden enormous demands made upon the machine tool industry by the tremendous national defense program.

"In 1929—the so-called 'boom year'—the machine tool industry of the United States produced a volume of $185,000,000. By the depression year of 1932 this had dropped to $22,000,000. The average volume of the industry for the ten years ended in 1939 was $99,000,000.

"And then suddenly along came the national defense program. The result may be summed up briefly. The industry's output in 1940 was $450,000,000. The industry's estimated output for 1941 will be $750,000,000. This will be seven and a half times the average for the ten years ended in 1939.

"Look to Tomorrow"

"The defense program of the United States, plus aid to Britain, demands more and still more machine tools—and the machine tool industry of this country is dedicated to the job of producing these machine tools in the quantities and within the time required. All other considerations have gone by the board. We are working for Uncle Sam; and until Uncle Sam's demands have been taken care of, problems such as advertising and selling would seem to be matters of little consequence.

"But are they in fact matters that can be overlooked? I don't think so. My own belief is most emphatically that even though a company's plant is sold out for months in advance, that company has for that very reason a most important job to do both in advertising and in selling.

"Any company which is to endure, any company which lays its plans over a long period of years, knows that while today is important, survival is always a matter of tomorrow. And when you study the history of any company that has survived over the years, through thick and thin, you find that this company has been successful in two respects; first, in maintaining quality of product, and second, in maintaining human relationships.

More Than Sales Stimulant

"Goods are not bought and sold by adding machines. They are bought and sold by people. Human relationships are the foundation for all business relationships. And advertising and selling are methods of maintaining human relationships.

"First, consider advertising. Of course, if advertising is to be viewed merely as a stimulus to sales, it might seem quite logical for a company to discontinue advertising at a time when a backlog of orders taxes the capacity of a company's plant.

"But the moment advertising is viewed in its broader sense—as a means of maintaining contact with people, a means of sustaining human relationships—it becomes evident that there remains a real job for advertising to do.

"During this period, for instance, our own company has used first a series of advertisements based on the theme of what will happen when peace comes, when cannon grow cold, when shell holes become furrows again, when we start building up once more instead of tearing down. Although we did not talk about lathes in the copy, the inference was that when postwar days arrived our machines would be needed more than ever to enable manufacturers to cut costs and survice in the competitive battle.

"The next series of advertisements extolled the genius of American inventors and told how the American patent system has contributed so remarkably to America's standard of living. The protection of a patent system is naturally a subject of concern to all customers and prospects.

"We then followed with a series of advertisements suggesting an eight-point platform for American industry. I think the points of that program are worth repeating:

1. Industry should create its own new frontiers.
2. Industry should train young men.
3. Industry should beware of obsolescence.
4. Industry needs its older men.
5. Industry should maintain continuous research.
6. Industry should become increasingly flexible.
7. Industry should strive for employment stability.
8. Industry should make more goods for more people at lower cost.

"Now, as to sales. If salesmen are not mere order takers, but are in fact personal representatives of a business, whose function is to make and maintain contacts and establish goodwill, isn't it all the more important that they perform this part of their job in the days when the shoe is on the other foot, and the customer is begging for deliveries instead of salesmen asking orders.

"Consider the situation in the machine tool industry. Manufacturers of national defense equipment have first claim upon machine tools as fast as they are produced. Washington determines priorities. Right there is a big job for salesmen. Certainly they must explain to the trade just what this picture is. They must tell customers the whats and whys of this picture. They must make clear to one maker of defense equipment that, in the opinion of Washington, another maker of defense equipment may need machine tools even more urgently. They must tell the manufacturer who is not engaged in the defense program, but who wants machine tools badly, just why he will have to wait, perhaps a long time, for his deliveries.

Deliveries Greatest Problem

"Think for a moment about the prospect to whom we have been trying to sell machine tools for years. We used to bombard him with salesmen and with literature. Are we now suddenly going to give him silent treatment—now when the chances are that he really does want and need our machines?

"If we do, we will have to pay plenty for that sort of treatment, after the emergency has passed. 'Well,' he will say. 'you came around often enough when *you* wanted something from *me*—but when *I* wanted something from *you*, where were you?"

"Even with customers who are given prior delivery ratings the salesmen have a job to do today. Deliveries are not easy in days like these. A company must have 20 machines. When? That is the vital question. They can't possibly

(*Please turn to page* 129)

February Pig Iron Operating Rate

Declined 0.2 Point; 3 Stacks Out

■ AVERAGE daily production of coke pig iron and ferroalloys in United States in February was 150,127 net tons as the operating rate dipped 0.2 points, with a net decrease of three in stacks active on the last day of the month, according to reports from operators of the nation's 229 potential blast furnaces.

Although daily production last month was highest on record for February, it was down 397 tons or 0.26 per cent from January's average, 150,524 tons. It was up 32 per cent over daily average of 113,943 tons in the month last year, and compared with daily production of 120,800 tons in February, 1937. Previous high for the month had been in 1929, when average daily output was 128,735 tons with 208 stacks in blast.

Aggregate production in February was 4,203,557 tons, less than in any month since September last year; in that month output was 4,172,551 tons. Decrease in total from January was 462,676 tons or 9.9 per cent. Production last month, however, was 27.2 per cent higher than in the corresponding period last year, when 3,304,368 tons was produced. It compared with output of 2,307,405 tons in February, 1939, total of 3,382,407 tons in the month in 1937, and 3,604,581 tons in February, 1929.

Combined production of the first two months this year, 8,869,790 tons, was 21 per cent greater than in the period in 1940, and was nearly double output of 4,743,879 tons in January and February of 1939. It was 26.9 per cent greater than aggregate output of 6,988,517 tons in the first two months of 1937 and 19 per cent above total of 7,449,572 tons in the period in 1929.

Two Months' Daily Average Up

In the first two months of 1941 daily average was 150,335 tons, up 23 per cent from 122,149 tons in the period last year. It compared with 118,449 tons in the period in 1937 and 126,264 tons, daily average for the two months in 1929.

Operating rate in February was 98.5 per cent, based on capacity reported for Dec. 31, 1939, and was down 0.2 point from January's 98.7 per cent. It was the first decline in rate since April, 1940. Rate had previously increased consecutively each month since April, with the exception of December, when it remained the same as in the preceding month. In February last year the rate was 75 per cent; in the month in 1937 the rate was 79.5 per cent.

Merchant iron production in February was 589,323 tons or 14 per cent of the total; nonmerchant, 3,614,234 tons. This compared with production of 654,091 tons, 14 per cent, and 4,012,132 tons, respectively, in January; and with respective output of 374,406 tons or 11.3 per cent and 2,575,923 tons in February last year.

Furnaces in blast Feb. 28 totaled 202, against 205 reported active Jan. 31. Total at end of last month was the same as in December, 1940, and compared with 157 stacks active in February last year. In the period in 1939, furnaces in blast totaled 121; in 1937 total was 176; and 208 for the month in 1929.

Three stacks were blown out or banked for repairs in the month, and one was blown in. One of the former was a merchant stack, the others of the steelworks or nonmerchant classification. Cambria K of Bethlehem Steel Co., in Pennsylvania, was blown out Jan. 28, but had not been reported previously. Furnaces blown out in February:

In New York: Lackawanna A. Bethlehem Steel Co. In Ohio: Ohio No. 6, Carnegie-Illinois Steel Corp.; and the Anna stack of Struthers Iron & Steel Co., blown out for relining.

Steelton E stack of Bethlehem Steel Co., at Steelton, Pa., was put in blast early last month. Aliquippa No. 2, Jones & Laughlin Steel Corp., in Pennsylvania, was blown out for relining Feb. 2, blown in on new lining Feb. 24.

Youngstown Sheet & Tube Co.'s South Chicago No. 4 furnace, in Illinois, was blown in March 1.

Carboloy Increasing Production Facilities

■ To provide facilities for tripling production of cemented carbide tools and dies, Carboloy Co. Inc., Detroit, currently is rearranging equipment, adding 23,000 square feet of productive floor space, installing 12 new hydrogen atmosphere furnaces, 18 new milling machines, seven new lathes, new sifting and grading machines, pill and slab presses and other miscellaneous equipment. Present plant, completed in 1939, now is operating on a three-shift basis with shop employment tripled since production was started.

Greatly increased space will be available for packaging of finished tools and stocking the new line of standard carbide tools. Raw material stocks likewise will be expanded appreciably.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[1]	1939[2]	1938[3]
Jan.	98.7	85.4	51.0	33.6
Feb.	98.5	75.0	53.5	33.6
March	....	69.5	56.1	34.2
April	....	68.9	49.8	33.4
May	....	74.2	40.2	29.4
June	....	83.6	51.4	25.5
July	....	86.1	55.0	28.2
Aug.	....	89.9	62.4	34.8
Sept.	....	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] Based on capacity of 55,628,060 net tons, Dec. 31, 1939; [2] capacity of 56,222,790 net tons, Dec. 31, 1938; [3] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,203,557	3,304,368	2,307,405
Tot. 2 mo.	8,869,790	7,328,924	4,743,879
March	.....	3,270,575	2,680,446
April	.....	3,139,043	2,301,965
May	.....	3,497,157	1,923,625
June	.....	3,813,092	2,373,753
July	.....	4,060,513	2,638,760
Aug.	.....	4,234,576	2,979,774
Sept.	.....	4,172,551	3,218,940
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

FEBRUARY IRON PRODUCTION
Net Tons

	No. in blast last day of Feb.	No. in blast last day of Jan.	—Total Tonnages— Merchant	Non-merchant
Alabama	18	18	113,430*	192,812
Illinois	16	16	94,480	281,656
Indiana	18	18	20,634	466,925
New York	12	13	95,420	161,677
Ohio	45	47	133,304	850,275
Penna.	68	68	98,896*	1,199,385*
Colorado	3	3		
Michigan	5	5		
Minnesota	2	2	16,121*	179,563
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	6	6		
Mass.	1	1	17,038*	281,941
Virginia	1	1		
West Va.	3	3		
Total	202	205	589,323*	3,614,234*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,127	113,943	82,407	52,254
March	.....	105,502	86,465	53,117
April	.....	104,635	76,732	51,819
May	.....	112,811	62,052	45,556
June	.....	127,103	79,125	39,601
July	.....	130,984	85,121	43,827
Aug.	.....	136,599	96,122	54,031
Sept.	.....	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	150,335	128,128	96,740	57,962

Plan Decentralization of Industries in Canada

TORONTO, ONT.

■ Greater distribution and decentralization of Canada's industries is being initiated by the Dominion government, according to James G. Gardiner, minister of war services, Ottawa, Ont. New policy's aim is to distribute as widely as possible new industries expected to settle in Canada as a result of disturbances abroad, rather than a decentralization of future war industries.

Refugee capitalists from countries overrun by Germany are already reported seeking industrial opportunities in Canada. Similarly, there is general expectation of a large-scale removal of British industry to the Dominion in the next few years.

Government has set up a personnel to conduct a thorough industrial survey of resources in coal, water power, natural gas, raw materials, labor and accessibility to markets provided by each section of the country.

Department of munitions and supply awarded 1539 contracts, total value $19,570,249, in the week ended Feb. 21. Orders included:

Capital expenditure: Electric Steels Ltd., Montreal, $1,367,850; Canadian General Electric Co. Ltd., Peterborough, Ont., $8,315,045; Western Clock Co., Peterborough, $12,800; Sangamo Co. Ltd., Toronto, $26,000; Seiberling Rubber Co. of Canada Ltd., Toronto, $100,025; Shaw Tool & Machine Co., Toronto, $18,200; Houser Machine Works, Merritton, Ont., $26,950; John Bertram & Sons Co. Ltd., Dundas, Ont., $53,025.

Munitions: T. W. Hand Fireworks Co. Ltd., Toronto, $20,304.

Ordnance: Canadian Traction Co. Ltd., Ottawa, Ont., $17,820; Pressure Castings of Canada Ltd., Weston, Ont., $23,232.

Tools: James T. Donnelly Co. Ltd., Toronto, $6221.

Machinery: Canadian Fairbanks-Morse Co. Ltd., Ottawa, $6610; General Supply Co. of Canada Ltd., Ottawa, $14,825; Canadian Blower & Forge Co. Ltd., Kitchener, Ont., $12,552.

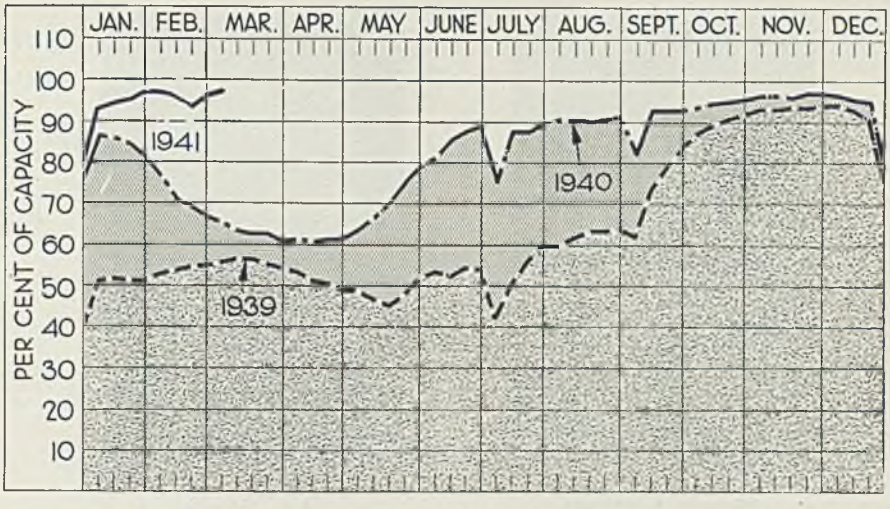
Electrical equipment: Canadian General Electric Co. Ltd., Ottawa, $6000; Northern Electric Co. Ltd., Ottawa, $25,845; Outboard Marine & Mfg. Co. of Canada Ltd., Peterborough, $38,210; Burlee Ltd., Toronto, $34,790; Canadian National Carbon Co. Ltd., Toronto, $79,761.

Aircraft: Standard Tube Co. Ltd., Ottawa, $43,380; Smith & Stone Ltd., Georgetown, Ont., $16,697.

Land transport: International Harvester Co. Ltd., Ottawa, $10,778; Ford Motor Co. of Canada Ltd., Windsor, $11,077.

Instruments: Canadian Dental Trade Association, Toronto, $10,246; Canadian Laboratory & Supplies Ltd., Toronto, $6908.

Miscellaneous: Universal Cooler Co. of Canada Ltd., Brantford, Ont., $9410; Metal Craft Co. Ltd., Grimsby, Ont., $50,529; Central Scientific Co. of Canada Ltd., Toronto, $10,856; Hobbs Hardware Co. Ltd., London, Ont., $5270; LaFrance Fire Engine & Foamite Ltd., Toronto, $16,696; General Steel Wares Ltd., Ottawa, $22,768; Beare & Sons, Toronto, $5046; Crouse-Hinds Co. of Canada Ltd., Toronto, $20,514; Surgical Supplies (Canada) Ltd., Toronto, $7800.



PRODUCTION . . . . Up

■ STEELWORKS operations last week gained 1 point to 97½ per cent. Three districts advanced, two declined and seven were unchanged. A year ago the rate was 63½ per cent; two years ago it was 56½ per cent.

Youngstown, O.—Maintained 97 per cent with 75 open hearths and three bessemers active. The same rate is expected this week. Carnegie-Illinois Steel Corp. and Struthers Iron & Steel Co. each blew out one blast furnace for relining. Sharon Steel Corp. has banked its Mary furnace temporarily because of fire damage to the blower house.

Detroit—With two open hearths out for repairs the rate continues at 92 per cent.

St. Louis — Held at 93 per cent for the fifth consecutive week.

Birmingham, Ala. — Lost 10 points to 90 per cent as two open hearths were taken off, due to pig iron curtailment when a blast furnace at Ensley, Ala., was blown out for repairs.

Cincinnati — Dropped 2½ points to 95 per cent as an open hearth was taken off for repair.

Cleveland — Unchanged at 85½ per cent. Two interests will add open hearths this week, increasing the rate somewhat.

Pittsburgh — Gained 2 points to 98 per cent.

Wheeling—Continued unchanged at 88 per cent.

Chicago — Up 1 point to 100 per cent, equaling the all-time peak of the weeks of Nov. 23 and Jan. 11. Youngstown Sheet & Tube Co. blew in its No. 4 blast furnace stack at South Chicago, March 1, making 35 stacks out of 40 active in this district.

Central eastern seaboard—Steady at 95 per cent.

New England — For the third week production was at 92 per cent, two interests being at 100 per cent.

Buffalo — Addition of one open hearth brought a gain of 2½ points to 93 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 8	Change	Same week 1940	Same week 1939
Pittsburgh	98	+ 2	61	48
Chicago	100	+ 1	60	58
Eastern Pa. ...	95	None	60	40
Youngstown ...	97	None	41	52
Wheeling	88	None	90	74
Cleveland	85.5	None	73	52
Buffalo	93	+ 2.5	55.5	32.5
Birmingham ..	90	—10	78	83
New England .	92	None	75	65
Cincinnati	95	— 2.5	54.5	43
St. Louis	93	None	65	57.5
Detroit	92	None	78	76
Average	97.5	+ 1	63.5	56.5

Pig Iron Exports Up, Scrap Lower in January

■ Exports of pig iron in January totaled 80,322 gross tons, valued at $2,330,351, compared with 70,856 tons, valued at $1,857,231 in December. In January the United Kingdom took 76,834 tons, valued at $2,236,966, and South Africa, 3019 tons, valued at $79,025.

Steel and iron scrap exports amounted to 43,457 tons, valued at $821,053, against 68,135 tons, valued at $1,208,110 in December. Great Britain received 38,776 tons, valued at $750,506. This included 15,990 tons of No. 1 heavy melting steel and 14,621 tons of No. 2.

■ Orders received in 1940 by General Electric Co., Schenectady, N. Y., aggregated $654,190,000.

MEN of

Thomas J. Roberts

J. C. Merwin

Who has been elected president, Chain Belt Co., Milwaukee, as noted in STEEL, March 3, p.26

THOMAS J. ROBERTS, heretofore assistant to **T. K. Mial,** vice president in charge of sales to industry and product development for general industrial use, Johns-Manville Corp., New York, has been placed in charge of the new industrial department office established by Johns-Manville in Atlanta, Ga.

♦

H. C. Meyer Jr. has joined the chemical division of Foote Mineral Co., Philadelphia, as a junior analyst.

♦

Andrew H. Knight, attorney, has been appointed executive assistant, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

♦

John Morrell has been elected vice president and a director, Kropp Forge Co., Chicago.

♦

William A. Cather has been elected vice president, Michel-Cather Inc., New York, formerly A. Eugene Michel & Staff Inc.

♦

John E. Fearon, formerly in charge of the flow meter sales section, appliance division, Cochrane Corp., Philadelphia, has joined Boiler Equipment Service Co., Atlanta, Ga.

♦

Harold O. Washburn, vice president and treasurer, American Hoist & Derrick Co., St. Paul, has been elected a director, Chicago Great Western Railway Co.

♦

Dr. Howard A. Smith, formerly associated with Duraloy Co., Scottdale, Pa., is now research metallurgist for Universal-Cyclops Steel Corp., Bridgeville, Pa.

♦

Harry C. Peterson, formerly sales representative in the St. Louis territory for Carnegie-Illinois Steel Corp., has been transferred to the office at Peoria, Ill., which is under supervision of the Chicago office. Mr. Peterson replaces **Dale W. Brown,** who has been transferred to Cleveland as assistant to **F. Royal Gammon,** district sales manager.

♦

John W. Mock, the past year associated with Turner Brass Works, Sycamore, Ill., has been appointed sales manager, Liquid Fuel Appliance division.

♦

A. Kay Foster, vice president, Birmingham Trust & Savings Co., Birmingham, Ala., has been elected a director, Sloss-Sheffield Steel & Iron Co., Birmingham.

♦

H. D. Crawford has been elected vice president, Parkersburg Rig & Reel Co., Parkersburg, W. Va.

♦

Henry G. Carter, 5505 Branch avenue, Tampa, Fla., has been appointed district representative by Northern Equipment Co., Erie, Pa., for its line of regulators, valves, governors and allied equipment.

♦

Charles F. Teuber, engineer of gas burning industrial equipment, People's Gas Light & Coke Co., Chicago, has retired after 32 years' service with the company.

♦

G. D. Groce, the past ten years service manager, Cleveland Tractor Co., Cleveland, has been appointed general service manager, Buda Co., Harvey, Ill.

♦

John Payton has been named district manager in the Indiana and east central Illinois territory by Reznor Mfg. Co., Mercer, Pa. Mr. Payton's headquarters are at 1245 West Thirtieth street, Indianapolis.

♦

Howard P. DeVilbiss and **Roy A. Guyer** have been elected vice presidents, DeVilbiss Co., Toledo, O. Mr. DeVilbiss, son of the late Thomas A. DeVilbiss, who developed the company's industrial division, has been active in the enterprise since his father's death in 1928. Mr. Guyer, sales manager of the spray painting division, has been associated with the company 29 years.

♦

A. Maxwell Jones, since 1936 general sales manager, Buffalo Bolt Co., North Tonawanda, N. Y., has been elected vice president in charge of sales. He has been associated with the company since 1902.

♦

Roy P. Williamson has been named sales manager, jack division, Buda Co., Harvey, Ill. He was until recently associated with Gustin-Bacon Mfg. Co., Chicago and St. Paul, and has been identified with the railroad supply business many years.

♦

A. S. Keller, sales manager, Chicago Metal Hose Corp., Maywood, Ill., has been promoted to vice president in charge of sales; **A. E. F. Johnson** from superintendent of production to vice president in charge of production; and **D. Wendell Fentress** from development engineer to vice president in charge of special technical developments.

♦

Elmer C. Lusk has joined the technical staff of Battelle Memorial Institute, Columbus, O., and will assist with the various ore dressing and coal preparation investigations in progress at the institute's laboratories.

♦

R. V. Clark has been elected president and a director, Hayes Mfg. Corp., Grand Rapids, Mich. **William B. Cudlip** and **Ira A. Moore** have also been elected directors.

Mr. Clark was associated with E. W. Bliss Co., Brooklyn, N. Y., from 1920 to 1935 when he resigned to become vice president and general

INDUSTRY

R. E. Christie

Foster P. Whitworth

manager in charge of the airplane division, United States Aircraft Corp. In 1940 he was associated with the National Defense Commission in the aeronautical section, from which he resigned to become president of the Hayes organization.

♦

Leroy D. Evans, advertising manager, LaSalle Steel Co., has been appointed a member of the personal staff of **T. L. Kelly,** executive vice president, and has moved his headquarters from the plant in Hammond, Ind., to the executive offices in the Palmolive building, Chicago.

♦

J. H. Bell has been promoted to executive vice president, Cardox Corp., Chicago, and also will be in charge of mining activities. **Erie Geertz** has been advanced to vice president in charge of the fire division, and **Harry Ensminger** to general sales manager of the same division. **Lawrence E. Lawson** has been promoted to vice president, carbon dioxide gas division, and **Dr. C. A. Getz** to director of research.

♦

Harlow D. Burnside, resident manager of the Fisher Body division of General Motors Corp. in Buffalo, has been promoted to resident manager of Fisher Body division in Janesville, Wis. **Clarence A. Trump,** assistant manager of Fisher Body's Kansas City plant, has become manager at Buffalo.

Mr. Burnside replaces **Leonard T. Dalecke,** who will become manager of a General Motors plant engaged in the manufacture of parts and subassemblies for twin-engine bombers.

♦

W. S. Richardson, division general sales manager, B. F. Goodrich Co., Akron, O., has announced the following changes in the mechanical division sales staff: **A. W. Doran** has been assigned to special duties in connection with railroad and governmental sales; **B. E. Silver,** sales representative in Indiana, has been transferred to government sales in Washington. **W. E. Nees** succeeds Mr. Silver with headquarters at Indianapolis, while **Ralph Barcus,** of the Akron district staff, succeeds Mr. Nees in the West Virginia territory, with headquarters in Charleston.

♦

R. E. Christie, the past two years assistant to president, Crucible Steel Co. of America, New York, has been elected a vice president and also a director.

♦

Foster P. Whitworth has been elected works manager, Bullard Co., Bridgeport, Conn. He succeeds Thomas E. Dunn, resigned. STEEL, March 3, p. 26). Mr. Whitworth joined the company in 1896 as an apprentice and after three and one-half years left to go with the American-British Co. From that time until his return to Bullard in 1905 he was associated with a number of companies. Mr. Whitworth has served in various capacities with Bullard, and in 1928 was promoted to assistant works manager.

♦

Stewart J. Hieronymus, the past 12 years associated with Cutler-Hammer Inc., Milwaukee, has been appointed sales engineer, Lincoln Electric Co., Cleveland, with headquarters at its San Francisco office.

♦

Clinton E. Swift has become associated with the Weldrod division of Ampco Metal Inc., Milwaukee, to head the development, production, and distribution of Ampco-Trode, a complete line of coated aluminum bronze welding rods. Mr. Swift joined Westinghouse Electric & Mfg. Co. in 1929; in 1931 became welding engineer, American Brass Co., following which he was welding engineer for C. F. Braun & Co., and welding superintendent, Young Radiator Co. He is a member, American Welding Society.

T. P. Samuels has been transferred from Milwaukee to the Pacific coast territory for Ampco, working under supervision of **O. D. Cooper,** with headquarters in Burbank, Calif.

♦

Howard Gould, David J. Joseph Co., Cincinnati, has been appointed chairman, uniform contract committee, Institute of Scrap Iron & Steel Inc., Washington. **Jack R. Forcheimer,** Jack R. Forcheimer & Son, St. Louis, has been named vice chairman.

Max Meltzer, Steel Trading Corp., Pittsburgh, has been named chairman of the institute's resolutions committee, and **Ed Stein,** United Iron & Metal Co., Canton, O., has been made vice chairman.

Other chairmen of committees are:

Legislative: **Alvin A. Wolff,** Wolff Pipe & Iron Co., St. Louis, and **William J. Wolf,** Wolf & Co., Hamilton, O., vice chairman.

Industrial relations: **Samuel G. Keywell,** Samuel G. Keywell Co. Inc., Detroit, and **Joseph Cohen,** General Scrap Iron Inc., Phillipsdale, R. I., vice chairman.

Traffic: **Charles R. Ritter,** Luria Bros. & Co. Inc., Philadelphia, and **W. S. Logan,** David J. Joseph Co., Cincinnati, vice chairman.

♦

R. H. Coleman has been named director of the newly established promotion division, Remington Arms Co. Inc., Bridgeport, Conn. The following will be in charge of the respective sections comprising the new division: **Gail Evans,** manager, advertising; **J. J. Callahan,** manager, dealers'; **D. W. Flannigan,** manager, trap, skeet and peace officers; **R. B. Dillman,** manager, trade analysis; **F. J. Kahrs,** manager, rifle; **W. A. Tewes,** manager, technical.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Britton asks manufacturers to release for defense needs machine tools not in use, says "large numbers" are idle . . . Seek co-ordination of metals exports to Great Britain under "unlimited" license . . . "Liberalizing" amendments to excess profits tax approved . . . Asserts 50 per cent of companies possessing machine tools are operating far below capacity

WASHINGTON

■ URGENT appeal for immediate sale of idle machine tools to manufacturers working on defense contracts has been issued by Mason Britton, chief of the machine tool section, Office of Production Management.

Unprecedented demand for machine tools in the armament program makes it essential that during the critical period ahead every available piece of machinery be placed at the immediate disposal of defense production, Mr. Britton stated.

Large numbers of machine tools in the factories and shops of the nation are idle, he said. In other cases duplicate machines are employed part-time where one machine could do the work now being done by two and the second one sold for use in important defense work.

Sales can be made either direct to defense contractors or through second-hand machine tool dealers who are in a position to recondition them and contact manufacturers in need of such equipment.

Since the price stabilization division of the National Defense Advisory Commission has established maximum prices for second-hand machine tools, such equipment can no longer bring exorbitant prices. At the same time, with the large demand for machine tools that now exists, reasonable prices can be obtained.

Most urgent demand is for boring mills, planers, radial drills, lathes and milling machines, especially machine tools of the heavier type. Such equipment is known to be idle or semi-idle in the automotive, railroad, canning, mining, textile, paper, printing equipment and other industries.

Buyers and sellers of second-hand machine tools have been warned by Leon Henderson, commissioner of the price stabilization division, that the first "ceiling price" established by the government went into effect March 1. This schedule, issued Feb. 17, (see STEEL, Feb. 24, p. 32) sets maximum prices at which various classifications of machine tools may be sold.

British Purchasing Commission To Co-ordinate Metals Exports

State Department's division of controls has issued the following statements in connection with expediting exports of iron and steel products, copper, bronze, brass and nickel products:

"In an effort to expedite exports to the British Empire of copper, bronze, brass, and nickel products subject to the requirement of export licenses in accordance with the President's proclamation of Jan. 10, 1941, the British Purchasing Commission has made arrangements to co-ordinate such shipments to the countries of the Empire. The British Purchasing Commission has already obtained unlimited licenses authorizing the exportation to those destinations of all the above-mentioned products as defined in the President's executive order of Jan. 10, 1941.

"In order to obtain a clearance of shipments for exportation of these particular products, it is necessary for the shipper to communicate with the British Purchasing Commission, the Willard hotel, Washington, attention of Capt. W. C. Coventry.

"It will also be necessary for every company exporting such copper, bronze, brass, and nickel products to the British Empire in connection with these unlimited licenses, to supply statistics every ten days regarding their actual exportations. These statistics should be forwarded to the British Purchasing Commission, which in turn is required to present summaries to the interested branches of this government.

"Applications for license to export to the British Empire the articles and materials referred to in the unlimited licenses which have been issued to the British Purchasing Commission, are being returned to the applicants with the suggestion that they communicate with the commission."

Dealing with iron and steel products exports, the announcement said:

"In an effort to expedite exports to the British Empire of the iron and steel products subject to the requirement of export licenses in accordance with the President's proclamation of Dec. 10, 1940, the British Iron & Steel Corp. has made arrangements to co-ordinate such shipments to the countries of the Empire. The British Iron & Steel Corp. has already obtained blanket licenses authorizing the exportation to those destinations of all the iron and steel products as defined in the President's executive order of Dec. 10, 1940.

"In order to obtain a clearance of shipments for exportation of these particular steel products, it is necessary for the shipper to communicate with the British Iron & Steel Corp., 43 Exchange Place, New York, attention of R. W. Finlayson.

"It will also be necessary for every company exporting such iron and steel products to the British Empire in connection with these blanket licenses to supply statistics every

Write Today!

TOOL MAKERS DIE MAKERS!

Send for the Blanchard Catalog No. 11 Today

THE No. 11 Blanchard Surface Grinder was designed especially for lowering the cost of grinding dies, jigs, fixtures and small parts—with finish, accuracy, and speed to satisfy modern production requirements.

Tool makers—die makers—don't miss this opportunity to get information on the machine that was designed as you would have it—for your own requirements! Send the Coupon today!

Without obligation, please send me my copy of the No. 11 Blanchard Surface Grinder Catalog.

Name_____ Title_____

Company_____

Street_____

City_____ State_____

BLANCHARD MACHINE CO., 64 State St., Cambridge, Mass.

ten days regarding their actual exportations. These statistics should be forwarded to the British Iron & Steel Corp., which in turn is required to present summaries to the interested branches of this government.

"Applications for license to export the articles and materials referred to in the blanket licenses which have been issued to the British Iron & Steel Corp. are being returned to the applicants with the suggestion that they communicate with the corporation."

Eleven Cents Established as Top Aluminum Scrap Price

Eleven cents a pound was established as a top price for mixed aluminum scrap sold by airplane manufacturers, in telegrams sent to airplane manufacturers and scrap metal dealers last week by C. A. Bishop.

Price will apply to unsegregated aluminum chips (mixed aluminum scrap) which are to be released to the dealers under a recent order by the division of priorities.

A price schedule for all aluminum scrap will be issued by the price stabilization division in a few days, Mr. Bishop informed the manufacturers and dealers. Exact levels at which "ceiling" prices will be fixed have not yet been determined, he said, but as long as the price of virgin aluminum remains at 17 cents a pound the price of aluminum scrap will probably be less than 11 cents.

Congress Approves Excess Profits Tax Amendments

Senate last week voted approval of "liberalizing" amendments to the excess profits tax law, which are expected to ease the burden on heavily capitalized industries, such as steel, and those which have expanded rapidly during the past several years, such as aircraft (STEEL, March 3, p. 23).

Amendments won unanimous approval in the Senate and minor changes made by the upper chamber were quickly accepted by the House of Representatives, which previously had approved the original amendments.

Trecker Urges Decentralization Of National Defense Orders

Fifty per cent of companies possessing machine tools are now either idle or working less than eight hours a day, Francis J. Trecker of the Office of Production Management's defense contract service, asserted in a plea for wider distribution of defense orders.

"There is a centralization of defense work that we are anxious to correct as much as possible," he declared.

Although the idle 50 per cent includes older, slow-speed, less accurate machines, they nevertheless form a reservoir of productive capacity that must be utilized, Trecker said.

Aluminum Allocations To Be Tried on Temporary Basis

Office of Production Management's priorities division soon will ask the refrigerator industry to substitute glass, rubber and plastics for aluminum now used in ice trays, it was reported last week.

Allocation of aluminum to companies making civilian goods may be attempted on a temporary basis this month because of the problems involved in determining which industries are most essential.

Producers Indicate No Shortage of Zinc Pigments

Ernest T. Trigg, president, National Paint, Varnish and Lacquer Association, last week transmitted to members copies of correspondence with Marshall L. Havey, vice president, New Jersey Zinc Co., New York, which points out that recent published references to a zinc shortage should not be interpreted as indicating a general shortage of zinc pigments as distinguished from zinc metal.

Ocean Shipping Subject to Voluntary Priorities

Ocean shipping last week became subject to voluntary priorities, under a system designed to give first call on available cargo space to defense-needed imports.

United States Maritime Commission's new division of emergency shipping is administering the voluntary system. If this system proves inadequate, officials said requisitioning will be enforced.

The new division will work closely with other defense agencies and the Reconstruction Finance Corp. which is handling importation of large amounts of strategic materials. Its first major task will be the development of procedure for obtaining adequate shipping space for defense commodities. No priorities list has been made available but it is understood that copper, sugar and castor beans will be among those materials given preference.

Study Minimum Wage for Grey Iron Jobbing Foundry Industry

Committee to investigate and recommend a minimum wage in the gray iron jobbing foundry industry was appointed last week by Gen. Philip B. Fleming, administrator, Wage and Hour Division, United States Department of Labor. First meeting of the committee will be held at the Department of Labor Building, March 31.

Members are: For the public: Sidney E. Sweet, dean, Episcopal church, St. Louis, chairman; W. H. McPherson, professor of economics, Oberlin college, Oberlin, O.; John B. Andrews, executive secretary, American Association of Labor Legislation, 131 East 23rd street, New York; Malcolm Sharp, professor of law, University of Chicago, Chicago; Hardy C. Dillard, assistant dean, school of law, University of Virgina, Charlottesville, Va., and also director, Institute of Public Affairs.

For the employers: R. E. Kicher, vice president, Olympic Foundry Co., Seattle; M. A. Fisher, treasurer, Standard Buffalo Foundry Co. Inc., Buffalo; Charles J. Miller, president, Fremont Foundry Co., Fremont, O.; Franklin Farrell III, Farrel-Birmingham Co. Inc., Ansonia, Conn.; George M. Morrow, Goslin Birmingham Foundry Co., Birmingham, Ala.

For the employes: Harry Stevenson, president, International Molders and Foundry Workers Union of North America, Cincinnati; Chester A. Sample, vice president, International Molders and Foundry Workers Union of North America, Chicago; Dennis Keefe, vice president, International Molders and Foundry Workers Union of North America, Norwalk, Conn; Shelly Walden, vice president, International Molders and Foundry Workers Union of North America, Chattanooga, Tenn.; Harold J. Ruttenberg, research director, Steel Workers Organizing Committee, Pittsburgh.

Committee is charged with the task of investigating the industry and recommending a minimum wage higher than the statutory minimum of 30 cents an hour and not in excess of 40 cents an hour, which will not materially curtail employment.

$16,000,000 Shell Manufacturing Plant To Be Built at Cleveland

Plans for a $16,000,000 brass shell manufacturing plant to be built at Euclid, O., near Cleveland, were approved last week by the Office of Production Management. Defense Plant Corp. was said to be considering the project, and was reported certain to approve and advance required funds.

Owned by the government, the plant would be operated by Chase Brass & Copper Co., Waterbury, Conn. The company holds large contracts for shells to be furnished government arsenals.

Cleveland Hobbing Machinery Co., Cleveland, was also reported planning a new $500,000 plant for production of machinery for turning shell forgings. Financing will be handled privately.

MEETINGS

Conference To Consider Plant Changeover to War-Time Work

■ LEADING industrialists and engineers from ten states in the Middle West will meet with high Army and Navy officials in Cleveland March 12-13, for conference on expediting conversion of peace-time plants to war work. Gen. G. C. Marshall, army chief of staff, and Admiral H. R. Stark, chief of naval operations, and C. F. Hood, president, American Steel & Wire Co. and president, Cleveland Post, Army Ordnance Association, will speak at a dinner meeting, Wednesday.

Seven morning and afternoon discussion sessions and two luncheon meetings are on the program. The Wednesday luncheon meeting will be addressed by Lt. Gen. Delos Emmons, commanding general G. H. Q. air force, Langley Field, Va., who will discuss "Fighting Aircraft in Action". "Tanks in Action" will be the subject of the Thursday luncheon meeting which will be addressed by an officer of the second armored corps.

Subjects to be discussed at the seven conference sessions and speakers will be:

"Speeding Tank Manufacture"—Lt. Col. J. K. Christmas, Aberdeen proving grounds, Aberdeen, Md.; F. A. Stevenson, vice president in charge of operations, American Car & Foundry Co., New York.

"Ammunition Manufacture"—Lt. Col. A. B. Johnson, office of the assistant secretary of war; Geo. T. Trundle, Jr., president, Trundle Engineering Co., Cleveland.

"Aviation Manufacture"—T. A. Morgan, president, Sperry Corp., New York.

"Ammunition Manufacture"—Maj. H. M. Reedall, executive officer, Cleveland Ordnance District; Max Kronenberg, Cincinnati Milling Machine Co., Cincinnati; J. R. Longwell, Carboloy Co., Detroit; Philip McKenna, president, McKenna Metals Corp., Latrobe, Pa.; M. F. Judkins, Firth Stirling Steel Corp., McKeesport, Pa.

"Gaging Practices"—J. H. Herron, president, J. H. Herron Co., Cleveland; S. B. Terry, chief engineer, gage division, Pratt & Whitney, Hartford, Conn.; Fay Aller, chief engineer, gage and machine tool division, Sheffield Gage Corp., Dayton, O.; E. J. Bryant, gage division, army and navy munitions board, Machine Tool Committee, Washington.

"Training and Recruitment of Industrial Personnel"—A. R. Stevenson, Jr., chairman A. S. M. E. committee on education and training for the industries; Dr. Alonzo Grace, commissioner of education of Connecticut.

"Subcontracting"—Col. J. B. Dillard, general superintendent, Cleveland Twist Drill Co.; R. L. Mehonay, Jr., director of defense contracts service, O. P. M., Washington.

Problems of Marketing To Be Discussed at April Meeting

A marketing conference sponsored by the industrial and consumer marketing divisions of the American Management Association will be held at Hotel Roosevelt, New York, April 22-23. Subjects to be discussed include "Responsibilities to the Customer in a War and Defense Economy"; "Today's Problems in Selection, Training and Retraining"; "Getting Your Story to the Customer and Getting Him Interested in It"; and, "Developing the Most Effective Sales Tools".

Canners' Association Selects Chicago for 1942 Convention

National Canners' Association and Canning Machinery and Supplies Association, which held their annual convention and exhibition at the Stevens Hotel, Chicago, in January, have decided to return there for the event in 1942. The week of Jan. 25 has been selected.

Engineers Release Plans for Annual Meeting in Cleveland

Plans are now being completed for the annual convention of the Association of Iron and Steel Engineers which will be held in the Cleveland public auditorium, Cleveland, Sept. 23-26. Floor plans for the iron and steel exposition to be held in conjunction with the technical sessions, have been released.

Meeting of Automotive Engineers Is Postponed

National production meeting of the Society of Automotive Engineers, scheduled to be held in Milwaukee, May 12-13, has been postponed. New dates for the meeting will be announced as soon as they are established.

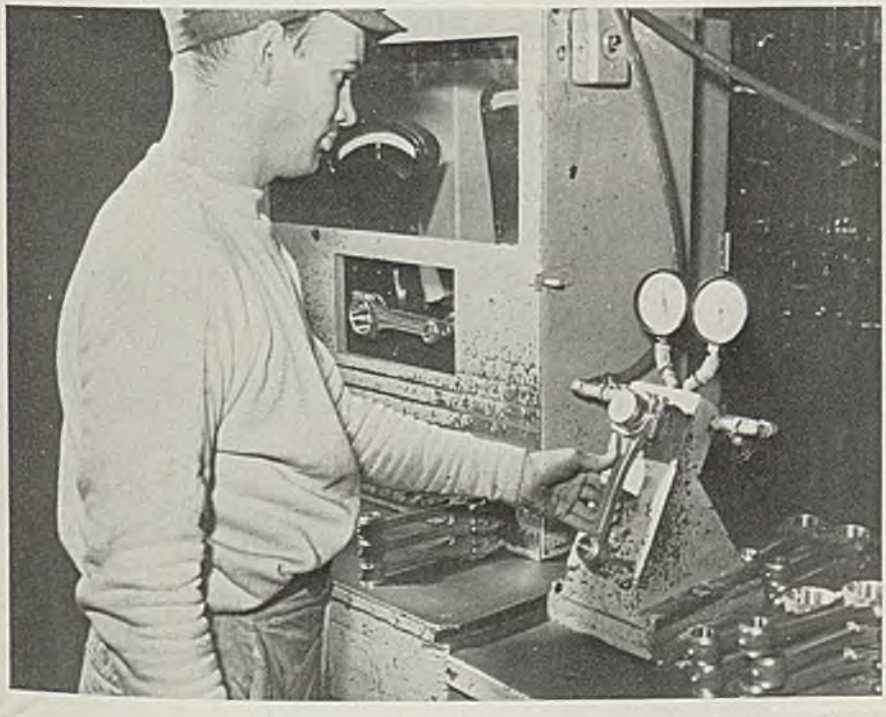
Cleveland Concerns Will Be Hosts to Electrochemists

Electrochemical Society will be the guest of Cleveland for the third time when it holds its 79th general meeting at the Cleveland hotel, April 16-19. In addition to three morning technical sessions, the Society has been invited to make afternoon visits to Nela Park and Pitney Lamp works of General Electric Co., the Ferro Enamel Corp. and to Easterly sewage disposal plant of the city of Cleveland.

Furnacemen and Steelmakers To Hold Joint Meeting

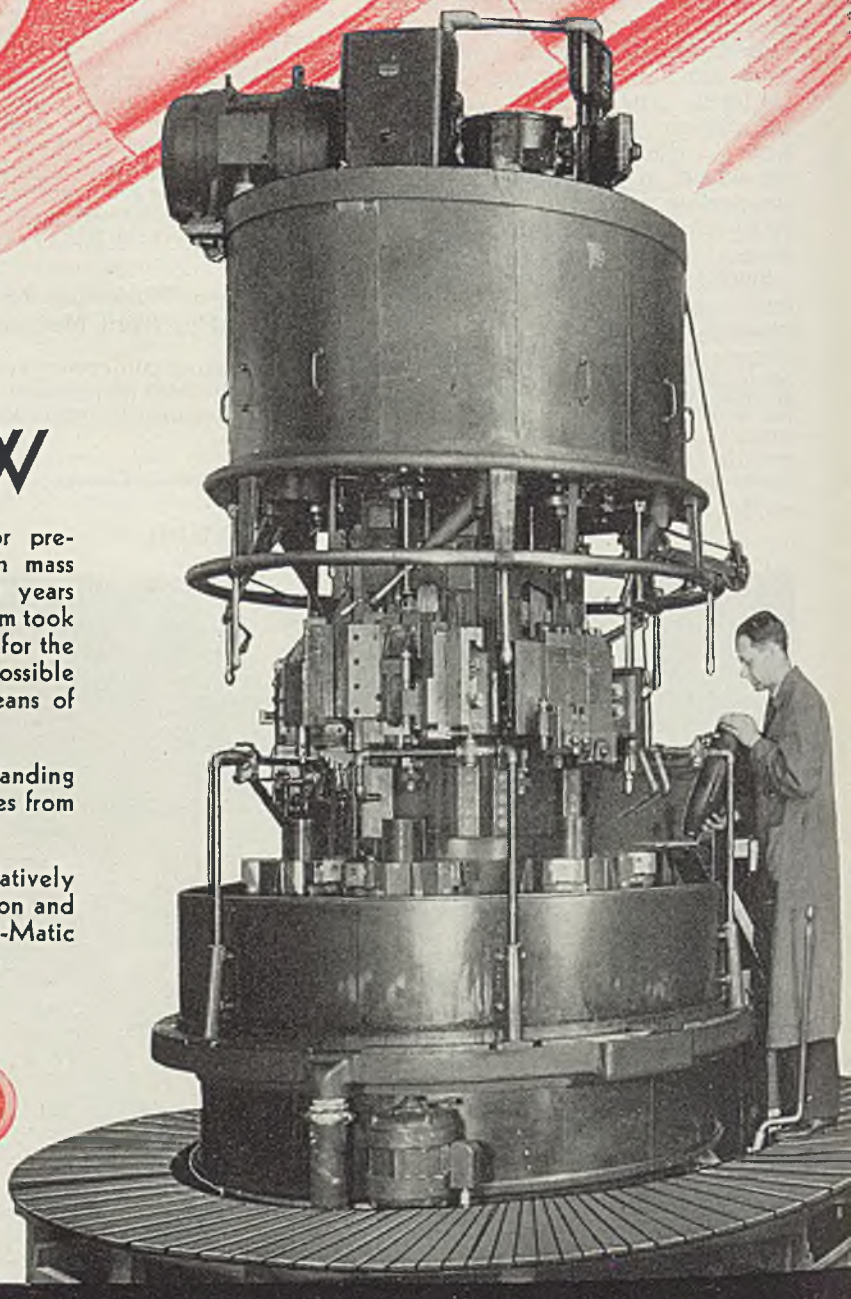
Annual conference of the Open Hearth and Blast Furnace committees of the American Institute of Mining and Metallurgical Engineers will be held at Palmer House, Chicago, April 23-25. General theme of the meeting will be "What the Raw Materials, the Open Hearth, and the Blast Furnace Man in the Steel Industry Can Do for National Defense".

Air Gage Aids Inspection



■ Here a crankshaft bearing hole in a connecting rod is being checked for size at Pontiac Motor Division. Formerly a step-plug was used. Now compressed air, at a never varying pressure, is shot through the bearing-size arbor. The amount of air which escapes between the arbor and the connecting rod is registered on the two dials, and the rod goes into production or is rejected

FEED THOSE GUNS



HERE'S HOW

European manufacturers, in their scramble for preparedness, quickly sought accepted American mass production manufacturing methods which for years they had avoided. Then our own defense program took up the methods of shell manufacture developed for the European countries. Through these methods it is possible to produce thousands of shells per day by means of numerous collective installations.

Mult-Au-Matics have been and are today outstanding in their manufacture of many sizes of shell bodies from 37 m/m to 155 m/m.

MULT-AU-MATICS are still available for relatively prompt delivery. Take advantage of this situation and immediately contact our engineers for Mult-Au-Matic deliveries and manufacturing data on your jobs.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of *MOTORDOM*

By A. H. ALLEN
Detroit Editor, STEEL

Ford bomber plant at Ypsilanti, ready by end of year, may have mile-and-a-quarter assembly line if government O.K.'s building of complete ships. Engineers on way to coast to line up production details . . . Improvement in aluminum situation seen a matter of a few months . . . Plenty of inquiries out for 1942 model steel, reflecting concern over deliveries . . . Foundry activity steps up as die programs are started

DETROIT

■ SEVENTY engineers and designers of the Ford Motor Co. left last Tuesday for San Diego, Calif., where they will work out methods to initiate production of complete airframes and tricycle landing gears for B24D Consolidated bombers in the new $11,000,000 bomber assembly plant which Ford is rushing for a site near Ypsilanti, Mich. Production of assemblies, including wings, fuselages, noses, stabilizers, rudders, etc., is scheduled to be under way by the end of the year in the new plant. They will be shipped, according to present plans, to assembly plants in Fort Worth, Texas, and Tulsa, Okla., although there is a possibility the government may decide the entire bomber should be assembled here, in which case the building will be extended to house a 1¼-mile assembly line.

The new plant will be built in T shape, one section 300 by 800 and the other 400 by 1200 feet. Present plan is for Ford to build 600 sets of assemblies for Consolidated and the same number for Douglas Aircraft, at a rate of 50 a month for each company. Engineers now enroute to California will pick the bomber to pieces and, part by part, will study requirements with the idea of developing faster manufacturing and assembly methods. As the details are worked out they will be rushed to production men here.

Controversy between the UAW-CIO and the Ford Motor Co. in the efforts of the former to unionize Ford plants gradually appears to be coming to a head. Betting is that, while the UAW might be successful in elections in the Highland Park and Lincoln divisions of the company, it stands little chance in the vast River Rouge plant, and current threats of strike intentions are mere boasts for public consumption.

Holds No Dispute Exists

Governor Van Wagoner has appointed a state mediation commission to investigate the alleged difficulty at the Ford plant, and James F. Dewey, federal labor conciliator is co-operating. Preliminary discussions have been held with company officials. H. H. Bennett, Ford personnel director, has made public a letter to the governor in which he stated that "no labor dispute exists between the company and its employes despite attempts by certain groups of labor agitators to create this false impression with the people. . . .

"These former sitdowners whose acts of terror in Michigan industry alone make Jan Valtin's revelations in *Out of the Night* look like Mother Goose stories, would now sabotage the defense program of the nation to satisfy their greed for dues and more dues.

"I feel that neither the state nor the government should be called upon to settle a 'cooked-up' dispute created solely to permit these dues-hungry agitators to pluck a million dollars a year in dues from our men."

The labor tide, running so strong against Ford in recent months, appears to be receding just a little. In the award of funds for the new bomber assembly plant, no stipulations with regard to labor were made. A district court has upheld Ford's right to distribute literature to his employes. And each time union labor engineers another stoppage of work on the defense program, the more difficult it is becoming for the UAW to get anywhere in its Ford organizing campaign, on which hundreds of thousands of dollars from union members' pockets already has been spent.

As a contribution toward easing supplies of aluminum for the defense program, Ford has decided to dispense with aluminum cylinder heads on Lincoln engines, which weigh about 28 pounds each, and to remove about 32 pounds of aluminum from the tractor, including radiator grille, pump housing, dash and steering column castings.

More and more it appears that the aluminum situation will be much improved within three or four months. Drying up of supplies of scrap aluminum resulting from speculative and hoarding practices will be relieved by setting a fixed price on the material. A suggestion that the Boy Scouts of America organize a campaign to collect discarded aluminum utensils from householders, turn collections over to the government which in turn would sell the material to dealers for a nominal price, with a limit on dealer profit, is a good one, and its inception would immediately put an end to speculation and hoarding. It is estimated that such a collection might bring in upward of 25,000,000 pounds of high-grade aluminum scrap.

Faced with the prospect of lengthy delays in obtaining supplies of aluminum rivets used in bus and truck construction, one manufacturer here has turned to the use of copper

rivets and is now lining up sources and suitable alloys for the switch.

Steel Inquiries for 1942 Models Appear; Foundry Scrap Scarce

Inquiries for steel to be used in 1942 model programs are pouring into steel company offices here. They do not appear to forecast any earlier start on new model building, but rather an effort to get coverage on steel so that when the third quarter rolls around, material will be available. One steel company here states that buyers will be lucky if they find their 1942 model inquiries filled at all this year, which might suggest actual deferment of assembly schedules beyond the customary September start.

Foundries are unusually busy on automotive work and are hard pressed to obtain suitable scrap for melting. High prices on foundry scrap are forcing some substitutions, such as cutting No. 1 heavy melting steel into short lengths and selling it as foundry steel, with $1 a ton premium over the heavy melting price; also the use of structural steel scrap instead of short rails. Automobile cast scrap is practically nonexistent. Cupola cast material, as it is termed, is bringing better than $20 a ton, and in general there is a pronounced scramble for material by melters.

Flame-Hardened Dies Eliminate Need for Tool Steel Inserts

Stamping dies with flame-hardened wearing surfaces are coming into more general usage. Acme Foundry Co. here, for example, is supplying large dies for fender and hood top stampings of a chrome-molybdenum iron which can be flame hardened and cooled in air, the iron as cast showing brinell of about 200 and flame hardened areas as high as 600. This avoids the use of tool steel inserts which are costly because of the extended amount of labor required to fit them and try out the dies.

An accompanying illustration shows a fender punch of this material, weighing 6500 pounds. Iron analysis is: Total carbon, 3.00 per cent, manganese 0.60, silicon 1.80, chromium 0.40, molybdenum 0.30, sulphur 0.06-0.09 and phosphorus 0.10. Cupola charge is 70-75 per cent steel, 10 per cent return scrap from the foundry and the balance silvery pig iron. Chromium is added in the form of ferrochrome briquets, molybdenum in the form of a 60 per cent ferroalloy. Ferrosilicon is added to the ladle, from 5 to 15 pounds to the ton being sufficient to bring silicon content up 20 to 40 points. Iron is poured in dry sand molds.

Test bars show tensile strengths in excess of 50,000 pounds per square inch. Structure under the microscope is almost entirely pearlitic, with uniformly distributed graphite flakes.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	.....
March	389,499	440,232	.....
April	354,266	452,433	.....
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Feb. 8	125,000	95,985
Feb. 15	127,500	95,050
Feb. 22	129,240	102,570
March 1	126,550	100,855
March 8	125,915	103,560

†Comparable week.

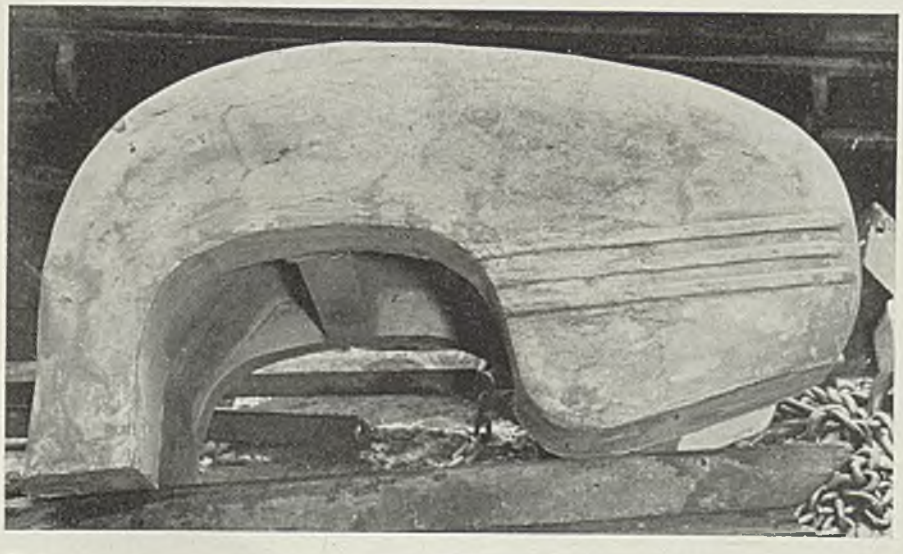
Chrysler Tank Arsenal Now Eighty Per Cent Complete

Three large milling machines for rough and finish milling of final drive housings of 25-ton tanks have been installed in the Chrysler tank arsenal, the first shipment on the consignment of 1000 machines and 8000 tools and fixtures required in the arsenal. Now 80 per cent complete, the plant already is staffed by 1000 workmen and if all machinery arrives on time, five tanks a day on a one-shift basis will be coming off assembly lines by mid-September.

The tanks will be equipped with a 75-millimeter cannon, a 37-millimeter cannon, a 30-millimeter antiaircraft gun and several machine guns. Rough dimensions will be 9 by 9 by 20 feet, accommodating a crew of seven. Power will be supplied by a 400-horsepower radial engine. Engines, armor plate and cannons will be supplied by the govment, with the remainder, including all gun mountings, being manufactured or purchased by Chrysler.

Annual financial report of Chrysler Corp., to be presented to stockholders April 15, shows net profit for 1940 of $37,802,279, equivalent to $8.69 per share of common stock. Provision for taxes in 1940 was $23,500,000, compared with $7,750,000 the year previous.

In connection with defense activities, K. T. Keller, president, points out that the Air Corps is showing some interest in a new in-line liquid-cooled airplane motor designed by Chrysler engineers. He also notes the corporation has undertaken to convert the design of a foreign machine gun to American standards and to produce two standard guns prior to determination of mass production possibilities.



■ Rear fender punch casting weighing 6500 pounds for one of the leading models. Made of high-tensile, chrome-molybdenum iron, the punch is flame hardened along the three speedlines to prevent undue wear

Shell Forging Billets Take Extra of $5 a Ton

Reference to premiums charged on steel bought for shell manufacture to WD specifications, in this department for Feb. 24, was incorrect. Carbon steel billets of the type used in manufacture of 75 and 105-millimeter shells carry a straight $5 per ton extra. This premium at one time was $10 which, incidentally, is the extra now being charged for cold-drawn steel bars bought to WD specifications. A $2 per ton extra is charged on certain grades

(*Please turn to Page* 64)

Precision, smooth finish, uniformity are the prime qualities you insist on in cold drawn steel bars. Our first responsibility to all our customers is to maintain these qualities.

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

"Let Toolmakers Tell Untrained Workers How To Avoid Breakage"

DETROIT

■ "IN THE industrial defense emergency, the unskilled workman is apt to become a costly problem," declares Charles J. Koebel, president, Koebel Diamond Tool Co., Detroit.

"In almost any metalworking plant—particularly those with defense contracts—you'll find many newly hired men. Most of them are inexperienced, yet the pressure for production is such that they must be entrusted with costly machines and valuable small tools. Result: An appalling damage bill is being paid by industry. This is reflected principally in the breakage of small tools—the result of operations of newly-hired men who are not necessarily careless but are untrained, or hastily trained, at their job."

Later, national educational programs may come to the rescue. Says Mr. Koebel: "Such programs as are now being fostered by the government and by technical schools and societies eventually will train the necessary quota of skilled mechanics. Meanwhile, where may we look for a practical means of training the industrial draftee?

"Put it up to the makers of the tools," suggests Mr. Koebel. "Let them understand that in today's emergency, the manufacture and delivery of a satisfactory product is only a part of their job. Let the small tool manufacturer also be responsible for telling the untrained workman how to take care of the tool."

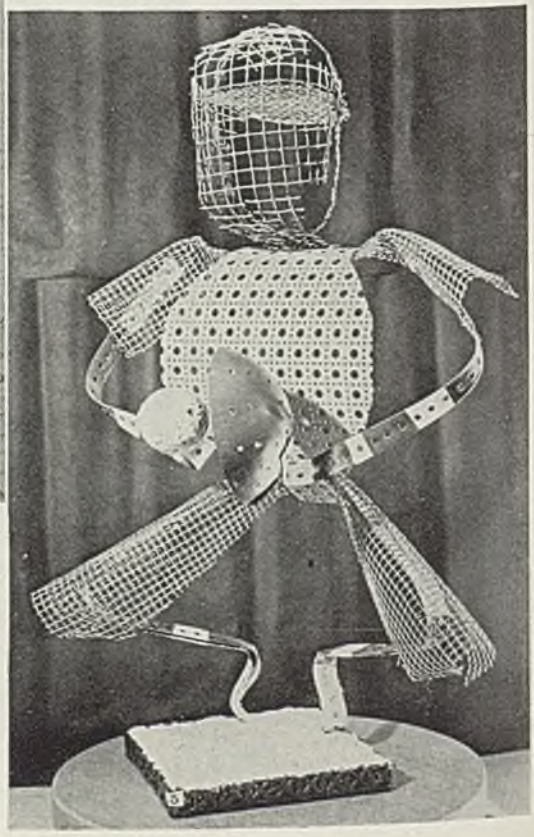
The method he suggests is simple. "Put the responsibility on each tool manufacturer to study what is happening to his product in the hands of the new workman. Have him find out (if he doesn't already know) exactly what information the workman needs.

"Then the tool manufacturer can supply the information to them in a pamphlet or booklet, using plenty of pictures. It must be worded in the simplest possible language — the workman's own terms.

"It is surprising how few such pieces of printed matter are published. Literature put out by manufacturers who sell to industry has been confined mostly to advertising material. The small amount of instruction literature is usually written briefly in technical language for engineers or tool supervisors. Such 'instruction' is useless to the foreman or older employe who must face the problem of educating the newcomer.

"Experience shows that workmen are more than willing to study information presented in attractive easy-to-read form. Foremen, tool supervisors and executives welcome such literature and facilitate its distribution to their employes."

Mr. Koebel has proved this. He has published a booklet *For (Grinder) Men Only* addressed to machine operators to simplify for them the many problems of handling diamond tools. The Koebel correspondence files attest to the success of this book. Requests for it have been plentiful; acknowledgment letters received from workmen as well as from executives have been grateful as well as enthusiastic. A copy can be obtained by writing Koebel Diamond Tool Co., 9375 Grinnel avenue, Detroit. Also available without charge is a factory poster, size 11 x 17 inches, without advertising material, and bearing this inscription, "When any man adds a single hour to the production life of a tool, or makes that tool do better work, that man makes a worthwhile contribution to American ideals and to America's future."



Steel as "A Medium for Expression"

■ Novel "sculptures" like that at the right, entitled "Baseball", are fashioned by a New York painter-sculptor, and present "in artistic terms" ordinary steel products. Popular with the public at several art exhibits, the hardware sculptures are created from pipe, screens, chicken wire, nuts, bolts, sieves and similar materials. Above, a huge bomb weighing nearly a ton has been placed on exhibition in London as a giant money-box for collection of funds to purchase a Spitfire pursuit plane. Children's contributions help swell the fund. NEA photos

Suggestions Asked on Proposed Scrap Price Differential Schedule

■ DIFFERENTIALS on all grades of iron and steel scrap and for all principal consuming and marketing centers have been issued as a tentative schedule by the price stabilization division of the National Defense Advisory Commission. Copies of the schedule were mailed last week to various trade associations which will transmit them to members for comment. Instructions accompanying the schedule asked that comment be submitted to the price stabilization division.

The differentials are said to be in line with the suggestions offered at a meeting of scrap industry representatives with price stabilization division officials in Washington several weeks ago.

Proposed differentials between scrap centers are based on the Pittsburgh price of $21 for No. 1 heavy melting steel upon which the division insists. The schedule was worked out on the basis of trade paper quotations for the period Sept. 1 to Dec. 31, 1940.

Besides the dealers and brokers in the various cities named, steel mills, foundries and others interested have been asked for comment. Unless comment in the form of serious objections is received, the schedule probably will become official.

Suggested differentials are listed in accompanying table.

	No. 1 Heavy Melting Steel Proven diff.	No. 2 Heavy Melting Steel Proven diff.	Hydraulic Compressed Sheet Scrap Proven diff.
Pittsburgh	Base	Base	Base
Chicago	—1.53	—1.11†	—2.29
Philadelphia	—1.06	—0.69	—1.08
Youngstown	+0.27	+0.55	—0.25
Cleveland	—0.71	—0.18	—1.20
Cincinnati	—3.89*	—4.00*	—5.04
St. Louis	—4.15*	—3.37*	—8.19‡
Birmingham	—3.63	—2.96	***
Buffalo	—0.67	—1.12	—2.79
Detroit	—4.99*	—4.87*	—2.83
New York	—5.36*	—4.43*	***
Boston	—6.87*	—6.54*	***
(Delivered dealers' yard)			
San Francisco (net)	—7.71	—7.65	—10.63
Los Angeles (net)	—8.18	—7.65	—10.63
Seattle (net)	—7.42	—7.65	—10.63
Export			
New York	—5.23*	—4.71*	
Boston	—4.89*	—4.68*	

*Dealers' buying prices. †Auto heavy melting—alloy free. ‡Bundled sheets. ***Not quoted.

	Railroad Scrap Rails Proven diff.	Rails—3-foot & Under Proven diff.	No. 1 Machinery Cast Proven diff.
Pittsburgh	Base	Base‡	Base§
Chicago	+0.62†	—3.21	—3.49
Philadelphia	+1.72†	***	+1.29§
Youngstown	***	***	***
Cleveland	+1.93†	—0.38	+0.92§
Cincinnati*	+0.96†	—1.50	—0.28
St. Louis	—0.26†	—3.22	—1.70
Birmingham	—3.76†	—6.94	—3.93
Buffalo	—1.15	—0.84	—1.03
Detroit	***	***	—2.59††
New York*	—3.76†	***	—3.16
Boston*	***	***	—1.85‡‡
Export			
Boston	—6.58	***	***

*Dealers' buying prices. †Specified as "for rolling". ‡2-foot and under. § No. 1 cupola cast. ††Automotive cast. ‡‡Delivered consumers' yards. ***Not quoted.

	Mixed Borings & Turnings Proven diff.	Stove Plate Proven diff.	Heavy Steel Axle Turnings Proven diff.
Pittsburgh	Base	***	Base
Chicago	***	—5.28	—1.43
Philadelphia	***	Base	—1.34
Youngstown	***	***	***
Cleveland	—0.51	—2.61	—0.42
Cincinnati	***	—5.34*	***
St. Louis	—3.87	—3.98*	***
Birmingham	***	—6.59	***
Buffalo	—1.17	—1.35	***
Detroit	—3.05*	—6.17*	***
New York	***	—4.41*	***
Boston	—6.66*	—5.46*	***

*Dealers' buying prices. ***Not quoted.

	Hand Bundled Sheets Proven diff.	Machine Shop Turnings Proven diff.	Railroad Steel Specialties Proven diff.
Pittsburgh	Base	Base	Base
Chicago	—2.63	—1.84	—4.09
Philadelphia	—2.80	—0.94	—1.73
Youngstown	***	—1.22	***
Cleveland	—3.55	—2.27	***
Cincinnati	—7.97*	—5.94	—7.64‡‡
St. Louis	***	—4.71	—5.11§
Birmingham	***	***	***
Buffalo	—3.17†	—1.96	—2.09
Detroit	—5.80‡	—3.82	***
New York	***	—5.44††	***
Boston	***	—6.33	***

*Loose sheet clips. †Old hydraulic bundles. ‡Sheet clips. ††Clean steel turnings. ‡‡Tires only. §Springs. ***Not quoted.

	Short Shoveling Turnings Proven diff.	Cast Iron Borings Proven diff.	Cast Iron Carwheels Proven diff.
Pittsburgh	Base	Base	Base
Chicago	—2.58	—1.50	—1.76
Philadelphia	***	—0.43	+0.30
Youngstown	***	***	***
Cleveland	—3.04	—0.84	***
Cincinnati	***	—6.35	—3.77
St. Louis	—3.28*	***	—1.77
Birmingham	—5.61†	—6.82	—4.42
Buffalo	—2.02	—1.47	—3.45
Detroit	—4.61	***	***
New York	***	—5.28	***
Boston	***	—5.52‡	***

*Heavy turnings. †Long turnings. ‡Chemical. ***Not quoted.

	Heavy Breakable Cast Proven diff.	Railroad Malleable Proven diff.	Low Phos Billet Crops & Punchings Proven diff.
Pittsburgh	Base	Base	Base
Chicago	***	—1.49	—4.21
Philadelphia	+4.04	—2.28	—1.66
Youngstown	***	***	***
Cleveland	***	—0.80	—1.87
Cincinnati	***	—4.56	***
St. Louis	+0.22*	—4.54	***
Birmingham	***	***	***
Buffalo	+1.83†	—1.73	—1.11
Detroit	—1.95*	***	—7.52*‡
New York	+0.09*	***	***
Boston	—1.70*	***	***

*Dealers' buying prices. †No. 1 cupola cast. ‡Plate. ***Not quoted.

Instructions Outlined for Obtaining Preference Ratings on Defense Work

■ DETAILED instructions for filling out application forms for preference ratings have been issued by the office of the Administrator of Priorities. Contents of an application form are reproduced on page 41.

Two copies of the application should be mailed to the Administrator of Priorities, Federal Reserve building, Washington.

The application should, if possible, contain all information which the applicant considers necessary, but if more space is required to answer a particular item, the supplementary information may be stapled to the application form.

The priorities office has requested a separate application be filed for each case presented. "Each case," it is explained, means each need for a particular kind of material, equipment or service (excluding labor) which can be filled by a *single* supplier and which is used in completing deliveries under a *single* contract except as outlined in item 8A on the application form. Separate orders for material placed with a supplier may be included in one application if the material on the several orders is similar and is all to be used in filling the same contract.

A single form should not be used for entirely different articles even though produced by the same firm. Where orders for the same material are given to several companies, a separate application for each supplier should be filled.

Under "Applicant's name" in the application form should be inserted the legal name of the company or individual requesting the rating.

In the following detailed instructions the item numbers and subdesignations correspond with those in the application form.

1. (a) The material on which priority is requested should be described in sufficient detail so as to be easily identified by the person examining the application. Quantities needed should be stated exactly and should be limited to the amount actually required in filling the orders covered by item 8. If the exact dollar value of the material is not known, a reasonable estimate will be sufficient.

(b) The "required delivery date" should be the *latest date* which will meet the requirements of the application. This information should be furnished even though the order has not been placed. If a series of deliveries are to be made, the complete schedule should be indicated.

2. If the order has not been placed, the item should be answered "no," together with an explanation of why it has not been placed, and the names of prospective suppliers should be given. If part of the material has been ordered and part of it is unordered, indicate what proportion has been ordered, and give the information requested as to the part ordered.

(a) State the legal name of the supplier and the address to which communications concerning the orders may be addressed.

(b) The number of the order or contract is the identifying number placed on it by the applicant.

3. "Related applications" are those covering material to be used in the production of the same goods, for which the material described in item 1 is to be used. For example, if it is necessary to apply for a rating on steel, a hack saw, and an electric motor, reference should be made, in answering item 3 of the application for steel, to the application for the hack saw and the electric motor; and in the application for an electric motor reference should be made to the hack saw and steel applications, etc.

4. This item is pertinent if the applicant has already received a rating on part of the material necessary to complete an order, but finds it necessary to apply for a rating on other material. Please furnish rating (and the number of the Preference Rating Certificate). If the preference rating is on an Army or Navy contract or an extension thereof identify by number and indicate the type of material covered by the rating, e.g.: Ordnance Department Contract No. 825, machine guns, A-1.

5. In accordance with the basic policy underlying the preference rating system, each applicant should try to solve his problem before requesting a preference rating. In the case of a request for new equipment, attempts to place the work with subcontractors should be made; in the case of raw materials or services, consideration should be given to the use of substitutes; and reasonable attempts should have been made to obtain the material from other suppliers, including suppliers in various parts of the United States. Each of these efforts should be mentioned.

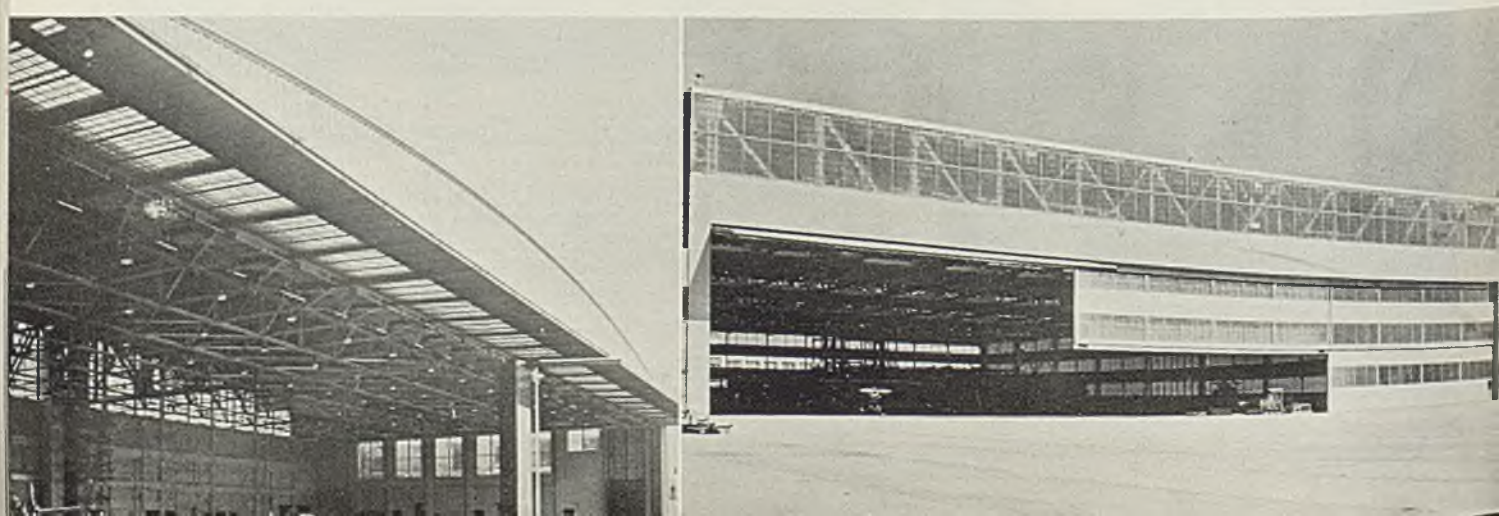
6 and 7. A preference rating should not be requested for material or for a particular job if the applicant has on hand such material *or similar* material which might be used.

8. All the space for the question may be used to answer any one section, since only one section is to be answered on a single application.

A. For purposes of this ques-

High, Wide and Handsome

■ **Steel doors for airplane hangars must be of tremendous size to accommodate the huge transport and clipper planes in service today. Illustrated below at left are vertical-lift, canopy-type doors, each 42 x 162 feet, at LaGuardia Field, New York. At right below, are shown doors of the Glenn L. Martin Co.'s assembly plant at Baltimore, which are 300 feet wide and 43 feet 6 inches high. All were manufactured by Truscon Steel Co., Youngstown, O.**



tion "U. S. Government" orders include nonmilitary, as well as military orders. If the application covers productive equipment or facilities which will be used to fill many orders, a general description of the orders will be sufficient, e.g.: Material to be used to fill orders of Pratt & Whitney and Curtiss-Wright for valves. If the material is to be used in a single order, describe only that order.

B. "Subcontracts," as used herein, shall include (a) contracts for material between prime contractors and any persons; (b) contracts for related materials between such persons and any suppliers; (c) contracts for related materials at any stage of production or processing which directly or indirectly enter into or contribute to the production or processing of materials ultimately to be delivered by the prime contractor. For example, a steel producer is a subcontractor to a wheel manufacturer, who is a subcontractor to a tank manufacturer.

a. The name and address of the contractor should be that of its principal office.

b. The description should make clear the use to which the material furnished by the applicant as to use and construction will be put by the prime contractor or the subcontractor who will receive it.

C. The answer to this item should make clear how the national defense program will be furthered by the granting of preference to the order in question. It is understood that in certain cases, nonmilitary equipment may be of great importance, but the applicant is requested to make a careful evaluation of this point before submitting this application.

9. If the shifts are other than 8-hour, 5-day-a-week shifts, this fact should be noted.

10 "Plant" means the factory or other production unit which is expected to make the material. If the product is to be made in several locations and assembled in another, give the location of the assembly point. It is contemplated that the applicant may have to obtain information from the producer in order to answer this item.

Further information, if desired, may be obtained from the Administrator of Priorities, Information Section, Washington.

■ Shipments of household washers and ironers in January, 1941 were 133,411 and 20,986, respectively, increases of 9.57 per cent and 32.03 per cent over the previous record in January, 1937, states the American Washer and Ironer Manufacturers' Association, Chicago.

APPLICATION FOR PREFERENCE RATING

Circular No. 1 Contains Instructions for Preparation of Application

Please use typewriter.
Applicant must be the concern which is to use the material, equipment, or service, (excluding labor) hereinafter called "material".
A separate application must be filed for each case presented.

To the ADMINISTRATOR OF PRIORITIES,
Federal Reserve Building
Washington, D. C. ..... 19.....

Applicant .....

Address .....

hereby requests issuance of a Preference Rating for the following material:

1. (a) Quantity, description and approximate dollar value of material for which a rating is requested.

   (b) Required delivery date:

2. If order for material has been placed, state
   (a) Name and address of the supplier.
   (b) Number of order.
   Date of order.
   Date delivery promised.

3. If the applicant is making other related applications for preference ratings at this time, list each application giving type of material and date of application.

4. If the applicant has already received a preference rating in connection with any portion of the contract listed in item 8, describe the item rated, the rating, and identify by the number of the preference rating certificate or contract number.

5. What effort has the applicant made to secure the material described in item 1?

6. If the applicant has in stock any material listed in item 1, state the amount of such material.
   (a) Will all such material in stock be used in completing the contract described in item 8?
   (b) If all such material in stock will not be so used, give the amount not to be used and the reasons therefor.

7. To what extent can the applicant use a substitute for the material described in item 1? Has the applicant any such material in stock?

Answer only one Section—A, B, or C

8. A. If the applicant is to use the material for filling a United States Government contract or order given directly to the applicant, insert here name of government department, number and date of contract, description of item being furnished, quantity, dates of delivery requested, and other pertinent facts.
   B. If the applicant is a sub-contractor of a prime U. S. Government contractor, state:
   (a) Name and address of the prime contractor.
   (b) Exact description of what the applicant is to furnish the prime contractor, specifying quantities and delivery dates to be met.
   (c) Identify the prime contract in accordance with the outline suggested in item 8A, and give the preference rating if any.
   C. If the applicant requires the material for purposes other than mentioned in items A and B, state fully the purpose for which it is to be used, and how the issuance of a rating will promote the defense program.

9. How many shifts are being employed in the plant or part of the plant, in which the material is to be used?

10. Location of plant in which material is to be produced or assembled by supplier.

11. Any additional information which the applicant may wish to present:

Please include on this form all information you think relevant to the problem.
DO NOT SEND LETTERS OF TRANSMITTAL OR EXPLANATION.

It is hereby certified that all of the material listed in Item 1 is essential to the completion of the contract listed in Item 8, that the quantities are not greater than needed for that contract and that the required delivery date is not earlier than the actual need for the material.

.....
Name of Applicant

By .....
Official Title

Subscribed and sworn to before me this
..... day of ..... 191..

.....
Notary Public

(SEAL)

Plant Expansion Contracts Comprise Large Part of Week's Defense Awards

■ DEFENSE PLANT CORP. awards comprised a large part of defense contracts last week reported placed by the War and the Navy departments. Aggregate for the period was $62,628,288, with the Navy's total slightly greater than that of the Army.

War department reported Defense Plant Corp. agreements with the following: Curtiss Propeller division of Curtiss-Wright Corp., New York, $5,221,100 for construction of a building, including machinery and equipment for manufacture of airplane propellers at Beaver, Pa.;

American Brass Co., Waterbury, Conn., $4,750,000 for a new plant for manufacture of ammunition brass and ammunition cups at Kenosha, Wis.;

Briggs Mfg. Co., Detroit, $288,100 for increased machinery and equipment for fabrication of outer-wing assemblies for Douglas Aircraft Corp.;

Bridgeport Brass Co., Bridgeport, Conn., $11,500,000 for a plant, machinery and equipment for manufacture of cartridge cases at or near Indianapolis;

Aeronautical Products Corp., Detroit, $495,880 for addition to present plant, machinery and equipment for fabrication of precision aircraft parts for landing gears, engines and carburetors.

Contract was awarded by the Navy department to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for construction, equipment and organization for operation of an ordnance plant near Canton, O. Estimated cost is not to exceed $16,150,000.

Other contracts reported last week by the War department:

Ordnance Department Awards

Allegheny Ludlum Steel Corp., Watervliet, N. Y., steel rods, $225,595.08.

American Brass Co., Waterbury, Conn., aluminum bronze, $2235.87.

American Locomotive Co., New York, springs, condenser, $6942.

American Manganese Bronze Co., Holmesburg, Pa., bronze case castings, $2800.

American Transformer Co., Newark, N. J., transformers, $2690.

Ames Baldwin Wyoming Co., Parkersburg, W. Va., shovels, $1797.26.

Ampco Metal Inc., Milwaukee, phosphorous bronze bars, bronze castings, tools and dies, $11,674.77.

Apex Tool & Cutter Co. Inc., Shelton, Conn., tools, cutters, $5276.

Armstrong-Blum Mfg. Co., Chicago, hydraulic roll machines, $14,126.34.

Arvey Corp., Jersey City, N. J., disc targets, $5252.50.

Associated Spring Corp., Wallace Barnes Co. division, Bristol, Conn., springs, $5663.10.

Atlas Press Co., Kalamazoo, Mich., shapers, $6600.

Barber Colman Co., Rockford, Ill., cutters, $1518.08.

Barwood & Co., Philadelphia, inspection gages, $5272.80.

Belknap Hardware Co. Inc., Louisville, Ky., crowbars, $2938.41.

Bendix Aviation Corp., Marine division, Brooklyn, N. Y., repeaters, $4125.

Benson, L. A., Co. Inc., Cleveland, reamers, $1925.80.

Bethlehem Steel Co., Bethlehem, Pa., steel, nuts, $15,289.20.

Black & Decker Mfg. Co., Towson, Md., saws and grinders, $4190.58.

Bliss, E. W., Co., Brooklyn, N. Y., draw presses, $23,362.

Bonney Forge & Tool Works, Allentown, Pa., tools, $1019.50.

Bridesburg Engineering Co., Philadelphia, tools, $2746.

Brown & Sharpe Mfg. Co., Providence, R. I., lathes, thread gages, milling machine attachments, $47,959.97.

Cape Ann Tool Co., Pigeon Cove, Mass., steel forgings, $6112.

Carboloy Co. Inc., Philadelphia, tools, $2520.

Carpenter Steel Co., Reading, Pa., steel rods, $226,874.34.

Central Steel & Wire Co., Chicago, steel, $1051.48.

Cincinnati Electrical Tool Co., Cincinnati, electric drills, $4030.

Colonial Broach Co., Detroit, broach sections, $4539.20.

Colton, Arthur, Co., Detroit, tablet machines, $120,617.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, $1413.92.

Conkey, W. B., Co., Hammond, Ind., targets, $36,986.

Curley, W. & L. E., Troy, N. J., telescopes, $8520.

Dana Tool-D Nast Machinery Co., Philadelphia, drills, $12,923.63.

Daniels, C. R., Inc. New York, metallic belt links, tool rolls, $33,493.02.

Delta Mfg. Co., Milwaukee, press, $1900.

Denison Engineering Co., Columbus, O., conveying equipment, $26,490.

DeSanno, A. P., & Sons Inc., Phoenixville, Pa., grinding wheels, $1981.91.

Detroit Broach Co. Inc., Detroit, broach section details, $2784.30.

Disston, Henry, & Sons Inc., Philadelphia, armor plates, $26,200.40.

Eaton Mfg. Co., Detroit, springs, $6280.

Elgin Softener Corp., Elgin, Ill., water softening unit, $1071.

Evans', John, Sons Inc., Philadelphia, springs, $1058.

Ex-Cell-O Corp., Continental Tool Works division, Detroit, mills, $1477.

Federal Electric Co. Inc., Chicago, sirens, $2501.10.

Federal Prison Industries Inc., Department of Justice, Washington, tool steel boxes, $3118.49.

Foster, Miller & Bierly Inc., Philadelphia, cast steel wheels, $1069.

General Electric Co., Davenport, Iowa, lighting fixtures, $3307.50.

General Machinery Corp., Hamilton, O., vertical boring and turning mills. $321,-014.

Grainger-Rush Co., Pawtucket, R. I., cable, $10,907.97.

Great Southern Box Co. Inc., New Orleans, wire boxes, $1116.

Greenfield Tap & Die Corp., Greenfield, Mass., taps, $2689.80.

Hadley Special Tool Co. Inc., Boston, carbon removing tools, $38,539.20.

Hamilton Metal Products Co., Hamilton, O., steel chests, $1400.

Hanson-Whitney Co., Hartford, Conn., thread gages, $2149.74.

Hanssen's, Louis, Sons Co., Davenport, Iowa, hardware, $8780.14.

Hardinge Bros. Inc., Elmira, N. Y., lathes, $3200.15.

Hart, Earle, Woodworking Machine Co., Tannewitz Works, Grand Rapids, Mich., band saws, $1244.

Hawkridge Bros. Co., Boston, tool steel, $1520.80.

Heppenstall Co., Bridgeport, Conn., steel, $3168.

Hydraulic Controls Inc., Chicago, hydraulic steering sets, $3055.50.

Hygrade Sylvania Corp., Ipswich, Mass., general lighting units, $1127.85.

Ideal Upholstering Co., Springfield, Mass., small arms materiel, $3270.75.

Ingersoll Milling Machine Co., Rockford Ill., milling machines, $175,500.

International Engineering Works Inc., Framingham, Mass., steel chests, $2306.25.

JCH Automatic Machine Works, Philadelphia, artillery ammunition components, $1237.50.

Jones & Lamson Machine Co., Springfield, Vt., lathes, $148,677.25.

Kidde, Walter, & Co. Inc., New York, fire extinguishers, $12,014.88.

Kux-Lohner Machine Co., Chicago, tablet presses, $106,390.

Landau, A., Co., Philadelphia, tools, $2696.

Landis, A. B., Sons Inc., Philadelphia, artillery ammunition components, $2349.

Langelier Mfg. Co., Providence, R. I., drills, $13,650.

Louisville Electric Mfg. Co., Louisville, Ky., power hacksaws, $4646.

Lufkin Rule Co., Saginaw, Mich., calipers, $1182.

McArdle & Cooney Inc., Philadelphia, pipe cutting and threading machines, $2593.

McGonegal Mfg. Co., East Rutherford, N. J., grinders, $2631.30.

McKiernan-Terry Corp., Dover. N. J., pneumatic staking machines. $10,860.

Manning, Maxwell & Moore Inc., Jersey City, N. J., tools, $1637.30.

Martell & Feree, Philadelphia, tractors, $3966.

Maxson, W. L., Corp., New York, range drums, $20,945.50.

Metal Specialties Co., Cincinnati, O., artillery ammunition components, $760,-972.

Mohawk Machine & Tool Co., New York, gages, $6954.

Montgomery Elevator Co., Moline, Ill., elevators, $12,894.

Moore Special Tool Co., Bridgeport, Conn., tools, $1732.

Mueller Brass Co., Port Huron, Mich., brass rod, $89,599.25.

Murdock Tool Co., Detroit, counterbore pilots, $3175.

National Lead Co., St. Louis, litharge and lead, $1090.25.

National Machine Tool Co., Racine, Wis., hand shears, $1069.

New York Thread Grinding Corp., New York, gages, $1222.10.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., drill assemblies, thread gages, $8815.84.

Normoyle, John J., Co., Moline, Ill., post grinder tool, $1350.

Ohio Seamless Tube Co., Shelby, O., seamless steel, $2367.30.

Parent Metal Products Co., Philadelphia, steel shelving, $43,465.76.

Pennsylvania Electric Steel Casting Co., Hamburg, Pa., steel castings, $2870.87.

Pennsylvania Tool & Mfg. Co., York, Pa., gages, $23,675.

Peters Engineering Co., Philadelphia, hoppers, $2895.

Peterson Bros. Tool Co., Milford, Mass., gages, $6755.

Poor & Co., Canton, O., drop forgings, $2016.

Porter Forge & Furnace Inc., Everett, Mass., steel forgings, $1613.91.

Press, V. & O., Co., Hudson, N. Y., draw presses, $2697.

Proctor & Schwarts Inc., Philadelphia, dryers, $1375.

Putnam Tool Co., Detroit, end mills, $1185.

Reece Button Hole Machine Co., Boston, phosphor bronze rods, $1218.

Reed Mfg. Co., Erie, Pa., wrenches, $13,-379.95.

Remington Arms Co. Inc., Bridgeport,

Conn., small arms materiel, $29,922.81.
Republic Steel Corp., Steel & Tubes division, Cleveland, welded steel tubing, $3186.70.
Reska Spline Products Co., Detroit, thread gages, $3644.
Root, B. M., Co., York, Pa., saws, $4790.25.
Rotary Electric Steel Co., Detroit, steel, $26,341.20.
Ryerson & Sons, Chicago, rings, $1293.20.
Savage Arms Corp., J. Stevens Arms Co. division, Chicopee Falls, Mass., small arms materiel, $5962.80.
Simplicity Pattern Co., Niles, Mich., targets, $12,985.
Snap-On Tools Corp., Kenosha, Wis., wrenches, $3324.25.
Somerville Machine & Foundry Co., Somerville, Mass., bronze castings, $7495.23.
Standard Machinery Co., Providence, R. I., draw presses, $9266.
Standard Pressed Steel Co., Jenkintown, Pa., nuts, $1836.
Starrett, L. S., Co., Athol, Mass., calipers, $9500.80.
Stokes, F. J., Machine Co., Philadelphia, presses, $196,950.
Sun Mfg. Co., Chicago, motor testers, $2625.
Swind Machinery Co., Cincinnati, drilling machines, $7992.
Tabor Mfg. Co., Philadelphia, dust collection system, Frankford arsenal, Philadelphia, $1750.
Thurston Mfg. Co., Providence, R. I., saws, mills, $2649.70.
Timken-Detroit Axle Co., Wisconsin Axle division, Oshkosh, Wis., hubs $3205.86.
Tools & Gages Inc., Cleveland, gages, $6891.
Torq Electric Mfg. Co., Cleveland, attachments for drilling machines, $4305.
Tri-Metal Products Corp., Conshohocken, Pa., manganese bronze base castings, $1504.
Udylite Corp., Detroit, anodes, $1800.
Union Spring & Mfg. Co., New Kensington, Pa., steel springs, $18,496.50.
Union Twist Drill Co., Athol, Mass., cutting tools, drills, mills, hobs, $12,652.58.
United Shoe Machinery Corp., Boston, dies, steel forgings, $4337.55.
Universal Cyclops Steel Corp., Bridgeville, Pa., steel rods, $226,143.42.
Vinco Corp., Detroit, gages, $11,784.70.
Warner Electric Brake Mfg. Co., Beloit, Wis., electric brake wheel units, $59,991.75.
Watson-Stillman Co., Roselle, N. J., accumulators, $1275.
Weinstein, S., Supply Co., New York, hardware, $8041.50.
Weldon Tool Co., Cleveland, cutters, $1238.80.
Wellman, S. K., Co., Cleveland, clutch facings, rivets and washers, $19,323.88.
Western Cartridge Co., Winchester Repeating Arms Co. division, New Haven, Conn., small arms materiel, $35,040.
Whitney, Baxter D., Co., Winchendon, Mass., planers, $3359.
Worcester Pressed Steel Co., Worcester, Mass., carrier plates, $1248.
Wright Aeronautical Corp., Paterson, N. J., tube and flange assemblies, $1541.40.
Youngstown Sheet & Tube Co., Youngstown, O., sheet steel, $5239.49.
Zimmerman Steel Co., Bettendorf, Iowa, castings, $4879.46.

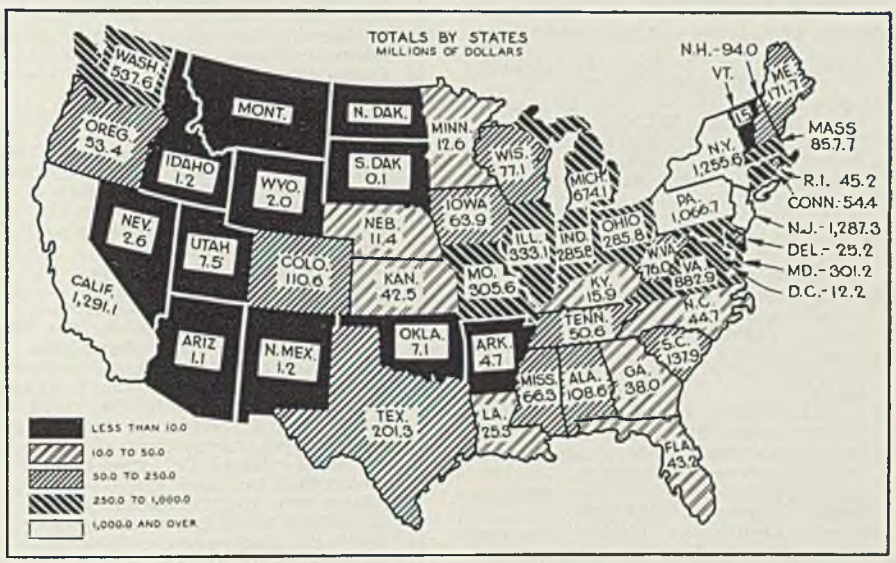
Corps of Engineers Awards

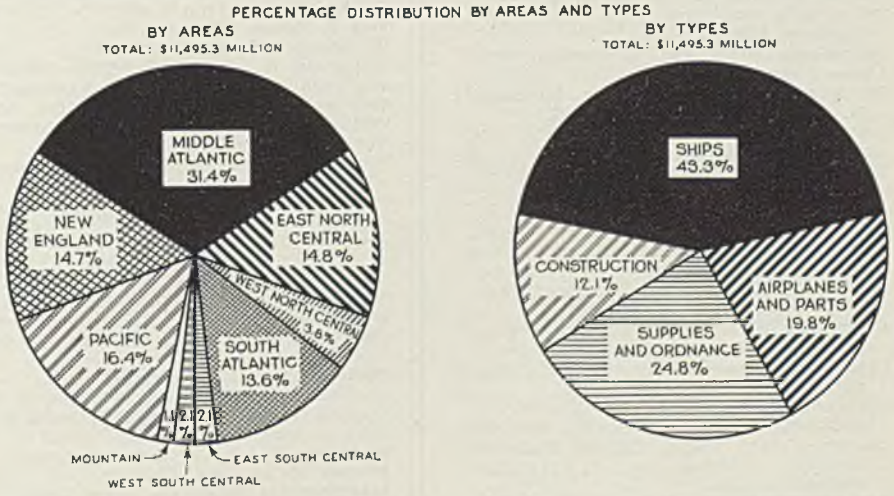
Addressograph-Multigraph Corp., Cleveland, repair parts, duplicating machines, $50,134.58.
American Type Founders Sales Corp., Elizabeth, N. J., drafting equipment, rotary offset presses, $18,167.50.
Anderson, Dorsey C., Philadelphia, welding outfits, $8193.78.
Brown, Arthur, & Co., New York, protractors, $962.50.
Caterpillar Tractor Co., Peoria, Ill., tractors, $9201.43.
County Supply Co., Plainfield, N. J., drills, $14,512.25.
Electrical Industrial Equipment & Supply Corp., Baltimore, lighting fixtures, $1725.44.
Independent Pneumatic Tool Co., Aurora, Ill., pneumatic tools, $14,067.20.
Louisville Electric Mfg. Co., Louisville, Ky., power hack saws, $689.10.
Milburn, Alex, Co., Baltimore, welding and cutting outfits, $670.62.
Okonite Co., Passaic, N. J., copper cable, $19,770.
Pease, C. F., Co., Chicago, reproduction equipment, $4101.25.
Sidney Machine Tool Co., Sidney, O., lathes, $4791.
Smith Welding Equipment Corp., Minneapolis, welding and cutting outfits, $1253.
Western Hardware & Specialty Mfg. Co., Milwaukee, bench grinders, $5886.13.
York Corrugating Co., York, Pa., corrugated pipe, $2850.

Quartermaster Corps Awards

American Box Corp., San Francisco, trunk lockers, $338,934.16.
Atkins, E. C., & Co., Indianapolis, butchers' saws $2806.65.
Dover Stamping & Mfg. Co., Cambridge, Mass., tin cake pans, $3301.49.
Ehret-Day Co., Asbury Park, N. J., construction of automotive shop building, Aberdeen proving ground, Maryland, $247,806.
Federal Motor Truck Co., Detroit, trucks, $13,740.80.
General Motors, Detroit, trucks, $10,417.75.
Green & Wilson, Waterville, Me., replacement of wharf, Ft. Levett, Maine, $44,842.
Miller, A. J., Auto Cruiser Co., Bellefontaine, O., 2-wheel trailers. $1159.15.
Mion Construction Co., Atlanta, Ga., parachute building, parachute training building and boiler house, Lawson field, Ft. Benning, Georgia, $231,460.
Olson Construction Co. and Dobson & Robinson, Lincoln, Nebr., pump house and equipment, Ogden ordnance depot, Utah. $3858.
Protectoseal Co. of America Inc., Chicago, gasoline cans, $4906.44.
Reeves Steel & Mfg. Co., Dover, O., corrugated nesting cans, $263.20.
Snodgrass, Ellis C., Portland, Me., removal and replacement of wharves, Ft. Foster, New Hampshire, $45,000.
Tidmarsh Engineering Co., Tucson, Ariz., horizontal, centrifugal booster pumps and accessories, Ft. Huachuca, Arizona, $11,395.
Village Blacksmith Folks, Watertown, Wis., butchers' cleavers, $2079.
Walker Moody Construction Co. Ltd.,

Distribution of National Defense Awards





■ Distribution, by areas and types, of national defense contracts awarded by the War and Navy departments from June 13, 1940, to Jan. 31, 1941. Aggregate of awards for the period was $11,495,300,000. Total of contracts placed in each state is in millions of dollars. Distribution by areas and type of contract is represented in per cent. Chart was compiled by National Industrial Conference Board, New York, from government reports

Honolulu, T. H., additions to sewage disposal plant, Schofield barracks, Hawaii, $59,172.
Watson Automotive Equipment Co., Washington, ambulances, $119,160.
Wing Electric Co., Worthington, O., underground electric distribution system, Ft. Hayes, Ohio, $10,455.
Wintroath Pumps Inc., Alhambra, Calif., deep well turbine pump, electric control and equipment, Ft. Huachuca, Arizona, $8793.

Air Corps Awards

Douglas Aircraft Co., Santa Monica, Calif., airplanes, $1,195,864.

Chemical Warfare Service Awards

Ellis, George D., & Sons Inc., Philadelphia, faceforms, $5924.70.
Pressed Steel Tank Co., West Allis, Wis., shipping containers, $14,320.70.

Medical Corps Awards

Buck X-Ograph Co., St. Louis, X-ray field units, developing units, $6793.
Case Crane & Kilbourne Jacobs Co., Columbus, O., trailer trucks, $13,296.
Condit, P. N., Boston, conductor tubes, $1620.
Sklar, J., Mfg. Co., New York, vein retractors, $1400.

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Navy department last week reported the following:

Bureau of Supplies and Accounts Awards

Alteneder, Theo., & Sons., Philadelphia, drawing instruments, $7700.
Aluminum Co. of America, Pittsburgh, aluminum alloy, $22,509.
American Brass Co., Waterbury, Conn., copper-nickel-alloy sheets, condenser tubes, brass tubing, $132,160.58.
American Chain & Cable Co. Inc., Bridgeport, Conn., shackles, $49,840.60.
American-LaFrance-Foamite Corp., Elmira, N. Y., portable fire extinguishers, $99,052.50.
American Steel & Wire Co., Cleveland, jackstays, ropes, pendants, lines, electric cable, $385,977.93.
Amthor Testing Instrument Co. Inc., Brooklyn, N. Y., portable tachometers, $8137.50.
Anaconda Wire & Cable Co., New York, electric cable, $149,391.20.
Arma Corp., Brooklyn, N. Y., dead reckoning equipment, $35,278.15.
Automatic Pencil Sharpener Co., Chicago, pencil sharpeners, $12,618.75.
Baldwin Locomotive Works, Standard Steel Works division, Philadelphia, steel propeller shafts, $59,594.90.
Bates Mfg. Co., New York, paper perforators, $12,885.
Bethlehem Steel Co., Bethlehem, Pa., steel bars, $11,058.80.
Blackburn-Smith Mfg. Co. Inc., Hoboken, N. J., duplex strainers, $10,452.
Bristol Aircraft Corp., Bristol, Va., life floats, $193,322.50.
California Steel Products Co., San Francisco, mooring buoys, $83,069.
Chase Brass & Copper Co. Inc., Waterbury, Conn., copper tubing, $12,388.90.
Clyde Iron Works, Duluth, Minn., steam winches, $32,630.
Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $276,967.60.
Columbian Steel Tank Co., Kansas City, Mo., mooring buoys, $91,672.06.
Crane Co., Chicago, composition and steel gate valves, $108,640.
Crescent Insulated Wire & Cable Co., Trenton, N. J., electric cable, $99,148.
Curtiss-Wright Corp., Curtiss Propeller division, Caldwell, N. J., propeller blades, $17,000.
Dekom Shipbuilding Corp., New York, floating work shops, $440,000.
Earle Gear & Machine Co., Philadelphia, set of racks and pinions, $53,520.
Edwards Mfg. Co., Cincinnati, practice bombs, $12,300.
Elgin National Watch Co., Elgin, Ill., stop watches, $93,620.
Federal Motor Truck Co., Detroit, motor trucks, $47,003.
Force, William A., & Co. Inc., Brooklyn, N. Y., numbering machines, $8250.
General Cable Corp., New York, electric cable, $312,611.65.
General Motors Corp., Cleveland Diesel Engine division, Cleveland, diesel engine generator sets, $152,427.
Gisholt Machine Co., Madison, Wis., turret lathes, $62,055.
Graybar Electric Co. Inc., New York, four-way clamps, $32,552.
Hamilton Watch Co., Lancaster, Pa., comparing watches, $9066.30.
Herring, Hall, Marvin Safe Co., Hamilton, O., burglar-resisting safes, $5674.50.
Highway Trailer Co., Edgerton, Wis., four-wheel trailers, $34,172.20.
Ingersoll-Rand Co., New York, air compressors, $380,771.
Insinger Machine Co., Philadelphia, washing machines, $11.360.
International Nickel Co. Inc., New York, alloy nickel, copper and nickel-chromium-alloy, $1,580,150.10.
Kittle Mfg. Co., Los Angeles, practice bombs, $19,350.
Lamar Indicating Fuse Corp., Pittsburgh, fuse indicators, $5539.
Leland-Gifford Co., Worcester, Mass., drilling machines, $7300.
L'Hommedieu, Chas. F., & Sons Co., Chicago, motor generator sets, $10,741.
Lionel Corp., New York, compensating

PURCHASES UNDER

(In Week Ended Feb. 21)

Iron and Steel Products	Commodity	Amount
Aluminum & Brass Co., Lockport, N. Y.	Cylinders	$13,500.75
American Brake Shoe & Foundry Co., American Forge division, Chicago	Forgings	111,600.00
Ames, W. R., Co., San Francisco	Ammunition boxes	20,112.00
Anderson, Albert & J. M., Mfg. Co., Boston	Cartridge cases	1,623,930.00
Apollo Steel Co., Apollo, Pa.	Sheet steel	94,399.41
Armstrong Bros. Tool Co., Chicago	Socket wrenches	167,485.19
Atlas-Ansonia Co., New Haven, Conn.	Fuse parts	484,000.00
Bethlehem Steel Co., San Francisco	Wire rope	46,212.00
Bethlehem Steel Export Corp., New York	Fabricated steel	3,699,985.01
Bridgeport Thermostat Co. Inc., Bridgeport, Conn.	Bomb bodies, fins	217,728.00
Carnegie-Illinois Steel Corp., Washington	Sheet steel, steel	324,982.62
Columbia Steel Co., San Francisco	Reinforcement bars, wire rope	35,713.60
Columbian Steel Tank Co., Kansas City, Mo.	Storage tanks	56,694.20
Crane Co., Chicago	Valves	21,163.50
Frasse, Peter A., & Co. Inc., New York	Steel tubes	15,410.20
Globe Machine & Stamping Co., Cleveland	Cartridge cases	491,000.00
Globe-Wernicke Co., Cincinnati	Partitions	10,547.00
Greene-Wolf Co. Inc., Brooklyn, N. Y.	Unions	14,934.00
Hager, C., & Sons Hinge Mfg. Co., St. Louis	Hinge hasps	22,602.77
Hard Mfg. Co., Buffalo	Metal litters	23,628.00
Heintz Mfg. Co., Philadelphia	Doors, scuttles	894,374.67
Hoover Co., North Canton, O.	Fuse parts	3,923,300.00
Kutztown Foundry & Machine Corp., Kutztown, Pa.	Bed plates	15,764.00
Leschen, A., & Sons Rope Co., San Francisco	Wire rope	39,243.00
Maclane Hardware Co., New York	Tools	84,115.50
Milwaukee Stamping Co., Milwaukee	Canister bodies	43,475.00
Norris Stamping & Mfg. Co., Los Angeles	Cartridge cases	2,664,000.00
Ohio Galvanizing & Mfg. Co., Niles, O.	Trailer trucks	24,980.00
Oliver Iron & Steel Corp., Pittsburgh	Bolts	23,384.21
Omaha Steel Works, Omaha, Nebr.	Steel for bridge	12,581.41
Parker Appliance Co., Cleveland	Couplings	12,776.00
Plomb Tool Co., Los Angeles	Socket wrenches	81,330.09
Risdon Mfg. Co., Naugatuck, Conn.	Grommets	67,296.20
Slaymaker Lock Co., Washington	Bolts	15,048.31
Spetnagel Hardware Co., Chillicothe, O.	Cotter pins	13,274.64
Struthers Wells-Titusville Corp., Titusville, Pa.	Forgings	172,152.00
Taylor Wharton Iron & Steel Co., New York	Steel cylinders	101,292.50
Veit & Young, Philadelphia	Blanks	13,226.00
Weatherhead Co., Cleveland	Fuse parts	1,032,000.00
Weinstein, S., Supply Co., New York	Chisels	10,341.30
Westergard Boat Works Inc., Rockport, Tex.	Hull and fittings	240,628.00
Westinghouse Electric & Mfg. Co., Springfield, Mass.	Fuse parts	944,000.00
Williams, F. C., Inc., Dearborn, Mich.	Heating units	58,098.80
York Safe & Lock Co., York, Pa.	Brake rings	13,894.35
Youngstown Sheet & Tube Co., Youngstown, O.	Bar steel	61,966.00

Nonferrous Metals and Alloys		
Aluminum Co. of America, Pittsburgh	Alloy aluminum, conductors and assemblies	$51,814.66
American Brass Co., Waterbury, Conn.	Brass	11,894.50
Bridgeport Brass Co., Bridgeport, Conn.	Cartridge cases	2,664,240.00
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Brass rod, cartridge cases, brass	852,282.52
Chelsea Clock Co., Chelsea, Mass.	Clocks	66,030.00
Columbian Bronze Corp., Freeport, N. Y.	Bronze castings	12,250.00
Doehler Die Casting Co., Pottstown, Pa.	Nozzles, booster cups	62,986.00
General Fire Truck Corp., Detroit	Fire extinguishers	10,470.00
Hamilton Watch Co., Lancaster, Pa.	Watches	38,832.64
Harvey Metal Corp., Chicago	Forgings	73,614.48
International Silver Co., New York	Silverplated ware	29,210.46
Phelps Dodge Copper Products Corp., New York	Brass pipe	41,715.95
Rembrandt Lamp Corp., Chicago	Bridge lamps	18,380.00
Revere Copper & Brass Inc., Baltimore	Cartridge brass	47,500.00
Scovill Mfg. Co., Waterbury, Conn.	Condenser tubes	12,771.20
Scrimgeour, William, Washington	Forks	70,880.00
Wallace, R., & Sons Mfg. Co., Wallingford, Conn.	Silver-plated ware	110,368.35

binnacles, $52,500.
Lloyd & Arms Inc., Philadelphia, piston ring machines, $14,736.
Lummus Co., New York, air ejectors, $38,597.44.
Market Forge Co., Everett, Mass., sounding machine sinkers, two-wheel trucks and stands, $44,370.
Mathes Lewin Co., East St. Louis, Ill., copper tubing, $18,857.40.
Metalite Mfg. Co., Los Angeles, scoops, $15,552.
Mine Safety Appliances Co., Pittsburgh, parts and tools for portable, powder-actuated tools, $43,832.21.
Morse Diving Equipment Co. Inc., Boston, air pumps, diving apparatus, $17,-657.40.
National Electric Products Corp., Pittsburgh, electric cable, $18,585.10.
Niagara Searchlight Co., Niagara Falls, N. Y., electric flashlights, $39,014.98.
Okonite Co., Passaic, N. J., electric cable, $239,347.08.
Oliver Iron & Steel Corp., Pittsburgh, steel bolts and nuts, $119,330.57.
Oliver Machinery Corp., New York, endless sanders, $24,730.
Outboard, Marine & Mfg. Co., Evinrude Motors division, Milwaukee, outboard motors, $65,429.52.
Packard Motor Car Co., Detroit, marine motor spare parts, $15,823.24.
Parker Appliance Co., Cleveland, cable testing machines, $14,000.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, electric cable, $276,214.50.
Pierce, F. J., Pasadena, Calif., outboard motors and spare parts, $52,090.92.
Pittsburgh Screw & Bolt Corp., Pittsburgh, steel bolts, $22,000.71.
Polarized Products Corp., Whitestone, Queens, L. I., New York, polarizing plates, $19,840.
Pump Engineering Service Corp., Cleveland, engine-driven fuel pumps, $88,-971.
Reiner, John, & Co. Inc., Long Island City, N. Y., diesel engine generator sets, $280,286.10.
Reo Motors Inc., Lansing, Mich., motor trucks, $32,936.40.
Reynold-Robson Supply Co., Frankford, Philadelphia, motor generator sets, $17,514.
Rockbestos Products Corp., New Haven, Conn., electric cable, $17,448.30.
Roebling's, John A., Sons Co., Trenton, N. J., wire rope and strand, $19,425.40
Rooksby, E. J., & Co., Philadelphia, portable boring bars, $28,865.
Savory Inc., Newark, N. J., tin pie plates, steel fry pans, $26,400.
Scrimgeour, William, Washington, meat chopping (grinding) machines, $9933.
Simmons Co., New York, troop standee berths, $32,681.
Submarine Signal Co., Boston, regulators, $16,235.10.
Superior Metal Products Co., St. Paul, practice bombs, $54,360.
Taylor-Parker Co. Inc., Norfolk, Va., milling machine cutters and saws, $28,226.67.
Taylor, S. G., Chain Co., Hammond, Ind., chains and fittings, $17,072.29.
Thermandor Electrical Mfg. Co., Los Angeles, practice bombs, $119,700.
Union Metal Mfg. Co., Canton, O., practice bombs, $57,350.
United Aircraft Corp., East Hartford, Conn., propeller blades, $20,850.
Virginia Machinery & Well Co. Inc., Richmond, Va., composition valves, $16,-522.
Wall, P., Mfg. Supply Co., Pittsburgh, practice bombs and suspension bands, $286,960.
Walworth Co., New York, composition valves, $11,186.
Welding, J. K., Co. Inc., Brooklyn, N. Y., floating workshops, $491,000.
Willis, E. J., Co., New York, bilge pumps, $24,500.
Wire Rope Corp. of America Inc., New Haven, Conn., steel wire rope, $87,323.
Woodhaven Metal Stamping Co. Inc., Brooklyn, N. Y., light wells, $15,000.
Young, H. G. W., Co., Boston, vegetable cubing and slicing machines, $34,758.75.
Zimmer-Thomson Corp., Jamaica, Long Island, N. Y., aluminum pole litters, $34,350.

WALSH-HEALEY ACT—

Machinery and Other Equipment

Commodity	Amount
Allith-Prouty Inc., Danville, Ill.	Stand assemblies	$88,750.00
American Hoist & Derrick Co., St. Paul, Minn.	Winches	32,207.00
Babcock Printing Press Corp., New London, Conn.	Machining forgings	607,500.00
Bay City Shovels Inc., Bay City, Mich.	Crane truck	14,400.00
Blakeslee, G. S., & Co., Chicago	Potato peelers	14,361.75
Bradford Machine Tool Co., Cincinnati	Lathes	241,735.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Milling machines	16,469.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	21,720.00
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.	Dishwashers	68,770.00
Copeland Refrigeration Corp., Sidney, O.	Refrigerators	25,306.00
Davenport Besler Corp., Davenport, Iowa	Locomotives	125,250.00
DeLaval Separator Co., New York	Oil purifying units	10,745.00
DeLaval Steam Turbine Co., Trenton, N. J.	Pumps	1,350,000.00
Dutton-Lainson Co., Hastings, Nebr.	Shell	206,323.20
Easton Car & Construction Co., Easton, Pa.	Electric trucks	11,125.50
Ellicott Machine Corp., Baltimore	Dredge	1,525,500.00
Farnham Mfg. Co., Buffalo	Roll forming machines	10,326.48
Fate-Root-Heath Co., Plymouth, O.	Locomotives	125,250.00
Gammons-Holman Co., Manchester, Conn.	Reamers	11,124.50
General Electric Co., Washington	Locomotive	26,090.00
General Machine Co., Newark, N. J.	Blenders	44,974.00
General Motors Corp., Cleveland Diesel Engine division, Cleveland	Generator engine parts	12,806.94
Gosiger, C. H., Machine Co., Dayton, O.	Lathes	240,109.80
Greenfield Tap & Die Corp., Greenfield, Mass.	Gages	51,557.54
Hobart Mfg. Co., Troy, O.	Dishwashers	22,783.25
Hussmann-Ligonier Co., St. Louis	Refrigerators	31,205.00
Imperial Machine & Foundry Corp., Long Island, N. Y.	Potato peelers	13,750.00
Independent Engineering Co. Inc., O'Fallon, Ill.	Portable helium purification laboratories	124,840.00
Jacobson & Co. Inc., New York	Engine test equipment	48,847.84
Kinsey, E. A., Co., Indianapolis	Grinders	15,214.00
Lakeside Bridge & Steel Co., Milwaukee	Cranes	172,560.00
Lees-Bradner Co., Cleveland	Milling machine	39,458.70
Linn Mfg. Corp., Morris, N. Y.	Tractor trucks	26,155.08
Liquid Carbonic Corp., New York	Soda fountains	*73,417.50
Lodge & Shipley Machine Tool Co., Cincinnati	Lathes	32,648.00
Lucks, Oscar, Co., Seattle	Bakery machines	27,155.55
Manning, Maxwell & Moore Inc., Bridgeport, Conn.	Gage assemblies	459,185.00
McKiernan-Terry Corp., Harrison, N. J.	Boat crane	109,600.00
McLachlan, F. S., Co. Inc., New York	Exhaust systems	31,430.00
Miller-Dunn Co., Miami, Fla.	Diving apparatus	34,260.00
Modern Tool & Die Co., Philadelphia	Gages	64,360.00
Monarch Machine Tool Co., Sidney, O.	Lathes	59,916.00
Montgomery Elevator Co., Moline, Ill.	Elevators	12,894.00
Nathan-Straus-Duparquet Inc., New York	Refrigerators	24,280.00
Osgood Co., Marion, O.	Crane	20,500.00
Pollak Mfg. Co., Arlington, N. J.	Bomb racks	65,000.00
Porter, H. K., Co. Inc., Pittsburgh	Locomotives	282,000.00
Price Bros. Inc., Frederick, Md.	Antenna	12,116.50
Pullman Standard Car Mfg. Co., Butler, Pa.	Machining shell	1,590,000.00
Read Machinery Co. Inc., York, Pa.	Mixers	20,925.00
Sealed Power Corp., Muskegon, Mich.	Diesel engine parts	30,831.00
Sidney Machine Tool Co., Sidney, O.	Lathes	52,533.00
Silent Hoist Winch & Crane Co., Brooklyn, N. Y.	Cranes	13,935.00
Smith-Courtney Co., Richmond, Va.	Lathe	11,372.00
Smith's, John E., Sons Co., Buffalo	Food cutters	15,975.00
Stewart-Warner Corp., Chicago	Diesel engine parts	57,523.50
Sturtevant, B. F., Co., Boston	Blower, packing rings	46,956.14
Talon Inc., Meadville, Pa.	Gages	27,544.50
Timken Roller Bearing Co., Canton, O.	Roller assemblies	45,005.76
Vandyck Churchill Co., New York	Boring mill	24,835.00
Walker Mfg. Co. of Wisconsin, Racine, Wis.	Jacks	12,284.00
Warren Steam Pump Co. Inc., New York	Pumps	708,328.00
Willys-Overland Motors Inc., Toledo, O.	Shell	8,862,040.00
Worthington Pump & Machinery Corp., Harrison, N. J.	Condensing plant equipment, pumps	60,233.00

*Estimated.

Aircraft Industry's Hiring Rate Gains 250% in Year

A year ago a total of 29 eastern and western manufacturers of airplanes, engines, and propellers were hiring 1491 new employes each week; now 5195 new workers are being added to aircraft payrolls each week, according to the Aeronautical Chamber of Commerce of America, Washington.

"This national increase of approximately 250 per cent in the period of a year, coupled with tremendous expansion programs and development of more rapid production methods, indicates the manner in which the American aircraft industry is cooperating for national defense."

Activities of Steel Users, Makers

■ MONARCH Machine Tool Co.'s $650,000 plant addition in Sidney, O., which was started Jan. 17, will be finished ahead of schedule and operations will begin by March 10, according to Wendell E. Whipp, president. Monarch's plant is operating on a two-shift basis of 60 hours a week and shipments in the first two months this year were 120 per cent over shipments in the first two months of 1940. The entire output is going into defense.

♦

McNally Pittsburgh Mfg. Corp., Chicago, has acquired all patents and manufacturing rights formerly owned by Koppers-Rheolaveur Co., Pittsburgh. A sales and engineering office will be located in the Koppers building, Pittsburgh, and both the McNally Pittsburgh and the Koppers-Rheolaveur lines of coal preparation equipment will be represented in this branch office. Former Koppers-Rheolaveur personnel will be in charge.

♦

Allegheny Ludlum Steel Corp., Pittsburgh, has opened a new warehouse and office building at 4915 Pacific boulevard, Los Angeles.

♦

Glyco Products Co. Inc., has moved its offices, plant and laboratories from 148 Lafayette street, New York, to larger quarters at 230 King street, Brooklyn, N. Y.

♦

F. W. Stewart Mfg. Co., 340 West Huron street, Chicago, maker of automobile supplies and hardware, has acquired a three-story building at 4311 Ravenswood avenue, and will transfer its operations there in April.

♦

Plant, equipment and all facilities of A-B-C Mfg. Co., 221-223 South Fourth street, Quincy, Ill., have been purchased by Morris P. Neal, and the corporate name has been changed to A-B-C Packaging Machine Co.

♦

G & N Mfg. Co., 11610 Madison avenue, Cleveland, Elmer H. Griese, president, manufacturer of high-pressure hydraulic diecasting machines, has opened a new machining and assembly plant at Bucyrus, O. The Cleveland plant will be devoted to flame-cutting and weld-fabricating machine parts for machining and assembly at Bucyrus.

♦

Printing Plates Research Inc. has been formed to promote a three-year research program at Battelle Memorial Institute, Columbus, O., aimed at development of new products and new uses for the manufacturing facilities of electrotype and stereotype foundries. About 7500 tons of electrotype metal and 1500 tons of copper are used by the industry annually. Research will be under direction of Dr. Bruce W. Gonser and Dr. R. M. Schaffert of the Battelle technical staff. F. W. Kreber, Van Bolt-Kreber Electrotype Co., Columbus, O., is president of Printing Plates Research Inc.

♦

Auburn Central Mfg. Corp., Connersville, Ind., successor to Auburn Automobile Co., is preparing to manufacture airplane wings, having received an order totaling several million dollars. Buchard Wilson, formerly associated with Vultee Aircraft Inc. of California, has been named general superintendent for the aircraft division of the Auburn plant.

♦

International Selling Corp., ores and chemicals, New York, has moved its offices from 26 Beaver street to 67 Broad street.

January Steel Payrolls $96,234,000, New Peak

■ January steel payrolls established a new record of $96,234,000, according to the American Iron and Steel Institute. This compares with $91,233,000 in December, and $82,827,000 in January, 1940. Previous peak was $94,322,000 in April, 1937.

Employment increased sharply to 598,000, compared with 585,000 in December, and 556,000 in January a year ago. All-time record was 630,000 in August and September, 1937.

Wage-earning employes averaged 86.6 cents an hour, against 86.5 cents in December, and 83.5 in January, 1940. Average work week in January was 39.2 hours, compared with 37.6 in December and 37.1 a year ago.

Weirton Expansion Held Necessary for Defense

■ Weirton Steel Co., Weirton, W. Va., a National Steel Corp. subsidiary, has been issued a certificate of necessity for a new blast furnace, 45 coke ovens and other facilities to be constructed at Weirton (STEEL, Jan. 13, p. 25). Certificate permits the company to amortize cost of program, estimated at $10,000,000, over a period of five years. War Department and the National Defense Commission held the expansion was in the interests of the national defense program.

New blast furnace will add 320,000 net tons a year to company's pig iron capacity and the coke ovens will increase coal carbonizing capacity by 400,000 tons. Without additions to primary steel producing facilities, the program is expected to add 270,000 tons to company's ingot production.

Construction of new facilities will be carried forward with all possible speed, according to T. E. Millsop, president. Excavation and other preliminary work is under way.

No More Priority Ratings To Be Issued for Steel

■ No more preference ratings or priorities are to be named in connection with steel at this time and as far ahead as can be seen at this time.

It appears that no such orders should have been issued at any time and that the policy of issuing them has been a mistake, for the reason that steel has not been and is not included in the critical list.

Clarification of this situation has resulted from President Roosevelt's announcement of last Friday to the effect that priorities will not be applied to steel for the present.

Although no preference ratings or priorities now apply to steel, voluntary co-operation will be encouraged, as in the past, to the end that requirements under the policy of building up the national defense and furnishing aid to Britain will have first attention. Thus the net effect will be about the same as would result from a system of priorities.

Census Reports Strong Increase in Beer Cans

■ Use of tin cans as containers for beer and ale has increased sharply, Bureau of the Census reports.

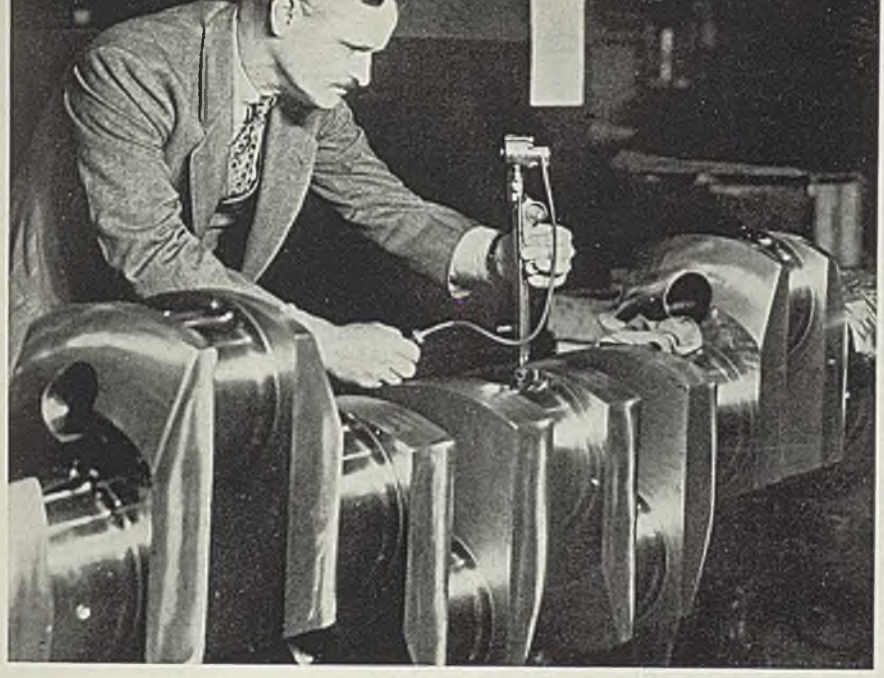
Soon after repeal in 1933, the distribution of malt beverages in cans was begun. First census statistics cover 1937 production when can manufacturers reported an output of 630,896,567 beer cans, valued at $14,108,829.

For 1939, total production was 776,021,876 beer and ale cans, valued at $18,600,944. The 1939 total represents a per capita annual production of nine cans for the more than 80,000,000 Americans 21 years of age and over.

Steel Mill Equipment Prices Up 15 Per Cent

■ Prices now being paid by the steel industry for mechanical equipment average about 15 per cent higher than those in effect a year ago. This applies to rolling mill and auxiliary units.

Some items, as motors, have advanced less than others, but the average is about 15 per cent.



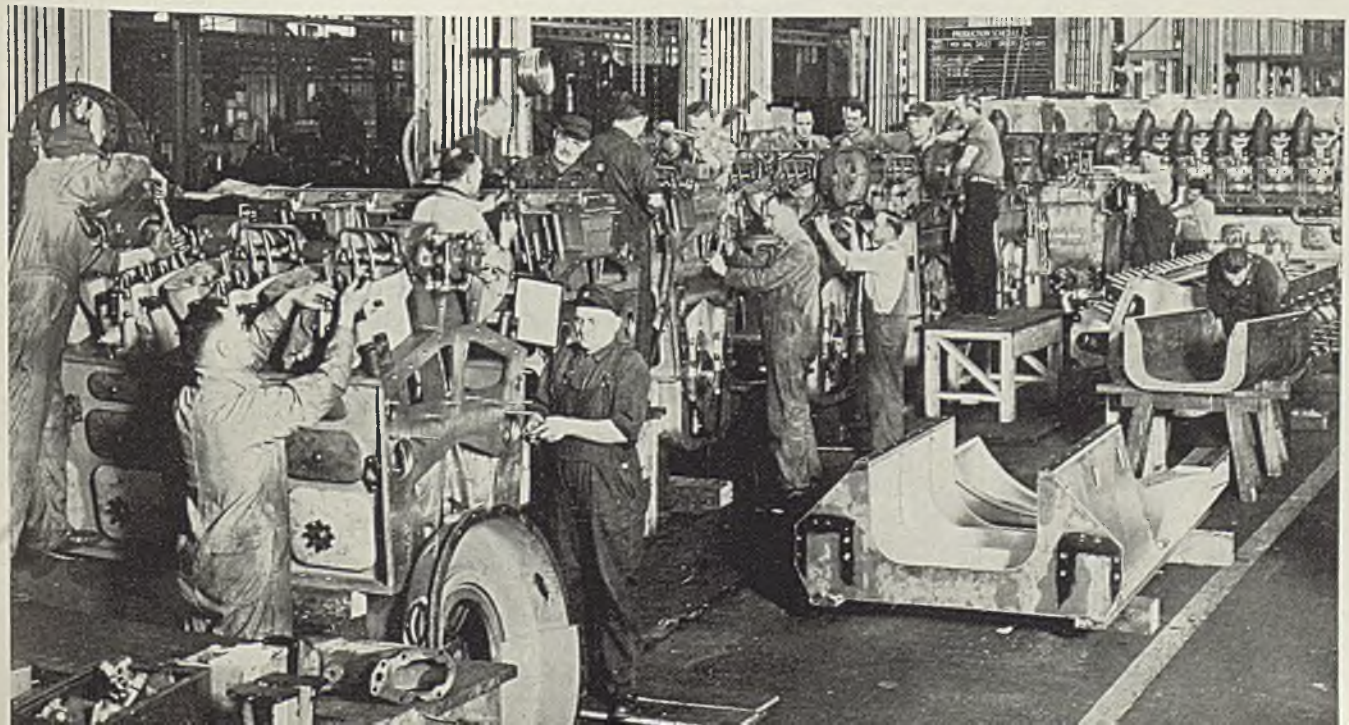
Diesels Power U. S. Navy Vessels

■ GENERAL MOTORS diesel engine division at Cleveland has converted almost its entire production to propulsion machinery for the United States Navy. A nearly-completed addition provides the Cleveland plant with more than 200,000 feet of floor space.

In addition to the marine diesels being manufactured at Cleveland, General Motors is making other units at Detroit for trucks, tanks and tractors. Company's diesel orders for defense aggregate $89,400,000.

Diesel power is becoming increasingly important to the modern navy. Today's submarine has been made possible largely through use of diesels and the units are used in many other navy ships. Most important recent diesel development has been the reduction in size and weight, accomplished chiefly through the development of the two-cycle principle, and use of higher speeds made possible by careful engineering and accurate workmanship.

Accompanying views show phases of the manufacture of marine diesels in the Cleveland plant. Above, huge crankshaft is tested for hardness by a navy inspector. Right, horizontal boring machine at work on an engine cylinder block. Below, general shop view showing engines being assembled.



Steel Ingot Capacities, by Companies

(Normal Rating in Net Tons, Less "Outside Castings")

	Total Dec. 31, 1940	To be added in 1941
Alan Wood Steel Co.	739,200	.....
Allegheny Ludlum Steel Corp.	433,020	75,000
American Locomotive Co.	181,440	.....
American Rolling Mill Co.	3,030,180	200,000
Andrews Steel Co.	500,770	.....
Atlantic Steel Co.	154,000	.....
Barium Stainless Steel Corp.	6,720	.....
Bethlehem Steel Co.	11,850,000	850,000
Braeburn Alloy Steel Corp.	20,730	.....
Byers, A. M., Co.	.....	20,000
Carpenter Steel Co.	51,500	.....
Central Iron & Steel Co.	336,000	.....
Colorado Fuel & Iron Corp.	1,131,210	.....
Columbia Tool Steel Co.	4,480	.....
Connors Steel Co.	16,800	16,000
Continental Steel Corp.	364,000	.....
Copperweld Steel Co.	66,000	66,000
Courtney & Co.	60	.....
Crucible Steel Co. of America	1,055,800	30,000
Disston, Henry, & Sons Inc.	14,110	.....
Edgewater Steel Co.	84,000	.....
Empire Sheet & Tin Plate Co.	327,600	.....
Erie Forge & Steel Co.	42,440	.....
Erie Forge Co.	80,000	.....
Firth-Sterling Steel Co.	12,700	.....
Follansbee Steel Corp.	141,120	.....
Ford Motor Co.	940,130	.....
Granite City Steel Co.	403,200	.....
Harrisburg Steel Corp.	86,800	.....
Heppenstall Co.	42,560	.....
Ingersoll Steel & Disc Co.	14,760	10,000
Inland Steel Co.	3,300,000	100,000
Jessop Steel Co.	16,000	.....
Jones & Laughlin Steel Corp.	3,943,750	.....
Joslyn Mfg. & Supply Co.	20,000	.....
Judson Steel Corp.	71,970	.....
Keystone Steel & Wire Co.	276,500	.....
Kilby Steel Co.	16,800	.....
Knoxville Iron Co.	24,000	.....
Laclede Steel Co.	283,000	.....
Latrobe Electric Steel Co.	12,000	.....
Lebanon Steel & Iron Co.	15,000	.....
Lukens Steel Co.	714,340	.....
Mesta Machine Co.	102,320	.....
Midvale Co.	305,780	133,400
National Forge & Ordnance Co.	21,500	.....
National Steel Corp.	3,580,000	448,000
National Supply Co. of Calif.	12,380	12,000
Newport News Shipbuilding & Dry Dock Co.	4,000	.....
Northwest Steel Rolling Mills	7,500	10,000
Northwestern Steel & Wire Co.	369,600	50,400
Otis Steel Co.	977,000	.....
Pacific States Steel Corp.	20,000	.....
Phoenix Iron Co.	245,700	.....
Pittsburgh Steel Co.	1,072,000	.....
Republic Steel Corp.	8,000,000	200,000
Rotary Electric Steel Co.	128,080	.....
Roebling's, John A., Sons Co.	187,820	.....
Rustless Iron & Steel Corp.	75,000	25,000
Sharon Steel Corp.	560,000	36,000
Simonds Saw & Steel Co.	13,440	.....
Standard Steel Works Co.	169,822	.....
Stanley Works	163,800	2,300
Texas Steel Co.	5,000	2,500
Timken Steel & Tube Div.	527,200	20,000
Union Electric Steel Corp.	21,380	.....
United Engineering & Foundry Co.	40,470	.....
United States Steel Corp.	29,720,000	499,500
Universal-Cyclops Steel Corp.	50,680	.....
Vanadium-Alloys Steel Co.	11,400	.....
Vulcan Crucible Steel Co.	4,230	.....
Washburn Wire Co.	67,200	.....
Wheeling Steel Corp.	1,960,000	.....
Wickwire Brothers	47,040	.....
Wickwire Spencer Steel Co.	224,000	.....
Wisconsin Steel Co.	715,000	150,000
Worth Steel Co.	423,360	65,000
Youngstown Sheet & Tube Co.	3,494,400	375,600
Total	84,152,292	3,396,700

New steelmaking facilities to be added during 1941, not included above, but to be used for "outside castings" are: United Engineering & Foundry Co., 15,000 net tons; and Mesta Machine Co., 52,000 net tons, totaling 67,000 net tons.

Blast Furnace Capacities, by Companies

(Net Tons)

	Total Dec. 31, 1940	To be added in 1941
Alan Wood Steel Co.	454,800	.....
American Rolling Mill Co.	873,600	300,000
Antrim Iron Co.	28,000	.....
Bethlehem Steel Co.	7,800,000	780,000
Brooke, E. & G., Iron Co.	137,890	.....
Colorado Fuel & Iron Corp.	564,000	245,000
Crucible Steel Co. of America	481,600	.....
Delaware River Steel Co.	120,960	.....
Delta Chemical & Iron Co.	23,010	.....
Ford Motor Co.	504,000	.....
Globe Iron Co.	84,000	4,500
Greensborough Ore Co.	80,640	.....
Inland Steel Co.	1,563,520	.....
Interlake Iron Corp.	1,360,800	.....
Jackson Iron & Steel Co.	67,200	.....
Jones & Laughlin Steel Corp.	3,360,000	.....
Lavino, E. J., & Co.	72,580	.....
Mystic Iron Works	196,000	.....
National Steel Corp.	2,363,980	550,920
Newberry Lumber & Chemical Co.	31,360	.....
New Jersey Zinc Co.	120,960	.....
Otis Steel Co.	482,000	.....
Pittsburgh Coke & Iron Co.	399,000	.....
Pittsburgh Steel Co.	537,000	.....
Republic Steel Corp.	*4,830,000	.....
Sharon Steel Corp.	173,600	.....
Shenango Furnace Co.	416,400	.....
Sloss-Sheffield Steel & Iron Co.	439,090	.....
Struthers Iron & Steel Co.	181,440	.....
Tennessee Products Corp.	49,590	.....
Tonawanda Iron Corp.	174,180	.....
United States Steel Corp.	23,688,700	327,700
Wheeling Steel Corp.	1,171,520	.....
Wickwire Spencer Steel Co.	362,880	.....
Wisconsin Steel Co.	719,710	.....
Woodward Iron Co.	453,600	.....
Youngstown Sheet & Tube Co.	3,241,980	.....
Total	57,609,590	2,208,120

*Includes capacity of Troy Furnace which was acquired by Republic Steel in 1940.

(Data are from Gano Dunn's report to President Roosevelt.)

Raw Material Supplies Adequate for Steelmaking

Gano Dunn reports temporary bottlenecks in some items, such as nickel and aluminum . . . Confidence in steel capacity may eliminate hoarding by industrial consumers

FURTHER study of the report made to President Roosevelt by Gano Dunn, senior consultant, production division, Office of Production Management, indicates that the steel industry can be assured of adequate basic raw material supplies despite increased blast furnace and steelmaking capacity now under construction.

While temporary bottlenecks are reported in such items as nickel and aluminum, necessary in steelmaking, it is indicated these will be made available in sufficient quantities, also. The Dunn report, however, is confined to steel, pig iron, scrap and coke and does not include the many alloying materials or deoxidizers.

At the same time, the Dunn report concludes that confidence in the steel industry to produce all necessary requirements will result in a falling-off in inventory increases for hoarding.

Mr. Dunn expresses the opinion a certain amount of increased inventory of finished steel is essential to a rise in business but that a considerable part of buying recently has resulted from fear of congestion in the steel industry and represents hoarding by the smaller consumers who, in the aggregate, represent a considerable part of steel purchasing power.

The capacity of the steel industry to produce was increased substantially during the past year, and further increases now are in the construction stage. As will be noted in the accompanying tables, normal blast furnace capacity at the end of 1940 was 57,609,590 net tons, representing an increase of 1,885,950 tons compared with a year earlier. By Dec. 31, 1941, capacity will have been increased by 2,208,120 tons to 59,817,710 tons.

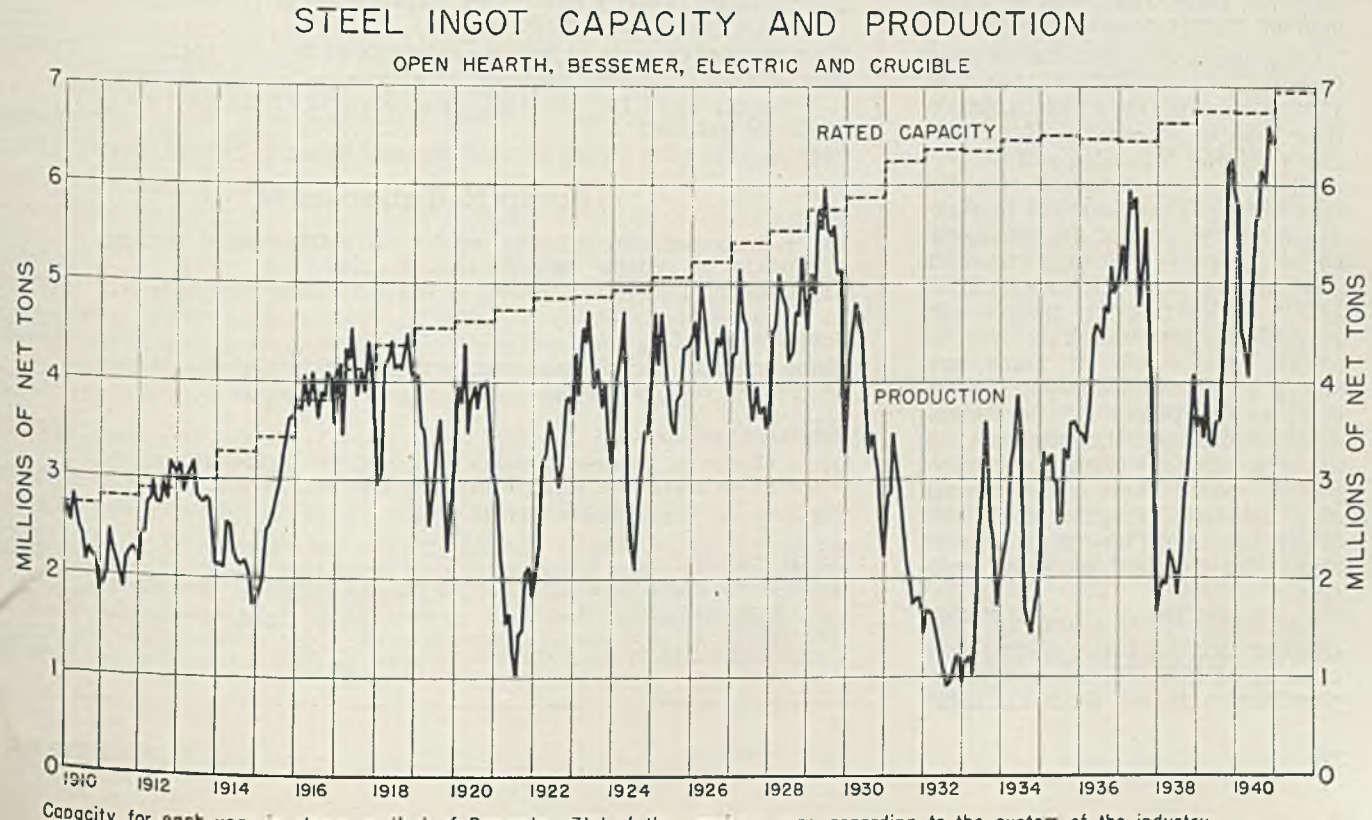
Normal steelmaking capacity stood at 84,152,292 net tons Dec. 31, 1940, an increase of 2,532,796 tons from a year ago. During 1941, capacity will be increased 3,396,700 tons to 87,548,992.

It should be noted these figures are on the "normal" basis used by the steel industry. Mr. Dunn figures capacities may be figured 2½ per cent higher on the basis of speeding up repairs. Equipment is normally down 10 per cent of the time for repairs and maintenance, and Mr. Dunn believes this can be reduced by at least one-fourth. His so-called "reliable capacity" ratings based on 102½ per cent of "normal" are considered practical by the Committee on Manufacturing Problems of the American Iron and Steel Institute.

Based on 50 per cent scrap charge in making open-hearth steel, 10 per cent in making bessemer and 95 per cent in making electric furnace steel, Mr. Dunn figures that 46,524,364 tons of scrap would be required in producing a maximum of 87,576,099 tons of steel during 1941. Inasmuch as there is a deficit in blast furnace capacity of 189,514 tons, he expresses the opinion that this can be readily offset by a slight increase in the scrap charge to 46,713,878 tons.

Scrap required in the outside mar-

■ **This exhibit, accompanying Gano Dunn's report to the President on sufficiency of steel capacity, charts the relationship of rated capacity to actual production**



ket would amount to only 20,441,048 tons, he estimates, since steel companies themselves would produce 26,272,830 tons of home scrap. Purchased scrap required in 1942 would be 21,412,941 tons, based on ingot capacity of 91,124,718 tons Dec. 31, 1941. In January, other sources estimated scrap required this year by steel mills and foundries at 28,200,000 tons, based on normal production of 80,000,000 tons of ingots and representing an increase of 4,000,000 tons over 1940.

As for iron ore, Mr. Dunn figures total requirements at 99,853,978 tons for steelmaking, iron foundries and ferroalloys, based on steel capacity of 87,576,099 tons. He estimates that of this total, Chile, Cuba, Canada, etc., would supply 2,375,000 tons, Alabama and other states 15,900,000 tons, leaving 81,578,978 tons required from the Great Lakes region. Capacity of Great Lakes transportation facilities is placed at 84,000,000 tons for the 1941 season so that a surplus of 2,421,022 remains.

Coke Is Choke Point

Based on steelmaking capacity of 91,124,718 tons Dec. 31, 1941, Mr. Dunn estimates total ore requirements at 102,722,486 tons. He predicts foundry and ferroalloy requirements will remain unchanged. Inasmuch as ore received from other countries and miscellaneous domestic sources is expected to show no change, 84,447,486 tons will be required from the lakes area. However, transportation facilities will be increased by 862,400 tons annually since the United States Steel Corp. has authorized two new 14,000-ton ore carriers scheduled to go into service in the spring of 1942. Taking into consideration these new facilities, there would still be a surplus of 414,914 tons of ore.

Coke capacity applicable to blast furnaces at the end of 1940 was 47,395,812 tons, of which 8,096,000 tons must be reserved for blast furnaces serving foundries and for ferroalloys, leaving 39,299,812 tons for steelmaking. Coke required in making 49,809,344 tons of pig iron needed to produce 87,576,099 tons of steel ingots amounts to 43,832,223 tons. As of Dec. 31, 1940, deficit in coke capacity therefore was 4,532,411 tons, which Mr. Dunn considers a serious bottleneck. However, he also points out that by exercising priorities, the large amount of coke capacity currently supplying the requirements of commercial and domestic heating could be drawn upon until new capacity now under construction becomes available.

There still will be a deficit in coke capacity Dec. 31, 1941. Adding new capacity of 4,165,600 tons now under construction to the 39,299,812 tons, as noted, gives total capacity available Dec. 31, 1941, of 43,465,412 tons. Based on ingot capacity of 91,124,718 tons Dec. 31, 1941, 45,308,414 tons of coke would be needed, leaving a net deficit of 1,843,002 tons. This deficit can be offset by diverting coke from commercial and domestic outlets, he believes.

Mr. Dunn estimates that finishing or rolling mill capacity exceeds ingot production capacity by as much as 50 per cent in some instances and on the average is 15 per cent higher.

Steel Ingot Capacity

(Data from Gano Dunn's Report)

	Net tons
Normal rated steelmaking capacity Dec. 31, 1940	84,152,292
Additional capacity derived from more rapid repairs (2½ per cent of above)	2,103,807
Reliable capacity (102½ per cent of normal)	86,256,099
Capacity reported by Steel Founders Society of America (outside steel castings)	1,320,000
Maximum reliable steelmaking capacity Dec. 31, 1940	87,576,099
Steelmaking capacity now under construction based on normal rating (after deduction 75,120 tons bessemer which is to be discontinued)	3,396,700
In terms of reliable rating of 102½ per cent, new capacity total becomes	3,481,619
Outside steel casting capacity under construction	67,000
Total increase reliable capacity under way in 1941	3,548,619
Capacity Dec. 31, 1941 (adding 87,576,099 and 3,548,619)	91,124,718

Blast Furnace Capacity

Normal rated pig iron capacity Dec. 31, 1940	57,609,590
Capacity required for iron foundries and ferroalloys (8,000,000 tons for foundries, 1,200,000 for ferroalloys)	9,200,000
Capacity at normal rating available for use in making steel	48,409,590
Gross charge of furnace material for 87,576,099 tons steel capacity (Dec. 31, 1940)	96,333,708
Pig iron portion of above charge (based on 50 per cent open-hearth charge, 90 per cent bessemer and 5 per cent electric)	49,809,344
Capacity at normal rating available for steelmaking (from above)	48,409,590
Deficit in blast furnace capacity at normal rating	1,399,754
Capacity at reliable rating available for steelmaking (102½ per cent of 48,409,590)	49,619,830
Deficit in blast furnace capacity at reliable rating Dec. 31, 1940	189,514
Blast furnace capacity now under construction at reliable rating (102½ per cent of 2,208,120 tons)	2,263,323
Blast furnace capacity at reliable rating as of Dec. 31, 1941	51,883,153
Blast furnace capacity required if maximum reliable industry capacity as of Dec. 31, 1941, amounting to 91,124,718 tons is to be attained	51,486,834
Surplus at reliable rating in blast furnace capacity Dec. 31, 1941	396,319

Scrap Requirements

Gross charge of material required for 87,576,099 tons of steel at maximum reliable capacity Dec. 31, 1940	96,333,708
Available blast furnace capacity at reliable rating for pig iron	49,619,830
Scrap required	46,713,878
Home scrap produced when reducing 91,124,718 tons of steel ingots (30 per cent of ingots)	26,272,830
Purchased scrap to be supplied	20,441,048
Gross charge of furnace material required for 91,124,718 tons of steel at maximum reliable capacity Dec. 31, 1941	100,237,190
Pig iron portion of above charge	51,486,834
Scrap required	48,750,356
Home scrap produced when reducing 91,134,718 tons of steel ingots (30 per cent ingots)	27,337,415
Purchased scrap to be supplied	21,412,941

He points out that while the steel producing part of the industry consists of approximately 77 companies, there are about 163 other companies having only rolling or finishing mills.

Steel requirements in the Dunn report are based largely on figures compiled by Melvin G. de Chazeau, production division, Office of Production Management. These are classed as Army-Navy or direct defense, British and other export and civilian.

Direct defense needs for the fiscal year ending June 30, 1941, in terms of raw steel are placed at 2,800,000 tons; for the 1942 period at 4,100,000. In addition, the Maritime Commission will require 250,000 and 350,000 tons respectively. These figures are converted to calendar year basis in accompanying statistics, which show defense requirements, including maritime, at 3,100,000 tons for 1941 and 4,500,000 for 1942.

Civilian steel requirements are based on national income. If income this year reaches 80 billions, civilian requirements will be 61,000,000 tons of ingots. If it only reaches 77 billions, steel required will drop to 57,000,000 tons. Based on income of 90 billions in 1942, 70,000,000 tons will be needed and 66,000,000 tons if income is 87 billions. Mr. Dunn estimates one ton of ingots is equivalent to 0.72-ton of finished steel.

British Requirements

British steel requirements in terms of ingots are estimated as follows:

	Thousands of net tons	
	1941	1942
Commercial steel	7,111	7,111
Manufactured goods:		
Ships	540	540
Aircraft	122	225
Tanks	234	137
Ordnance	182	38
Ammunition	918	1,850
Machine tools	33	33
Surplus to offset possible underestimation	500	600
Total British, exports	9,640	10,534

Exports to other countries are placed at 3,800,000 tons for 1941 and 4,000,000 tons for 1942. Canada is expected to take 1,800,000 tons in 1941 and 2,000,000 tons in 1942, with the balance of 2,000,000 tons in each year destined for other countries.

While British steel requirements are accounted for in the Dunn figures on consumption, no consideration is made in any of the statistics for pig iron, ore and coke required to make this pig iron, or scrap.

He estimates the British will require 940,800 tons of pig iron this year requiring an additional 1,608,768 tons of iron ore. A similar tonnage will be required in 1942. In the latter year, a slight deficit in Great Lakes ore transportation facilities could be offset by a moderate increase in overtime operation of the ore fleet and docking facilities, such as unloading on Sundays and operating the fleet at higher speeds. Coke required each year will amount to 827,904 tons, which also can be provided by diversion from other commercial and domestic outlets. Scrap exports to Britain are estimated at 84,000 tons monthly during 1941 and 1942 or 1,008,000 tons each year.

Iron Ore Requirements

Data from Gano Dunn's Report

Pig iron for maximum reliable in industry capacity of 91,124,718 tons of steel Dec. 31, 1941	51,486,834
Pig iron for iron foundries required in 1941. Trend has been downward therefore no increase over Dec. 31, 1940	8,000,000
Total	59,486,834
Ore required to make one ton pig iron	1.71
Ore required for steel production and iron foundries	101,722,486
Ore required for ferroalloys (increase in ferroalloys provided by increase in manganese ore)	1,000,000
Total ore requirements	102,722,486
Imports from Cuba, Canada, Chile and Brazil in 1941	2,375,000
Balance required from domestic sources	100,347,486
Ore from Alabama and other states	15,900,000
Net balance required from Great Lakes	88,447,486
Capacity of Great Lakes transportation facilities	84,862,400
Surplus in Great Lakes ore based on transportation facilities as of Dec. 31, 1941	414,914

Coke Capacity

Coke capacity available for pig iron used in making steel Dec. 31, 1940	39,299,812
Coke capacity to be added during 1941	4,165,600
Capacity available Dec. 31, 1941	43,465,412
Coke required if maximum reliable industry capacity of 91,124,718 tons Dec. 31, 1941, is to be attained	45,308,414
Deficit in coke capacity Dec. 31, 1941	1,843,002

Steel Consumption

During 1941, Based on National Income of Ninety Billion Dollars

	Millions of tons
Direct defense requirements, including those of Maritime Commission	3.1
Total exports, including those to Great Britain and Canada, in which is a considerable margin for possible under-estimation	13.4
Civilian requirements as estimated by Melvin G. de Chazeau, production division, OPM	61.0
Total requirements in 1941	77.5
Reliable steelmaking capacity Dec. 31, 1940, as previously reported	87.6
Estimated surplus of steel industry capacity as of Dec. 31, 1940	10.1

During 1942, Based on National Income of Ninety Billion Dollars

Direct defense requirements, including those of Maritime Commission	4.5
Total exports, including those to Great Britain and Canada, in which is considerable margin for possible under-estimation	14.5
Civilian requirements as estimated by De Chazeau	70.0
Total requirements in 1942	89.0
Reliable steelmaking capacity as of Dec. 31, 1941	91.1
Estimated surplus of steel industry capacity as of Dec. 31, 1941	2.1

(If national income reaches only 77 billions in 1941, civilian steel requirements drop to 57 million tons, bringing surplus steel capacity up to 14.1 million tons. If national income in 1942 reaches only 87 billions, civilian requirements drop to 66 million tons and brings surplus steel capacity up to 6.1 million tons. Figures are in terms of steel ingots, one ton equalling 0.72-ton of finished steel.)

National Defense Too Serious For This Bedlam of Politics

■ NINE out of ten persons returning from a trip to Washington refer to their departure from that city as an escape from a madhouse.

The characterization is not greatly exaggerated, because the excitement, frenzied activity and confusion in the capital are overpowering. It is difficult to assemble the personnel required for an undertaking as gigantic and as complicated as the national defense program without creating a scene of bedlam.

But the degree of madness and disorder could be reduced considerably if the leaders in the present government administration would exercise some of the elements of old-fashioned common sense which have served the nation conspicuously in previous periods of emergency.

♦ ♦ ♦

For instance, why is it that the present administration gives ear to crackpot counsel but is curiously deaf to the voice of experience?

A few months ago a small band of rabid new dealers conceived the idea that the producers of steel were callously indifferent to the requirements of national defense and as a result of their selfish and unpatriotic attitude were going to be caught short on steel capacity. They trumped up a fantastic presentation of statistics to show that the industry should increase its capacity by 10,000,000 or more tons immediately.

If this presentation had been put up to President Wilson in 1917 or 1918, he would have referred it to Bernard M. Baruch, who after March 4, 1918, was in complete charge of the War Industries Board. Mr. Baruch would have submitted the proposal to the steel men on his staff and immediately they would have told him that the report was loaded with theoretical nonsense.

That would have been the end of it.

But what happened in 1940 and 1941?

President Roosevelt, notoriously receptive to the latest bright ideas from persons having neither experience nor responsibility, listened to their story. Apparently he gave them some encouragement because they put on a pretty effective publicity campaign on the inadequacy of steel capacity.

♦ ♦ ♦

Meanwhile the people who know the steel situation assured the government that any reasonable demand for steel would be met. History showed that the industry had responded promptly and satisfactorily to every previous emergency demand.

But, because the administration listened to crackpots and discounted experience, it became necessary to commission an unbiased expert to investigate. Gano Dunn went to great effort to prove what every informed person already knew.

♦ ♦ ♦

There would be less bedlam in Washington if the President could learn to trust experience and to wave aside fanaticism.

More and more the responsibility for defense must be placed upon those who know from experience and less and less upon those who would like to try this or that experiment.

This nation must quit fooling with the serious business of defense.

E. L. Shaner

EDITOR-IN-CHIEF

The BUSINESS TREND

Order Backlogs Extended Further on New Demand

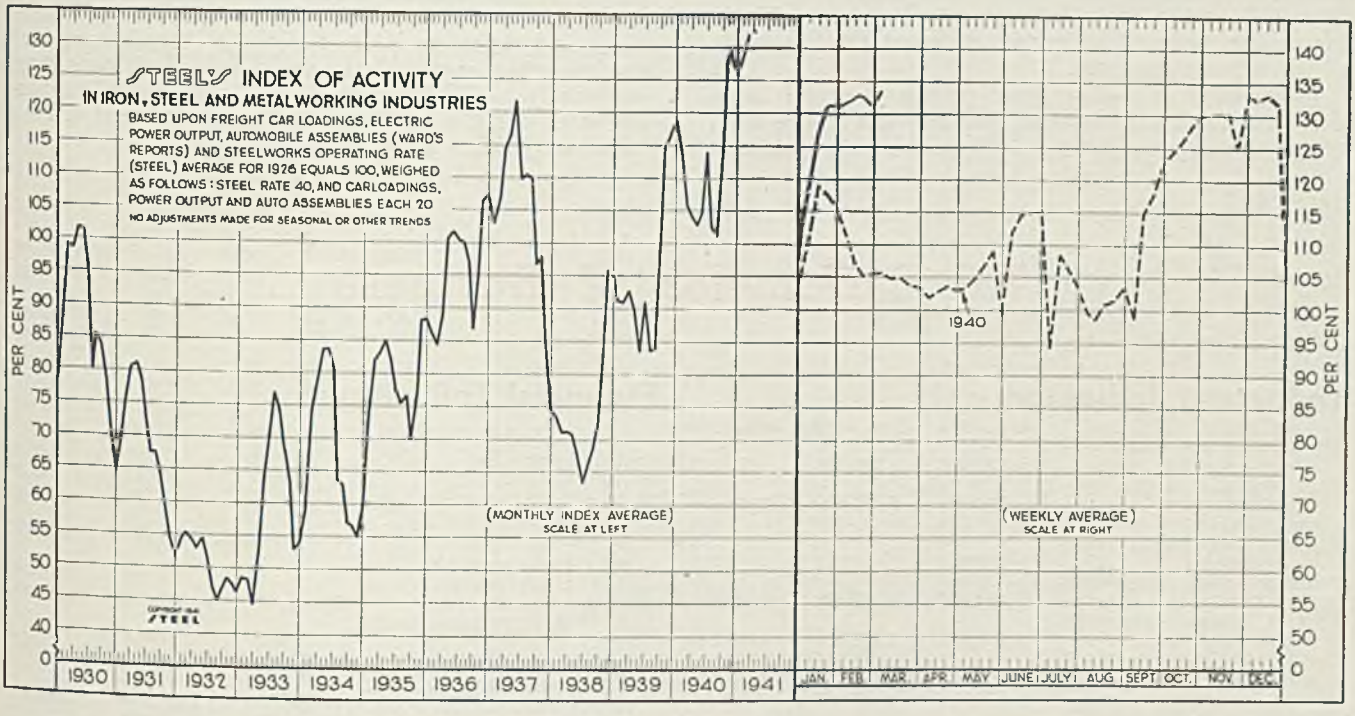
■ ACTIVITY in the capital goods industries remains at capacity levels, except in those instances where interruptions resulting from equipment breakdowns and strikes curtail output temporarily.

New demand continues unabated. Order backlogs in most industrial lines, particularly those related to the defense program, are being further extended. In the steel industry, producers report shipments on certain products can not be made until fourth quarter this year. In view of the record breaking order backlogs reported in most industries, new orders are being carefully checked against past requirements.

During February the average of STEEL's weekly index was 132.3, up 5 points from the January average of 127.3. It compares favorably with the average of 105.8 registered by the index during February, 1940. The February figure of 132.3 represented the highest monthly average recorded by the index. The monthly peak last year of 129.5 occurred in November.

The weekly index climbed 1.8 points to 133.0 during the period ended March 1. In the same week of 1940, 1939 and 1937 the weekly index stood at 105.6, 91.5 and 112.8 respectively. Three of the four business indicators composing the index advanced during the latest period.

Steelmaking operations gained 2 points to 96.5 per



STEEL'S index of activity gained 1.8 *points to* 133.0 *in the week ended March* 1:

Week Ended	1940	1939
Dec. 21	132.4	123.4
Dec. 28	107.5	104.0
Week Ended	**1941**	**1940**
Jan. 4	114.5	110.3
Jan. 11	128.2	119.2
Jan. 18	130.8	117.3
Jan. 25	130.7	115.4
Feb. 1	132.0	111.6
Feb. 8	132.7	107.2
Feb. 15	132.3	105.1
Feb. 22	131.2	105.4
March 1	133.0	105.6

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	.....	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	.....	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	60.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

cent during the week ended March 1. The national steel rate has now regained most of the loss, resulting from necessary furnace repairs and labor disputes, recorded during the week ended Feb. 22. On a tonnage basis steel ingot production is at an all time peak. The current rate of steelmaking operations compares with 65.5 per cent at this time a year ago, 56 per cent in 1939 and 86 per cent in 1937.

Steel producers report a steady inflow of new orders. February bookings were larger than recorded during January, despite the shorter month. Every effort is being made to discourage speculative buying. Currently shipments are being allocated as closely as possible to estimated needs of consumers. Steel inquiries carrying priority certificates issued at Washington are fewer than earlier expected for this stage of the defense program.

Production of automobiles during January numbered 524,126 units, the best monthly total since May, 1937, and compared with 506,931 in December while in January, 1940, output was 449,492 units. Preliminary estimates indicate that assemblies last month exceeded the January total, despite the shorter month.

Electric power consumption and revenue freight traffic recorded encouraging gains during the latest week. Power output climbed to 2,825,510,000 kilowatts during the week ended March 1, up slightly from the preceding week and represented an increase of 14 per cent over the like 1940 week. Carloadings advanced more than seasonally to 756,670 cars in the latest week, comparing with 678,493 in the preceding period and 634,410 in corresponding week last year.

Where Business Stands

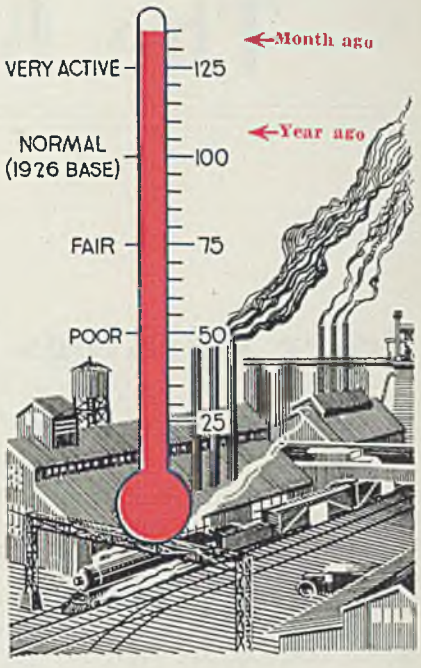
Monthly Averages, 1940 = 100

	Jan., 1941	Dec., 1940	Jan., 1940
Steel Ingot Output	1.22	1.14	1.01
Pig Iron Output	1.17	1.14	1.01
Building Construction	0.91	1.37	0.59
Auto Output	1.34	1.30	1.15
Wholesale Prices	1.03*	1.02	1.01
Freight Movement	0.99	0.97	0.92

*Preliminary.

Industrial Weather

TREND: *Sidewise*



The Barometer of Business

Industrial Indicators

	Jan., 1941	Dec., 1940	Jan., 1940
Pig iron output (daily average, tons)	150,500	146,544	129,825
Iron and steel scrap consumption (tons)	4,278,000	3,950,000	3,581,000
Gear Sales Index	259	208	123
Foundry equipment new order index	285.3	257.8	149.0
Finished steel shipments (Net tons)	1,682,454	1,544,623	1,145,592
Ingot output (average weekly; net tons)	1,567,288	1,469,197	1,302,196
Dodge bldg. awards in 37 states ($ Valuation)	$305,205,000	$456,189,000	$196,191,000
Automobile output	524,126	506,931	449,492
Bituminous coal output, tons	43,905,000	41,400,000	44,976,000
Beehive coke output, tons	490,000	463,000	238,000
Business failures; number	1,124	1,086	1,237
Business failures; liabilities	$11,888,000	$13,309,000	$15,279,000
Cement production, bbls.†	11,147,000	12,725,000	9,488,000
Cotton consumption bales	843,274	775,472	731,793
Car loadings (weekly av.)	690,884	680,099	642,464

Commodity Prices

	Jan., 1941	Dec., 1940	Jan., 1940
STEEL's composite average of 25 iron and steel prices	$38.38	$38.30	$37.09
U. S. Bureau of Labor's index	80.5*	80.0	79.4
Wheat, cash (bushel)	$0.915	$0.93	$1.015
Corn, cash (bushel)	$0.69	$0.69	$0.66

*Preliminary

Financial Indicators

	Jan., 1941	Dec., 1940	Jan., 1940
Industrial Stocks‡	130.17	130.45	147.60
20 Rail stocks‡	29.01	27.61	31.09
15 Public Utilities stocks‡	20.17	19.91	25.44
Bank clearings (000 omitted)†	$27,862	$25,224	$26,827
Commercial paper rate (N. Y., per cent)	½–⅝	½	½–⅝
*Com'l. loans (000 omitted)	$9,308,000	$9,083,000	$8,499,000
Federal Reserve ratio (per cent)	91.0	90.8	87.5
Capital flotations: (000 omitted)			
New capital	$95,321	$189,899	$95,015
Refunding	$321,876	$415,893	$192,862
Federal Gross debt (millions of dollars)	$45,877	$45,025	$42,128
Railroad earnings (000)†	$78,790,679	$71,098,917	$60,963,114
Stock sales, New York stock exchange	13,312,960	18,397,158	15,991,103

†December, November and December respectively.
*Leading member banks Federal Reserve System.
‡Dow-Jones Series.

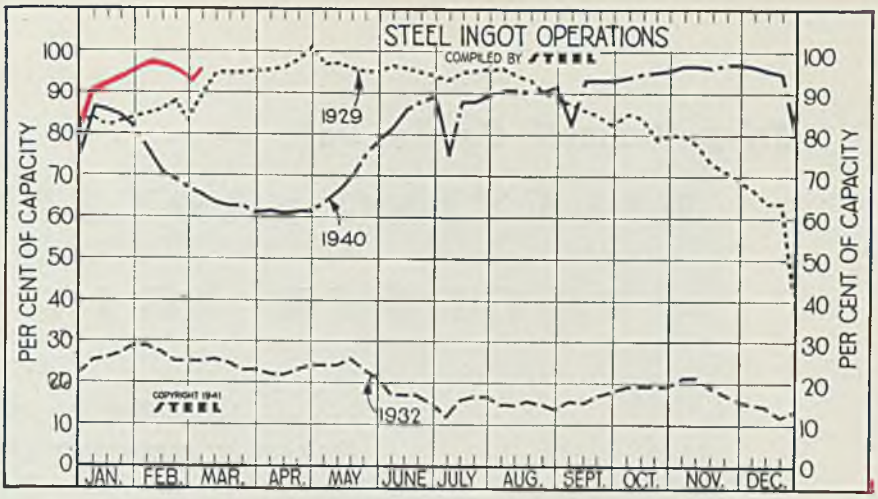
Foreign Trade

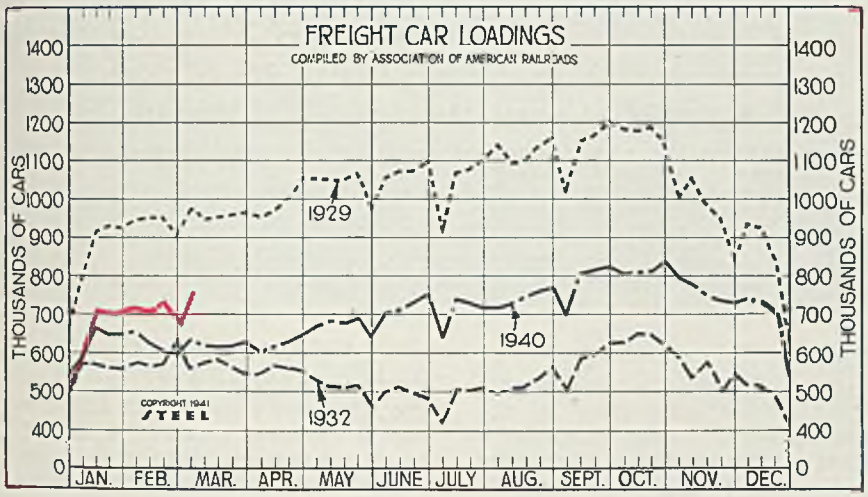
	Dec., 1940	Nov., 1940	Dec., 1939
Exports	$322,257,000	$327,685,000	$368,046,000
Imports	$253,099,000	$223,594,000	$246,807,000
Gold exports	$3,000	$6,000	$11,000
Gold imports	$137,178,000	$330,113,000	$451,183,000

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Nov. 16....	96.0	93.5	63.0	35.0
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	90.5	52.0	23.0
Dec. 28....	80.0	75.5	40.0	21.0
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	92.5	86.5	51.5	26.0
Jan. 11....	93.0	86.0	52.0	29.0
Jan. 18....	94.5	84.5	51.5	30.5
Jan. 25....	95.5	81.5	51.5	33.0
Feb. 1....	97.0	76.5	53.0	31.0
Feb. 8....	97.0	71.0	54.0	30.0
Feb. 15....	96.5	69.0	55.0	31.0
Feb. 22....	94.5	67.0	55.0	30.5
March 1...	96.5	65.5	56.0	29.5





Freight Car Loadings

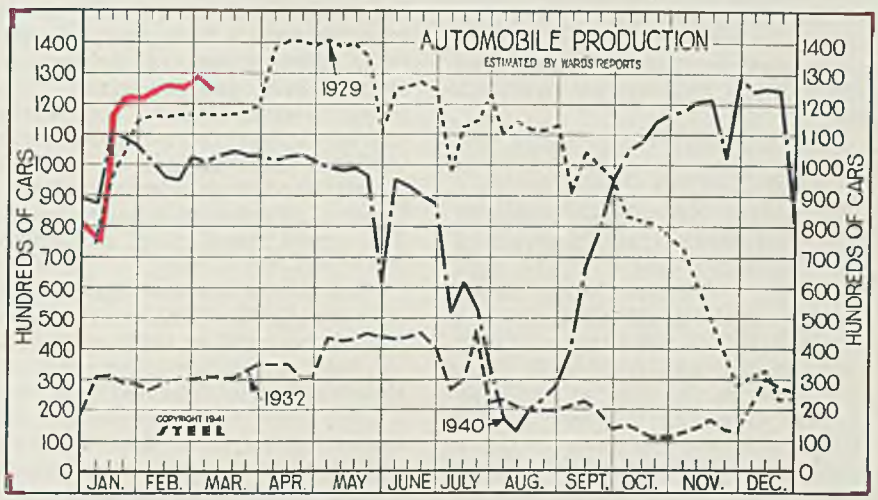
(1000 Cars)

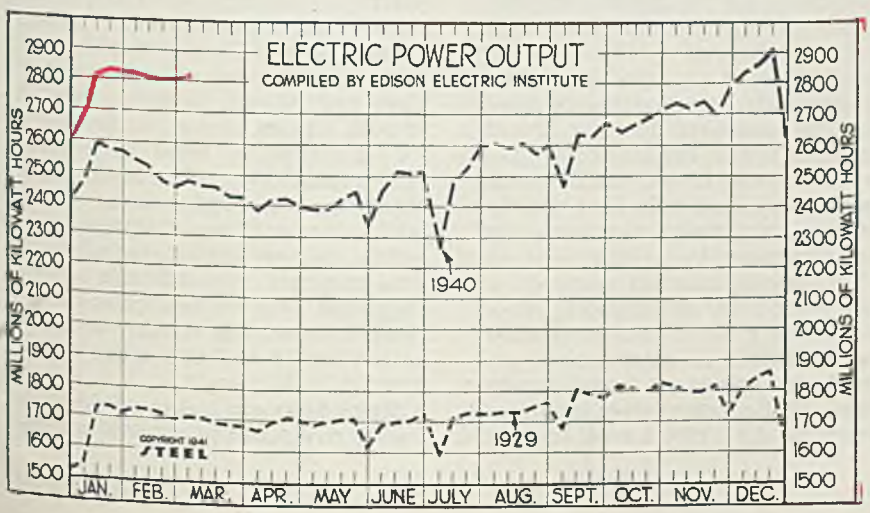
Week ended	1940	1939	1938	1937
Nov. 23.....	733	677	562	559
Nov. 30.....	729	689	649	623
Dec. 7.....	739	687	619	622
Dec. 14.....	736	681	606	603
Dec. 21.....	700	653	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	552
Jan. 11.....	712	668	587	581
Jan. 18.....	703	646	590	570
Jan. 25.....	711	649	594	553
Feb. 1.....	714	657	577	565
Feb. 8.....	710	627	580	543
Feb. 15.....	721	608	580	536
Feb. 22.....	678	595	561	512
March 1.....	757	634	599	553

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Dec. 7....	124.8	115.5	100.7	85.8
Dec. 14....	125.6	118.4	102.9	82.0
Dec. 21....	125.3	117.7	92.9	67.2
Dec. 28....	81.3	89.4	75.2	49.6
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	76.7	87.5	76.7	54.1
Jan. 11....	115.9	111.3	86.9	65.7
Jan. 18....	124.0	108.5	90.2	65.4
Jan. 25....	121.9	106.4	89.2	59.4
Feb. 1....	124.4	101.2	79.4	51.4
Feb. 8....	127.7	96.0	84.5	57.8
Feb. 15....	127.5	95.1	79.9	59.1
Feb. 22....	129.2	102.7	75.7	57.0
March 1...	126.6	100.9	78.7	54.4





Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Nov. 23...	2,695	2,482	2,184	2,085
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4...	2,705	2,473	2,169	2,140
Jan. 11...	2,835	2,593	2,270	2,115
Jan. 18...	2,844	2,572	2,290	2,109
Jan. 25...	2,830	2,566	2,293	2,099
Feb. 1...	2,830	2,541	2,287	2,082
Feb. 8...	2,824	2,523	2,268	2,052
Feb. 15...	2,810	2,476	2,249	2,059
Feb. 22...	2,820	2,455	2,226	2,031
March 1..	2,826	2,479	2,244	2,036

Bring Yourself Up To Date on . . . . .

RIVETING ADVANCES and "SQUEEZE RIVETING"

. . . . . by reading this series of articles that will present the case for compression-type riveters and for cold riveting with flat driven heads. Here Mr. Osborne, consulting engineer on riveting for the Dravo Corp., Pittsburgh, well known heavy steel fabricator, presents background information to aid in understanding the riveting process. The article next week will detail fundamental theory of riveting and upsetting and explain the advantages of cold riveting and why many who have tried it failed to obtain these benefits

By RAYMOND S. OSBORNE
Consulting Engineer
Pittsburgh

■ ATTACHING things together with rivets is about as old as the use of metals. Riveted work has been discovered which dates back at least 3000 years. An old Roman relic in a London museum is a rivet formed ready for use. It is interesting to note that the head formed on it conforms closely to the type produced on cold driven rivets today.

Until relatively recent years, rivets were driven by hand with hand hammers or mauls. Some 60 years ago, Mr. J. E. Stacey, late president of Stacey Bros. Gas Construction Co., Cincinnati, heard of the first pneumatic hammers being developed, hunted up the designer and obtained one to try out for driving rivets, which was done on a large gas holder in the vicinity of Washington. Thus he was one of the pioneers, if not the first, to use a pneumatic riveting hammer. After some further development, this tool was found much more satisfactory than mauls for driving rivets.

Compression riveters were developed about 60 years ago—even before the pneumatic riveting hammer. Steam was first used to actuate them, but later air and hydraulic machines replaced the steam-operated ones, the pneumatic units now being most popular.

No More "Hand Gangs": Thirty years ago it was quite customary to drive rivets on the smaller structural jobs by hand, although pneumatic hammers were in use on the larger jobs. As late as 1916, construction of the large numbers of giant tanks used by oil companies to store oil formed a considerable portion of the work done by the plate industry. These rivets were almost exclusively hand driven. The development of a satisfactory oil-engine driven air compressor made the use of compressed air feasible on such work. This was followed by a development of lightweight electric and gasoline-driven compressors which rapidly spread the use of air into the small job field, until now pneumatic tools have replaced hand tools almost entirely. Today, it is practically impossible to find a good "hand gang", particularly for structural work.

First Rivets Formed Hot: Without doubt, the first rivets were forged by hand as well as driven by hand—a rather slow process. Headers first used heated bars, and a large proportion of rivets are still made that way. At first, the bars were short and heated in a furnace separate from the header into which they were fed by hand until consumed or their temperature had dropped too low. Now bars are usually heated in a furnace which is practically attached to the header. The long bars used are fed directly into the header with practically no loss of heat. Also, header speeds have been increased greatly, cutting down the time before the bar is consumed.

The development of methods to cold work steel satisfactorily soon found this method applied to rivet manufacture. A considerable proportion of rivets are now headed cold. While some rivet manufacturers head all rivets cold, most of them do it hot as well, since there are sizes and lengths best suited to one or the other method. Practically all rivets over 1 inch in diameter are headed hot, and almost all rivets ½-inch or under are headed cold. Sizes in between may be headed either way, the tendency being to head the longer rivets hot and the shorter ones cold.

Most Rivets Cold-Headed: Producers of cold-headed rivets first had a rather difficult time overcoming the prejudice against this type of rivet. Now it is recognized as equal to those headed hot. Some claim cold-headed rivets are superior. One advantage they have over those headed hot is that they are made in a solid die with a knock-out pin which is the full diameter of the rivet. Thus they are always full size and square at the point, which is a benefit in driving them.

If bar temperature is not exactly right, or if the shears do not cut off sharply, a hot-headed rivet may be turned out with a rough, chisel shaped point. Rivets of this type have been encountered occasionally. They are difficult to drive properly as such a point promotes a tendency for the rivet to bend in driving. With reasonable care in heating and shearing, however, rivets made while hot will have square ends which are true enough for all practical purposes. Considerable experience with both hot-headed and cold-headed rivets has shown the characteristics of the two types to be practically identical.

Make 8000 an Hour: Cold-heading of rivets has progressed consid-

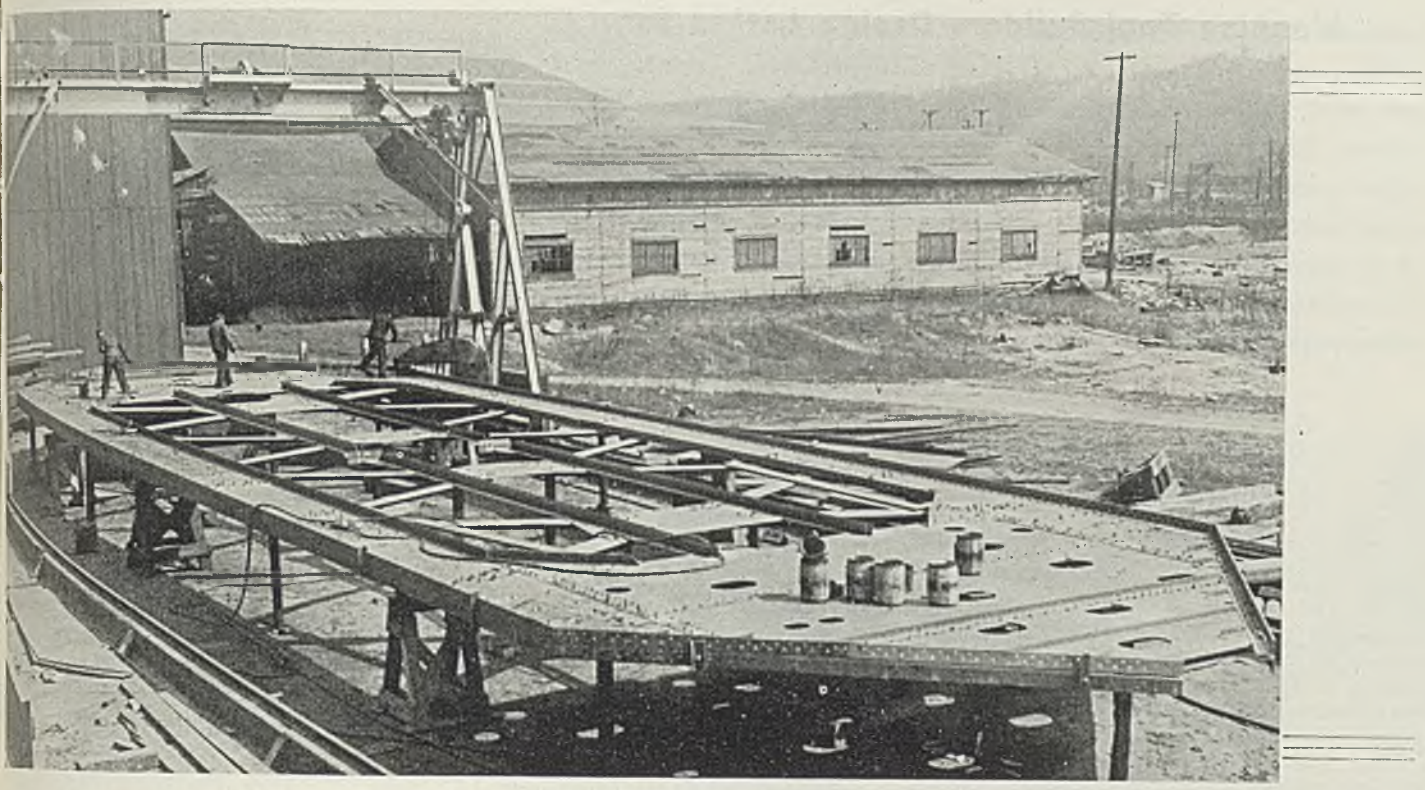


Fig. 1—This is a large steel frame in which the rivets are being driven cold using an Osborne compression-type riveter seen working at the far corner of the frame. Its general appearance is that of a large C-clamp. See closeup of this same operation in Fig. 2

erably along with other lines. Today, it is not unusual for a rivet-heading machine to turn out 5000 ⅝ or ¾-inch rivets in an hour. I happened to install some of the first machines to head rivets cold in diameters up to ⅞-inch. The drawn bars used were about 20 feet long, and two blows were employed to make the rivet head. Now one blow is used, and long bars are fed from coils which contain sufficient material to make about 400 pounds of rivets without stopping the machine against 25 to 50 pounds of rivets made from the short bars. Some manufacturers still draw the bars, others do not. While cold drawing undoubtedly has a certain value, it is not known whether the benefit is worth the additional expense.

Steel specifications for hot and cold-headed rivets differ little. Because of appearance, possibly steel for cold-heading receives a closer inspection for seams. Seamy steel shows up more in cold-heading operations than in hot-heading work as the seams are hidden more or less in hot-heading by putting a flash or thin collar on the rivet heads. Seams, however, are just as detrimental to either type rivet head. From the customer's viewpoint, cold-headed rivets perhaps are better since it is harder to get by with a poor quality of steel undetected.

Five Ways to Drive: In general there are five methods used in driving rivets. The term "driving" refers not only to forming the second head on the end of the rivet after it is put through the members to be joined but also to expanding the body or shank of the rivet to fill the hole into which it is fitted. For special work, adaptations for multiple driving and the like, certain variations or combinations of these five classes may be used. But for ordinary work, riveting may be classified:

1—Hand driving with hand hammers or mauls.
2—Hand driving with pneumatic hammers.
3—Machine driving with compression riveters.
4—Machine driving with high-speed mechanical riveters.
5—Driving split or tubular rivets with small hand, foot or power machines.

As previously mentioned, the hand-hammer method is practically obsolete except for driving small rivets 3/16-inch in diameter or smaller in sheet-iron work and the like. Cold driving up to about ½-inch diameter and hot driving for sizes above that are customary. On tank work with rivets easily accessible, it is not unusual to drive 800 ⅜ or 7/16-inch rivets or 480 ¾-inch rivets in 8 hours.

The second method, hand driving with pneumatic hammers, is used almost exclusively in structural field work and by far the greater portion of field plate work because erection operations do not lend themselves to use of the heavy riveting equipment necessary for compression driving. Pneumatic hammers easily drive rivets up to ⅞-inch in diameter with the rivets either hot or cold. Above this size, rivets are driven hot.

Comparatively few rivets in sizes ½-inch or larger are driven cold with pneumatic hammers, but most rivets under ½-inch are. Structural rivets are always driven hot, even sizes smaller than ½-inch, because equipment for hot driving rivets is more feasible to use on construction work.

Output Varies: On tank work, 1500 7/16-inch cold or 675 ¾-inch hot-driven rivets has been considered a day's work. A good gang, however, will often drive as many as 1500 good ¾-inch hot rivets in a day on piece work. On structural work, three hundred ¾-inch hot rivets has been regarded as an average day's work because rivets are in smaller groups and working conditions are much more difficult. So much depends on the number of rivets in a joint and on the designer's skill in keeping rivets accessible in the structure that the possibilities vary greatly.

"Bull" Riveters Speed Work: Use of compression riveters, commonly called "bull machines," is the third method of driving rivets. It is employed extensively in shop practice. Also large plate work in the field is often driven in this way. Compression riveters are used on both

(*Please turn to Page* 92)

Machine Tool Builders Design Lathes for

M A C H I N I N G

High-Explosive

■ This series of weekly articles on shell production started Jan. 27, 1941. Section one presented a background on shell; section two, types of shell and their metallurgy; section three, parting off the billets and heating for forging; section four, forging problems and their solution; section five, trends in shell forging, the Baldwin-Omes and upsetter forging machines; section six, considerations in machining shell.

Next week, section eight will present a complete detailed step-by-step description of all operations involved in a highly developed sequence of machining and related operations employed at plant of S. A. Woods Machine Co., Boston, details of almost all the operations being shown by actual illustrations also.

■ AS REQUESTED by the United States Army Ordnance Department, the National Machine Tool Builders' Association has designed and now announces a "single-purpose" lathe which readily can be built in shops not otherwise engaged on the defense program and not specially equipped for the production of machine tools. Details of this machine are presented by courtesy of Tell Berna, general manager of the association. An examination of Figs. 1 and 2 will show the design does not sacrifice "machine intelligence"—if we may be permitted to use the phrase—and yet the machine obviously is inexpensive and easy to construct.

Broadens Source of Machine Tools: By designing a shell lathe that can be built by plants not otherwise engaged in the defense program, such as those manufacturing printing presses and textile machinery, the machine tool industry has broadened the source of supply and at the same time has freed itself to a greater extent to concentrate on the production of equipment for aircraft engines, tanks, guns and other items that require precision machine tools. Though shell manufacture is important, it is not a precision job. The closest limit on a shell is 0.005-inch, and most limits are from 0.020 to 0.030-inch.

Single Basic Unit: This design, now in actual production as the defense program shifts into high gear, comprises a complete line of machines for turning, boring and facing medium-caliber shell. The machines are of two sizes—one for the 3-inch group of

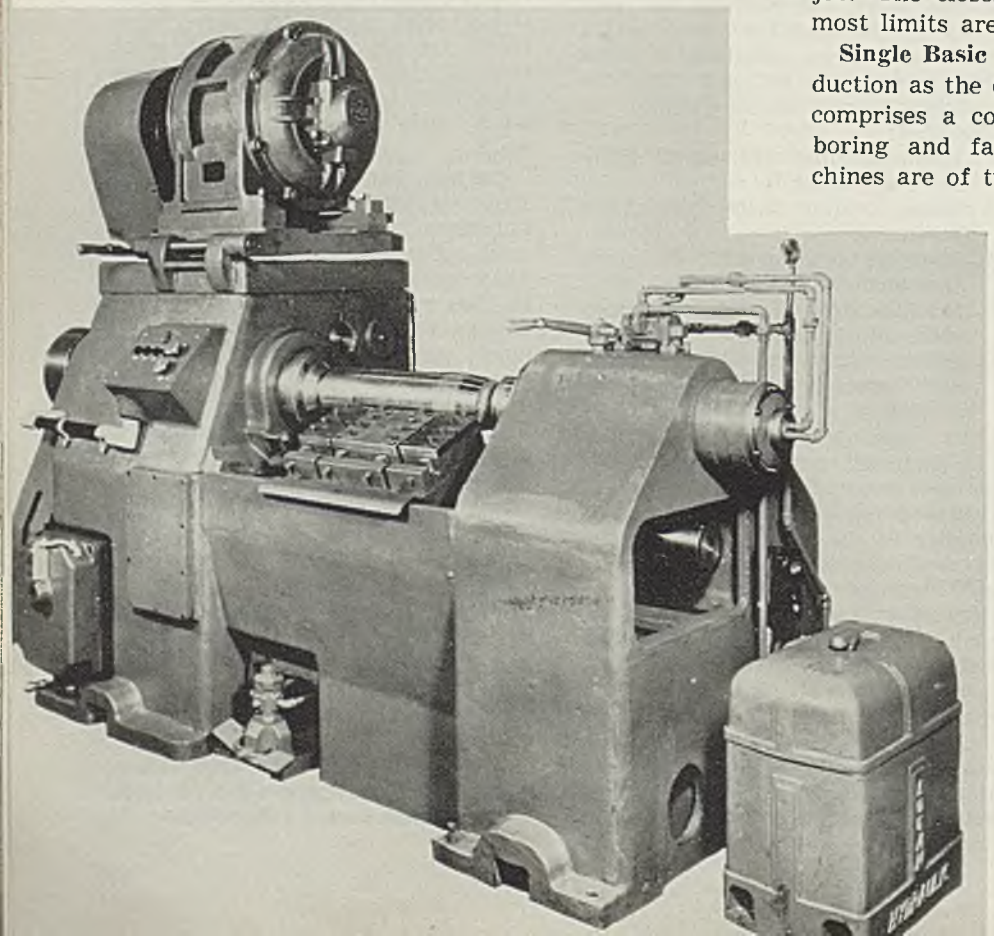


Fig. 1—Front view of "emergency" shell lathe of 6-inch type, as designed by National Machine Tool Builders' Association on behalf of United States Ordnance Department. This line of machines, designed specifically for machining shell of particular caliber groups (3 or 6-inch as the case may be) have capabilities of their automatic cycle, speeds, feeds and work-and-tool holding facilities limited in scope to the single purpose for which the machines are built. Efficient though they are on shell, they intentionally are impractical—if not wholly useless—for any other manufacturing purposes. Machine shown is tooled for turning operations only, the oscillating facing and cutting-off tool holders not being used in this particular case

Shell

At the request of the Ordnance Department, the National Machine Tool Builders' Association has perfected designs for an emergency line of lathes for automatically machining shell. Read here how extreme production volume is attained, how practically all machining is eliminated in making the frames of these machines, how exceptional accuracy is achieved without use of planed or scraped ways or conventional tool slides, what provisions allow these units to be constructed in any well-equipped shop, how automatic operation and easy insertion and removal of work are provided through simple means

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

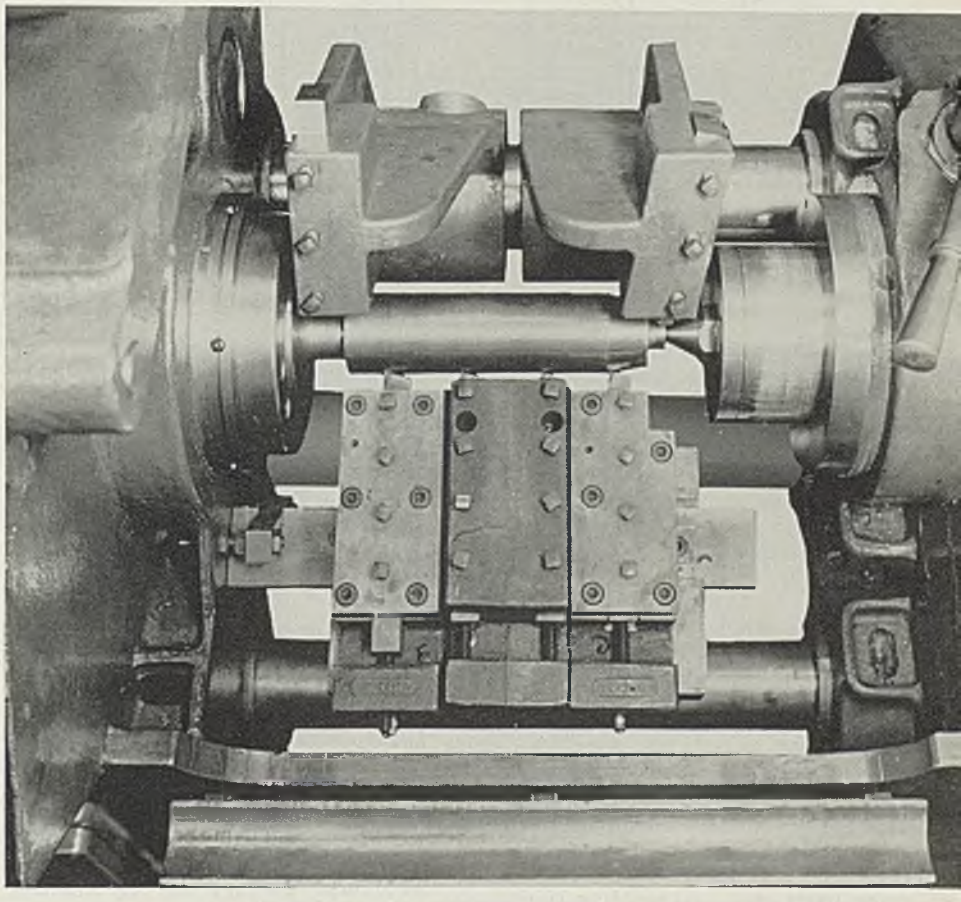


Fig. 2. (Right)—Looking down from front of lathe on a setup on 75-millimeter shell corresponding to that in Diagram 3 in Fig. 6. The hollow forging is driven by an expanding chuck on spindle (left) and given outboard support by live center in tailstock (right). While cutting, all four carbide tools in foreground move from right to left. The main tool slide or tool holder is clamped to a cam-actuated longitudinal feed rod, visible at center of machine below the work. This tool holder slides along on the top of a guide block or cam mounted on the supporting rod visible at the bottom of the illustration. At the end of the cutting traverse, this supporting rod is automatically rolled over about a quarter turn, allowing the heel of the main slide to drop down—thus clearing the tools from the work during the return traverse of the slide. While this main slide or toolholder is making its right-to-left cutting traverse, the extreme right and left-hand tools of its set of four are also moved transversely (to or away from the work) on auxiliary tool slides (see plan diagram of tool holder, Fig. 4) by action of strip cams mounted on a flat rail extending through the body of the main slide. These combined longitudinal and transverse feeds serve to generate "boat tail" (right) and preliminary form on nose. Meanwhile, the two upper tools, mounted in holders clamped to the cam-actuated rocking feed bar visible at top of the illustration, swing down and face both ends of the work. Cored holes through which "expanding metal" was poured to lock machined bushings in place, can be seen clearly on face of tailstock end of frame

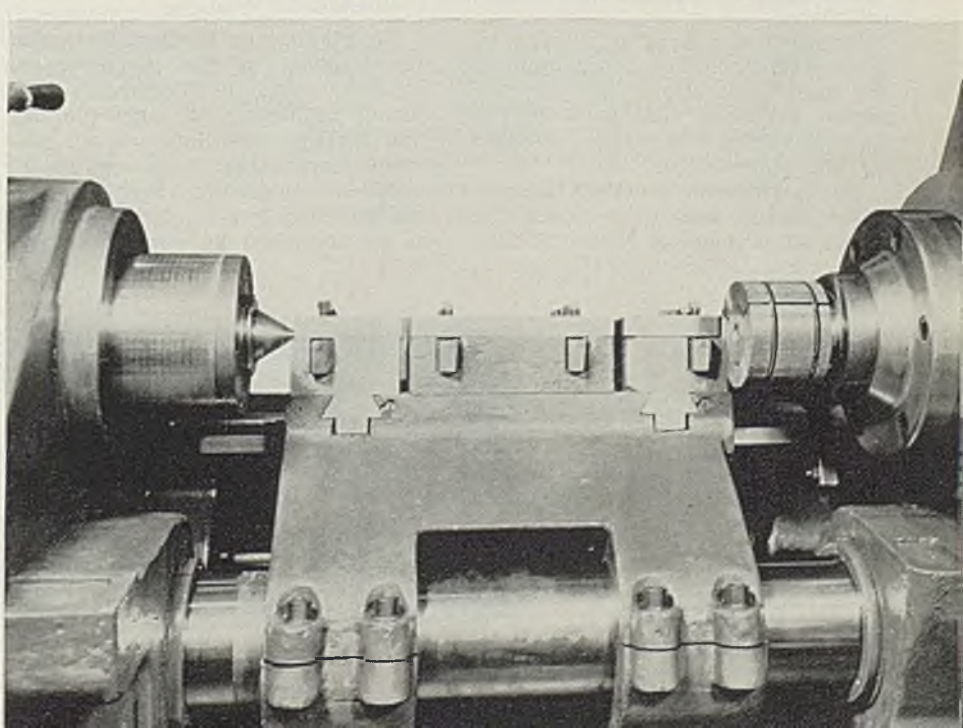


Fig. 3—Looking in from rear of machine toward front face of main slide tooled up as in view above but with work removed from chuck and center. This view clearly reveals design of dovetailed auxiliary slides which give transverse motion to "boat tailing" and "nosing" tools—also method of clamping rugged main slide to its longitudinal feed rod. By using four turning tools mounted as shown, shell can be turned completely from end to end by traversing main tool slide only slightly more than one-fourth the overall length of

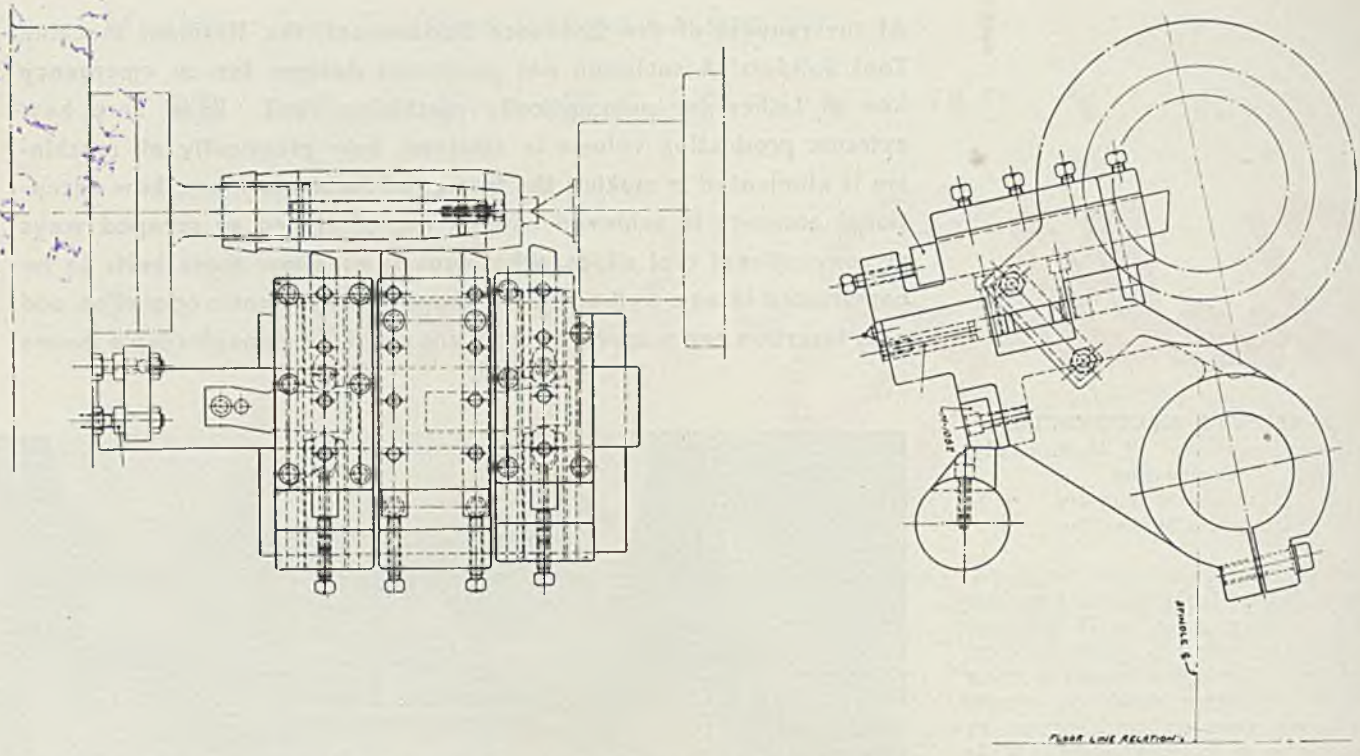


Fig. 4—Diagrams of main tool slide when set up as shown in Figs. 2 and 3. Top or plan view at left, from same angle as Fig. 2, gives clear idea of how strip cams on flat rail through center of main slide cause auxiliary "boat tailing" and "nosing" slides to move transversely during longitudinal traverse of main slide. End view at the right shows main slide riding along the top of the guide block on cam at left as it does during its turning traverse. This view clearly indicates how a quarter turn clockwise of the supporting rod carrying this guide block will cause heel of main slide to drop down, pivoting about the center of the main slide rod as shown—thus clearing tools from work during return stroke of slide

shell, the other for the 6-inch group. In each group there is a standard basic machine which then is equipped with whatever slides, tailstock, tooling equipment and motor drive are required for the particular work to which that unit has been assigned. The machines are capable of all operations except cross drilling, notching and such work as nosing-in, squeezing the band into the band seat, and welding the base end-plate.

Complete details of a typical complete setup including the equipment for these operations will be presented in STEEL next week in the final article of this series presented by Mr. Macconochie.

The engineering work on this machine design was done under the direct supervision of Myron S. Curtis, consulting engineer in machine design.

Simple, Inexpensive, Automatic: There are three outstanding features about the new machines: First, they are of simple construction so they can be built quickly in substantial quantities; second, they are inexpensive and can produce shells economically; third, they are automatic so they can be handled by unskilled operators.

No Planing or Boring: To make the building of the machines as simple as possible, the design completely eliminates all large planing and boring operations and all machining operations, large and small, on the main casting, except for the drilling of a few small holes. This is accomplished by supporting the carriage for the turning tools as well as the swinging arms for facing operations entirely on longitudinal bars instead of planed way surfaces. Moreover, these bars (there are three of them), together with the spindle, tailstock sleeve and all shafts, are carried by bushings which are cast in place in the main base of the machine.

The casting-in-place of bushings is accomplished by use of a low-melting-point lock-in metal. The base of the machine has pouring holes cast in it, and in some cases two bushings are poured through the same hole. The recommended pouring metal is a lead-tin high-bismuth alloy which expands slightly upon cooling.

Avoids Machining: In addition to the bushings supporting all shafts, the seat upon which the cover plate rests is also made of this alloy. The metal is poured in a trough on the top of the headstock of the machine and allowed to find its own level. The cover plate, which also supports the motor, is then fastened to the base casting upon this seat. It is not necessary to machine door seats as all doors and plates are attached to the rough base casting

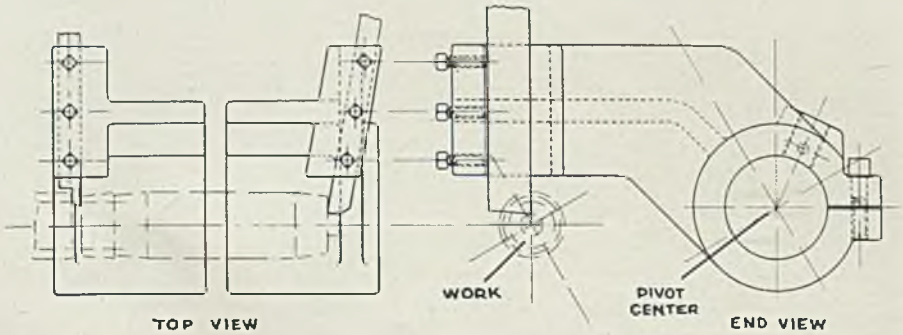


Fig. 5—Diagrams of the rocking tool holders and their mounting as set up for facing and cutting-off operations on ends of the shell. View at left is looking down from in front of the machine. At right is an end view from the tailstock end showing how these holders are clamped and locked to the cam-actuated oscillating rod which swings them to and from the work

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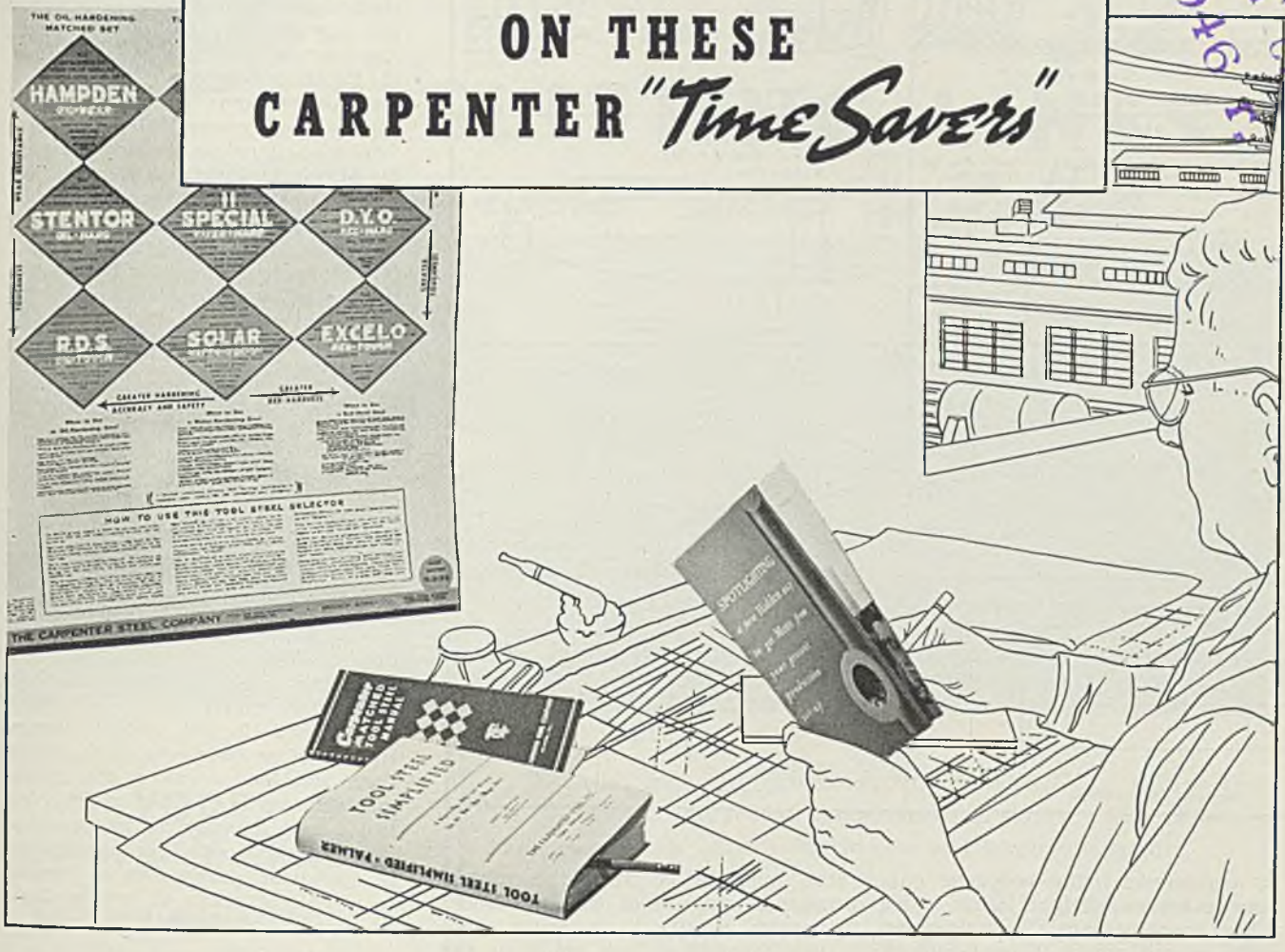

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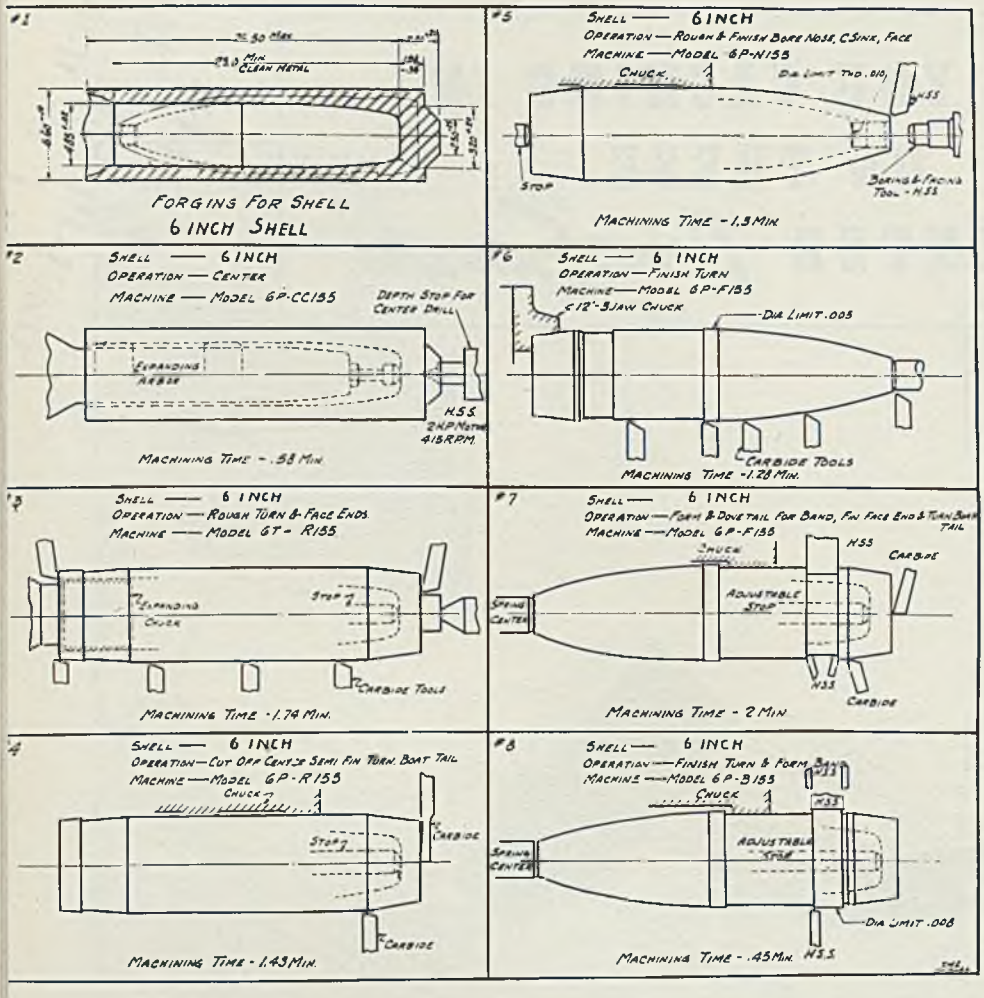


Fig. 6—Evolution of a shell as carried out in the 6-inch line of NMTBA-sponsored "emergency" lathes. (1) Sectioned view of forging as delivered to the machines. Note outline of finished shell superimposed upon it. Cavities are now being forged so accurately that internal machining is not required. (2) Center drilling closed end. Shell is mounted on expanding arbor on main spindle, and center drill with depth stop is mounted in tailstock spindle. (3) Mounted on expanding chuck and with live center in tailstock supporting closed end, shell is turned, "boat tailed" and faced at both ends, as in Fig. 2. (4) Gripped on the outside by a chuck, the center boss is cut off and another cut is taken on the "boat tail." (5) Turned end-for-end after having been "nosed in," the shell is chucked with its closed end against a stop and the nose is bored, countersunk and faced. (6) Chucked on the "boat tail" and with nose supported by the tailstock, nose and body are finish turned by battery of five tools. (7) Turned end-for-end again, shell is chucked on the body with nose supported by a spring center and bottom of cavity against a stop. Groove for band is formed and its sides are dovetailed, and finishing cuts are taken on "boat tail" and closed end. (8) After banding, shell is again mounted as in (7) and band is finish turned and formed. Each diagram shows one machine setup in the series. Each machine is one of the special automatic lathes pictured in Fig. 1 but tooled up especially for the operation in which it is used. Thus the sequence of operations shown here is handled in a line of machines, not a single machine

by cap-screws using neoprene gaskets to insure oil-tight joints.

The machines are all single-speed units except where 2-speed motors are used. Motor size varies from 10 to 60 horsepower depending upon the operation to be performed.

Simple Drive: The main drive of the machine is from the motor, mounted on top of the headstock, through V-belts to a drive shaft then through a jack shaft to the spindle. The drive to the feed mechanism is through a chain and sprockets to a set of pick-off gears, then through a shaft to a feed worm and gear. This gear drives a drum cam for reciprocating a sliding bar on which the turning carriage is located, as well as face cams for operating the facing arm and the bar for supporting and oscillating the turning carriage. A constant-speed, individual motor is belted to the feed box for rapid traverse of the tool carriage.

For profile machining, certain of the tool blocks are slideable in the tool carriage, being controlled by a stationary cam bar. The spindle

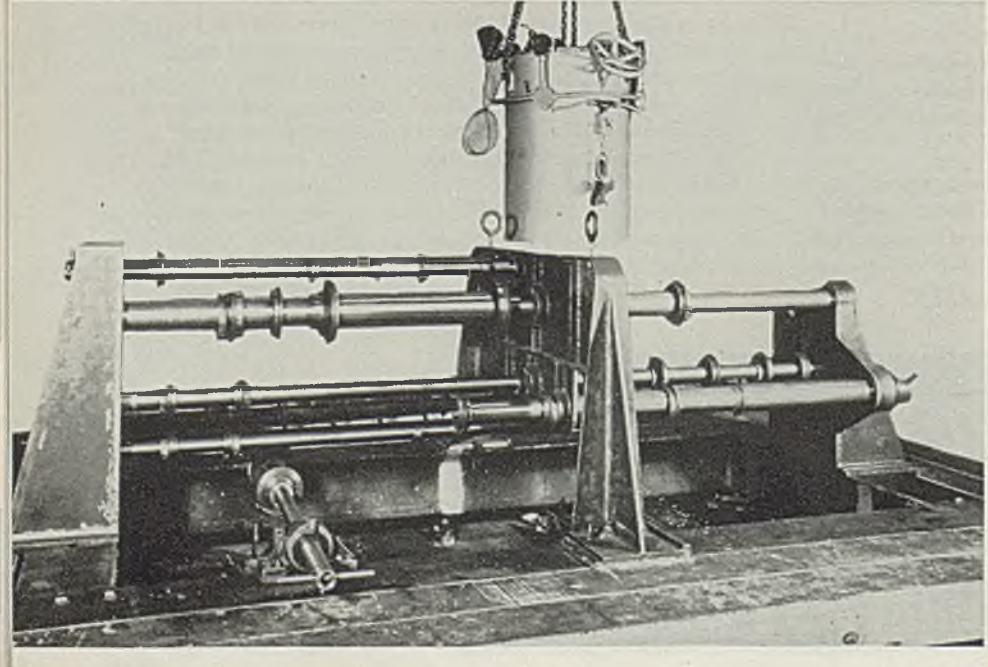
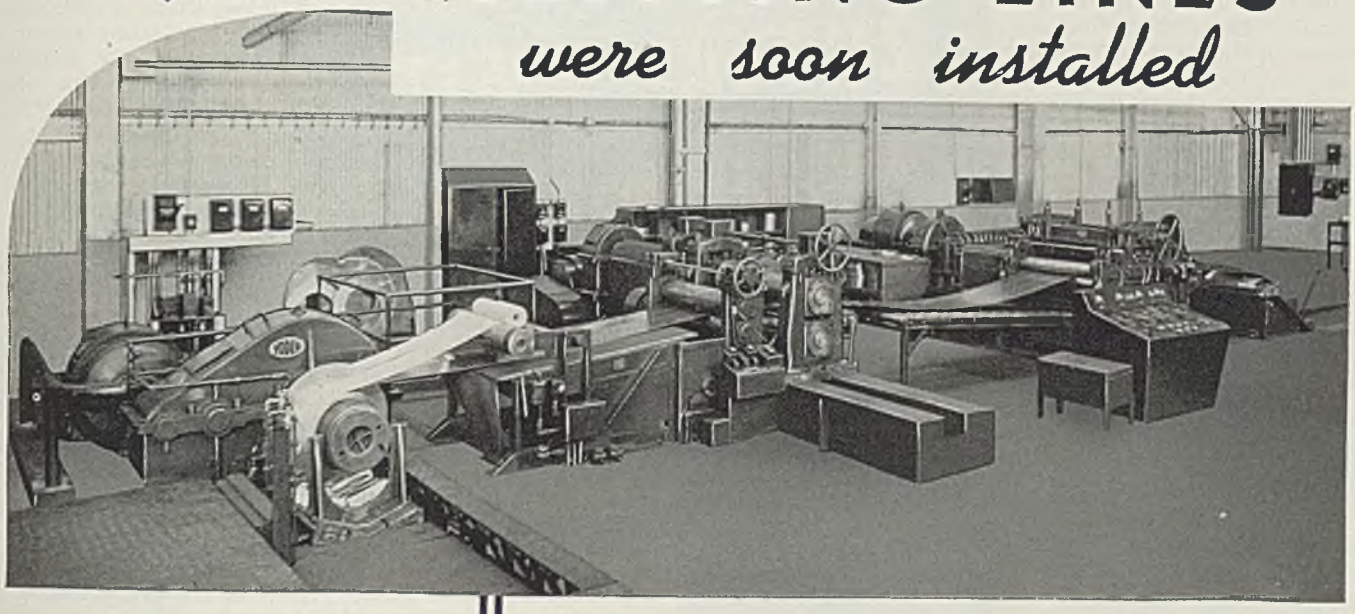


Fig. 7—Welded steel pouring fixture by means of which machined bushings for spindle, tailstock, shafts and rods are exactly located in rough cored holes in main frame casting while molten tin-lead-bismuth "expanding metal" is poured around them—thus locking them in place in the frame. Hanging above the fixture is the electrically heated controlled-temperature ladle from which the "expanding metal" is poured through cored openings provided for that purpose above the bushing holes in the frame casting. Several of these pouring holes can be seen in Fig. 2

OUTPERFORMED
and the 2nd and 3rd
SLITTING LINES
were soon installed



Yes, this No. 700 high production steel mill type slitting line is distinctive. It is refined and advanced in several essential details and particularly outstanding in one very important factor.

The YODER *Patented* Removable Cutter Sleeves permit quick set-up for different cutting widths *away from the machine.* The slitter continues to produce and the change over is made very quickly with a new "low" in non-productive time.

This slitting line has capacity for 1/16" to 3/16" by 40" wide soft cold rolled steel or hot rolled stainless steel in coils up to 10000 pounds.

Speeds, depending upon gauge and width, from 150 to 250 feet per minute are obtained. As many as 9 cuts may be made in 3/16" gauge 1.00 carbon steel at 150 feet per minute and a greater number of cuts in lighter gauges at higher speeds may be obtained

The line consists of a driven roll uncoil box, seven roll leveler, slitting shear with cutters mounted on sleeves, scrap chopper and heavy tension reel. Tandem operation is secured with variable voltage and field control from a central station.

Investigate this slitting line and discover the outstanding performance that prompted one mill to install a second and third line soon after the first one was put into operation.

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and all shafts run in plain bearings, but a ball thrust bearing is used on the spindle as well as on the feed drum shaft. These bearings are bronze, with a lining of babbitt metal about 0.030-inch thick.

Hydraulic Power: The machine has a live tailstock center which is moved longitudinally by hydraulic pressure. The valve for controlling this hydraulic movement is operated by the binder lever. But one movement of the lever is therefore necessary to move the center into position and to clamp it. Likewise, the reverse movement of this lever both unclamps the tailstock and removes it from the work.

There are two principal methods of holding the shell: First, gripping it on the inside of the open end by means of an expanding arbor, while using the tailstock center for supporting the base end of the shell; second, gripping it on the outside diameter by means of a collet chuck. In either case, the shell-holding mechanism is hydraulically actuated, and control is by means of foot levers which leave the operator's hands free.

Common Hydraulic System: In practice, one central hydraulic system, with accumulator and tank, will provide motive power for a complete line of the machines. This avoids the greater expense of a self-contained hydraulic system for each machine. Similarly, coolant will be supplied from a control tank and returned from a common collecting sump by a single pump.

Other Articles on Production of Ordnance

■ This is another article in the series being presented by STEEL on ordnance manufacture. For others already published, see issue of March 3, 1941, p. 58, for Problems in Machining Shell; Feb. 24, 1941, p. 58, for Controlling Metal Flow in Forging Shell; Feb. 17, 1941, p. 58, for Methods of Forging Shell; Feb. 10, 1941, p. 54, for Heating Billets for Shell Forging at National Steel Car Corp. Ltd., Hamilton, Ont.; Feb. 3, 1941, p. 54, for Composition and Metallurgy of High-Explosive Shell; Jan. 27, 1941, p. 44, for Background Information on Shell Making; March 11, 1930, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines; Feb. 10, 1941, p. 67, for New Method of Checking Gun Bores.

Lubrication of the machine is by gravity from a trough cast in the top of the base and from which oil pipes lead to the various bearing surfaces. The oil settles in a sump in the base of the headstock or goes to the common sump where a central system is employed. In a unit operated separately, the coolant is pumped by a separate motor-driven unit through a strainer and pressure valve back to the oil trough. The pressure switch consists of an electric unit interlocked with the control system so none of the operating motors, with the exception of the lubricating pump motor, can be started unless there is sufficient pressure on the lubricating system.

It is intended that the central system be employed as this not only reduces equipment and operating costs but keeps the coolant at a much lower temperature than otherwise would be possible without requiring tremendous quantities of coolant.

High Output by Using Multiple Tools: The rugged features of this shell machining lathe will not be lost upon anyone who has had any familiarity with the machining of shell, well known to impose a very severe test of endurance on the equipment employed. As may be observed from the typical operation sequence shown in Fig. 4, as many as four roughing tools and two facing tools of cemented carbide operate on the shell blank simultaneously, thus most effectively utilizing the power and rigidity designed into this machine.

More Light for Draftsmen

■ Forty draftsmen can be accommodated in this modern, airconditioned drafting room recently built for Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh. Its three exterior walls are almost completely of glass blocks. This feature in conjunction with the fifty-one 80-watt white-light fluorescent lamps used gives practically uniform illumination throughout the room, providing 75-footcandles at the table top working level. All lamp units are suspended from the ceiling on stems having a ball and socket connection at the ceiling end so that they hang straight. The lights are arranged so there is one 48-inch light unit above each end of each drafting table, eliminating shadows

Shell Forging Billets

(*Concluded from Page* 36)

of alloy bars processed to government specifications. However, steel companies point out that every order for special steel of this type must be submitted to sales headquarters before any price can be named, and as yet extra cards on carbon steels have not been revised to show the premiums assigned to WD specifications.

In addition to the many extra steps involved in manufacturing and processing of shell and armament steel, some, especially in the larger sizes, must be "buried" or pit cooled after hot rolling; in other words, cooled slowly in sealed pits or cars to prevent failures.

Burying is nothing new, for many mills are equipped for the work and have been doing it on heavy sections such as crankshaft billets and the like, mainly to improve cold shearing qualities.

In shell steel, aircraft quality steel, gun barrel steel, etc., every precaution must be taken to insure soundness. Disastrous results of premature explosions in shells are only too well known. As a further protection against such an eventuality, some forged steel shells now being produced have a disk of S.A.E. 1020 steel about 0.030-inch thick (for 90-millimeter size) spot welded over the base, liquid and gas tight.

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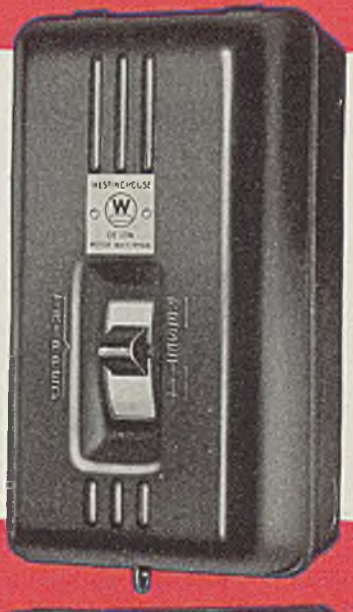

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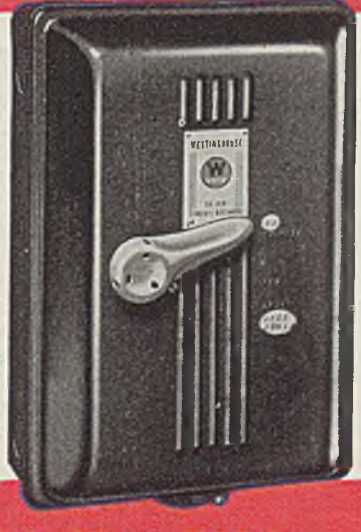

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MOTORS AND CONTROL

Protective Finishes for ALUMINUM AIRCRAFT

Since corrosion easily reduces the endurance limit as much as 67 per cent, the retention of maximum physical properties so necessary in aircraft construction necessitates adequate attention to corrosion prevention. Here Mr. Cordy not only details the factors involved and various means of corrosion prevention but also describes the latest practice now being employed by Curtiss-Wright Corp., one of the largest aircraft manufacturers in the country

■ CORROSION of aluminum and of aluminum alloy surfaces in aircraft is important primarily because any form of corrosion lowers the strength of the material greatly—especially the fatigue strength, which is affected severely. Tests[1] on duralumin have shown a reduction of fatigue strength as measured by the endurance limit of about 35 per cent after stressless corrosion. Other tests[2] to check effect of corrosion on fatigue strength under repeated stress have shown reductions as much as 66.7 per cent for aluminum as fabricated (100 per cent aluminum) and a reduction of 55.6 per cent for duralumin as fabricated with 4 per cent copper, 95 per cent aluminum. Reduction was 42.3 per cent for the same material when annealed.

Of course in aircraft work all parts are under repeated stress and so it is this reduction of over 50 per cent in the endurance limit which must be carefully guarded against—especially since all aircraft parts are designed with a comparatively low factor of safety and maximum physical properties of the material must be maintained.

The damage done by corrosion is due to the "stress raisers" produced. These are microscopic notches formed in the surface of the metal. For many years, notches of all types have been recognized as a major factor in causing fatigue fracture. The seriousness of the notch of course depends upon its sharpness, depth, slope of walls and whether the bottom of the notch is sharply defined or more in the nature of an indentation. Corrosion appears to produce a particularly destructive type of notch.

Corrosion of aluminum and aluminum alloys can be divided into two general classifications of distinctly different nature. The intercrystalline type, the first of these, gives only slight evidence on the surface as it penetrates into the interior of the metal, largely between grain boundaries. When duralumin alloys first were used in aircraft, instances of extremely rapid corrosion accompanied by embrittlement were encountered. Early investigators[3] found intercrystalline attack responsible for this serious embrittlement. As is now comparatively well known, the cause is incorrect heat treatment which permits particles of the constituent $CuAl_2$ to be precipitated along the grain boundaries. This makes the material susceptible to intergranular corrosion which rapidly reduces the strength of the material under repeated stress. This particular type of corrosion is easily avoided by quenching in cold water from the "solution" heat treatment given the alloy to develop maximum strength.

Correct heat-treating practice as employed at the Buffalo plant of Curtiss Aeroplane division, Curtiss-Wright Corp., was detailed in STEEL, June 24, 1940, p. 44. Following the heat treating procedure there detailed produces work that shows no precipitation whatever along grain boundaries upon microscopic examination.

"Pitting", the second type of corrosion, on the other hand, is confined entirely to the surface of the material and so is unlike intercrystalline attack which may occur at almost any depth.

Surface corrosion of aluminum and its alloys largely results in formation of pits. It is to prevent their formation that precautions must be taken. There is a widespread belief that aluminum and its alloys need no protection against corrosion. However, there are two sets of conditions against which precautions must be taken. Contrary to some generally held opinions, aluminum is a highly reactive metal. Its apparent inertness and its resistance to corrosion depend entirely upon the protection afforded by a very thin oxide film which forms spontaneously in air. It is this film that affords a high degree of protection against further corrosion.

Like those films formed on other metals by corrosion or oxidation, even though the film does not entirely stop corrosion, it does influence the manner in which further corrosion proceeds. Also the film will tend to localize attack at points on the film where cracks have formed under the influence of strain. Where the metal is not only subjected to corrosion but also to cycles of repeated stress, the protective film may be repeatedly broken so the destructive effect of this action under repeated stress, known as corrosion-fatigue, may progress rapidly unless careful provision is taken to guard against this. This is the purpose of anodizing and other treatments developed to protect aluminum.

The mechanism of corrosion fatigue is simply that corrosion combined with repeated stress breaks the film, cracks spread the corrosion and pits are formed. These, acting as stress raisers, then reduce the fatigue strength—as much as 67 per cent as was noted above.

Thus toughness of the protective film on the metal is the main factor in determining its resistance to corrosion fatigue.

Electrocouple Formation: Condi-

SURFACES

By A. G. CORDY
Superintendent
Metal Finishing Department
Curtiss Aeroplane Division
Curtiss-Wright Corp., Buffalo, N. Y.

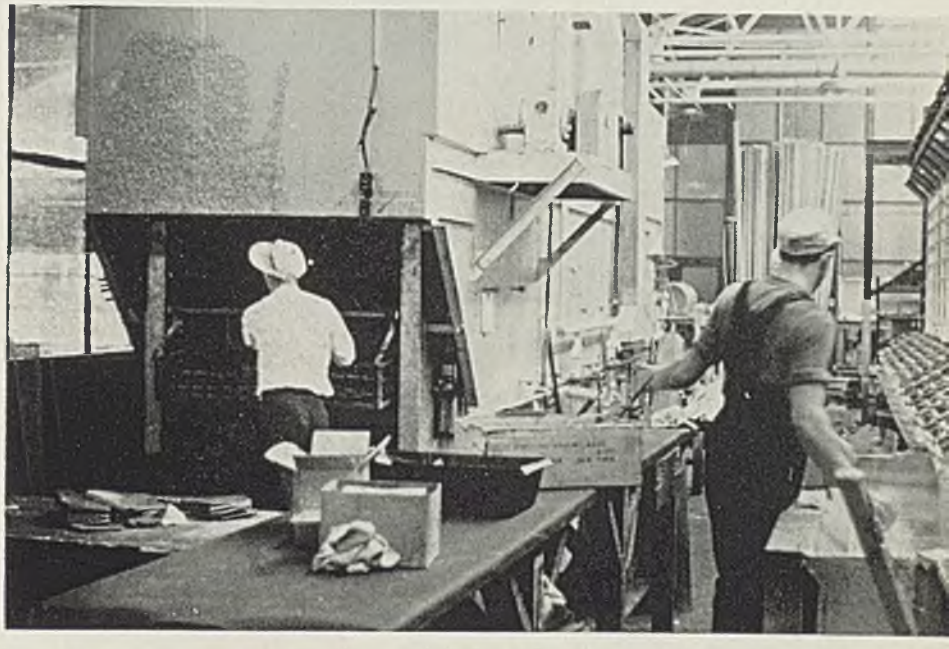


Fig. 1—Production finishing equipment employed at metal finishing department of Curtiss Aeroplane division, Curtiss-Wright Corp., Buffalo. At left is the production continuous cleaning machine. Right is the loading station of the conveyor dryng unit used to dry the primer after dipping the small parts in it

tions which set up electrolytic cells on the surface of the material form another important cause of corrosion.[4] This comes from the fact that aluminum is anodic to most other metals and so suffers electrolytic attack if exposed to an electrolyte while in contact with heavy metals such as copper, tin and lead. If a solution containing salts of such metals contacts the aluminum, a similar condition develops as those metallic ions reduced to a metal by the aluminum at certain points over the surface form minute electrolytic cells resulting in relatively deep pits. It has been noted[4] that appreciably less than 1 part per million of copper or tin in a solution greatly accelerates pitting of aluminum.

Electrolytic cells also may be set up by dirt, thermal insulation or other absorbent material which may hold solutions in contact with the aluminum surface. Also where the surface may be shielded from oxygen, the aluminum oxide film may be prevented from forming, the areas thus shielded will be anodic to the adjacent surfaces and will corrode electrolytically. Crevices in joints give rise to similar cells.

Electrolytic attack is prevented by designs which avoid contacts between dissimilar metals and insure adequate drainage and ventilation; by periodic cleaning to destroy the cells caused by dirt or reduced heavy metals; and by use of properly designed protective coatings.

Protective Coatings: A coating, to be effective against corrosion fatigue, must adhere firmly to the base metal; should be anodic to the base metal to afford protection should its continuity become broken; must have mechanical properties that will not reduce the fatigue resistance of the metal.

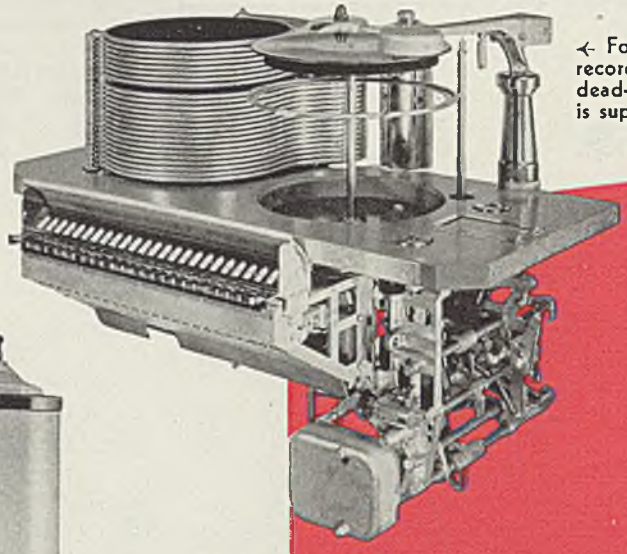
Protective coatings for aluminum include: Oxide coatings, metallic coatings, paint coatings.

Oxide Coatings: As has been pointed out, it is the natural oxide film on aluminum which makes it corrosion-resisting. Therefore it would seem reasonable that a process which would develop a heavier oxide coating would increase the protection afforded. This is true, and a number of processes to obtain this end have been developed. The aluminum can be boiled in various solutions of chromates and carbonates or it can be given an anodic treatment. The oxide film produced by either method can be improved by an aftertreatment known as "sealing", using dichromate solutions. On any anodically coated surface, care must be taken to prevent collection of dirt as this will cause local breakdown and pitting by mechanism of electrolytic attack explained previously. Coating the finished surface with liquid wax aids in keeping the surface clean.

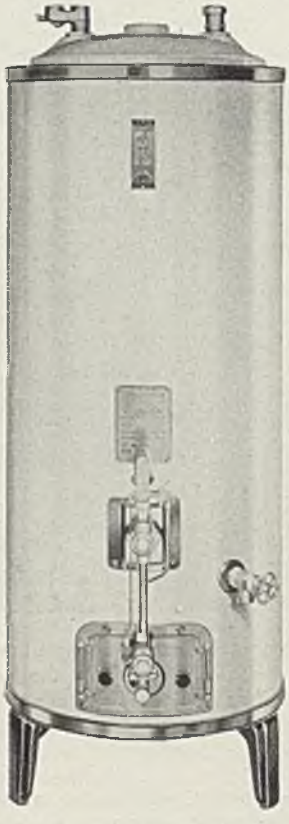
Anodizing: The most effective oxide coating that can be formed on aluminum is produced by the anodizing process in which the aluminum is made the anode in an electrolyte such as sulphuric acid, chromic acid or oxalic acid. Chromic acid anodizing is described in navy department specification SR-19c and army air corps process specification 98-20005-B. The Alumilite process is "sealed" in a 5 per cent solution of potassium dichromate. The corrosion inhibitive properties of the dichromate, which is absorbed into the anodic coating, greatly improves the corrosion resistance of the alloy as well as improving paint adherence.

Anodizing, being the best known surface preparation for maximum paint adherence and for production of the most effective oxide coating, is one of the most important methods of protecting aluminum and aluminum alloys against corrosion. The protective film produced by the process is aluminum oxide or hydroxide in the form of a semi-opaque uniform gray coating which is ex-

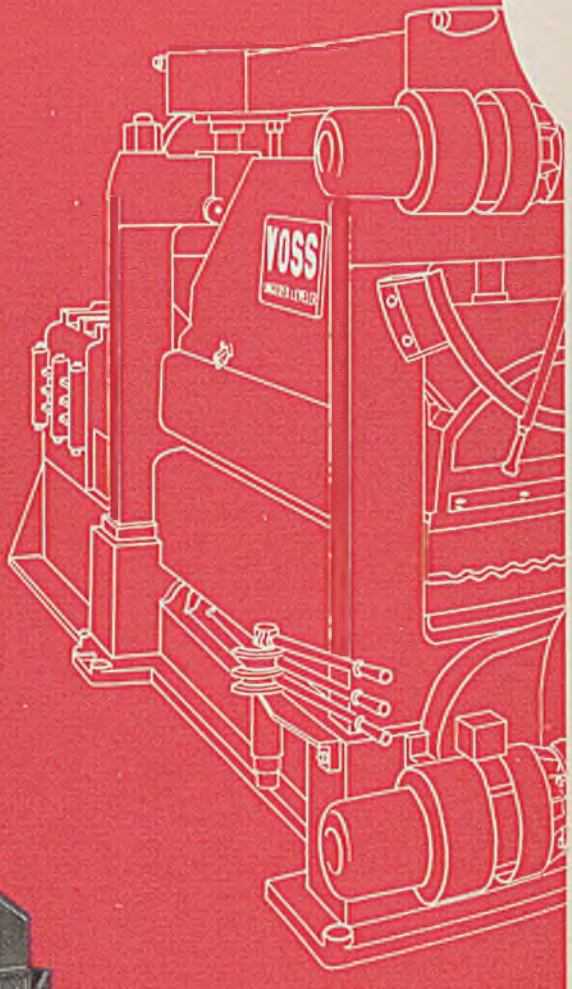
WHO'S USING VOSS

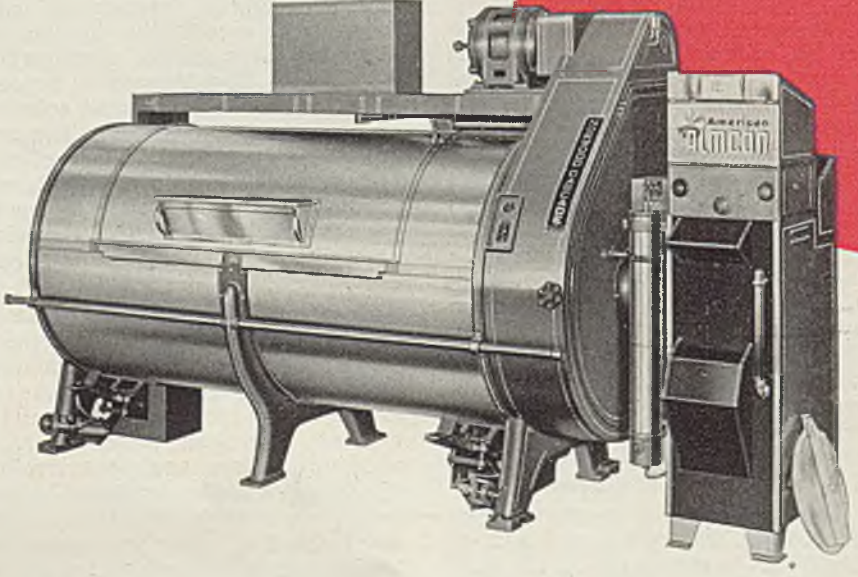


← Fool-proof performance of the popular Wurlitzer record changer is one of the contributions of the dead-flat steel strip used in its fabrication. This strip is supplied to Wurlitzer flattened on a Voss leveler.



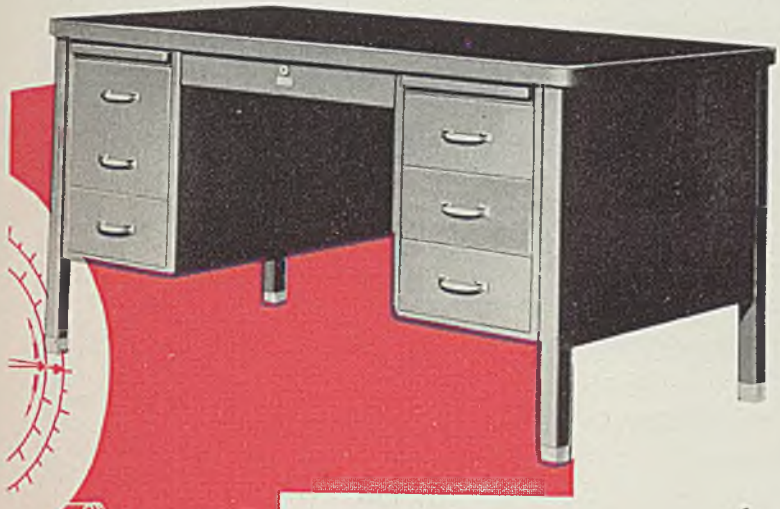
← Helpful in the manufacture, as well as to the final appearance, of the Ruud domestic water heater is the Voss-flatness of the full-finished auto body sheet forming its outer jacket.





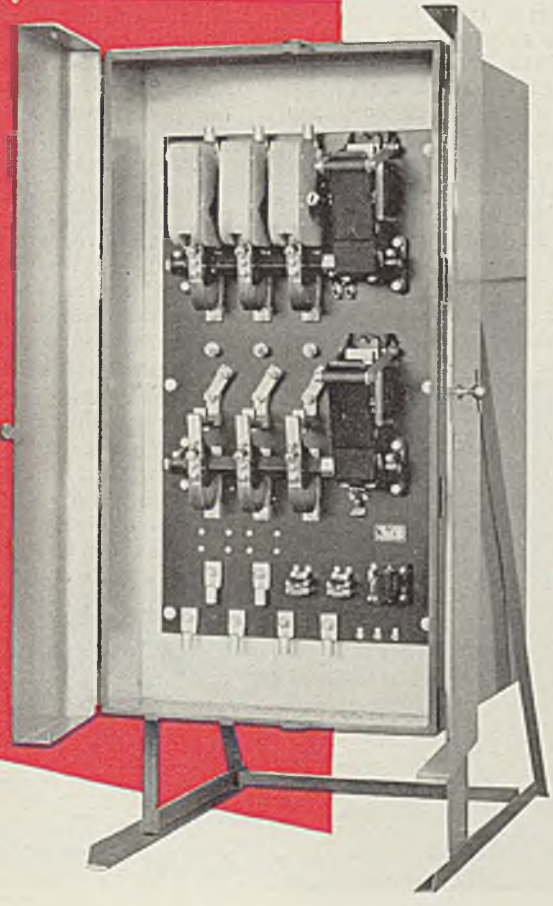
← Monel sheets which have been Voss leveled are used by the American Laundry Machinery Company in the construction of its Norwood Cascade Washer.

LEVELED SHEETS?



↑ Attractive and business-like office furniture is manufactured by the General Fireproofing Company from Voss flattened steel sheets.

↓ The true surface and neat appearance of a "Square D" reduced voltage starter cabinet have the thanks of men who work with control equipment. Sheets going into this unit were Voss leveled.



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When you stumble over Junior's all-steel wagon on your way out the door, each morning, you probably swear at some perfectly good Voss leveled sheet stock. Chances are that you drive or ride to work in an assembly of sheets which have benefited by a Voss leveler somewhere in their production.

At the plant, you go to a desk whose appearance has been enhanced by sheets flattened on our leveler, or you may work with equipment of which Voss leveled sheets form an essential part. By noon you are ready to forsake the din of the plant or the clatter of the office for the melody of a lunch-room record player. Voss flattened strip has its function here in the perfect reproduction of current recordings.

Quitting time comes, and you may be inclined to take a quick one at your favorite bar before going home. Flat metal panels gleam from behind the bar and reflect the magic touch of our leveling rolls. If, after a good dinner and a pleasant evening, you turn ice-box raider, you might recognize the trim, straight lines of enameling sheets that have undergone Voss leveling.

★ ★

We could add that you stand a good chance of being buried, eventually, in a coffin fabricated from Voss leveled sheets. But before this happens, we should like to introduce you to our leveler as a first-hand user. If your production calls for flat sheets, we have the machine and the experience to help you get them. —Edward W. Voss, 2882 West Liberty Avenue, Dormont, Pittsburgh, Pa.

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ceptionally hard, smooth and somewhat of a glassy appearance. The anodizing bath usually is a solution of sodium hydrogen phosphate or chromic acid, the latter being best for most work. Surface of the metal must be cleaned thoroughly. Parts are hung in the solution with aluminum wires or clamps of aluminum since no other metal can be exposed in the bath. Use of other materials in contact with the bath will prevent raising the voltage. A carbon rod is used as a cathode in the bath.

The voltage applied is raised gradually from around 8 or 10 volts to a maximum of about 40 volts to maintain the current at a uniform value throughout the treatment. As the deposit is built up, it requires a higher voltage to maintain the original current at a uniform value throughout the treatment. As the deposit is built up, the current drops off so the voltage is increased to maintain the original current value.

Current densities of 3 to 3.6 amperes per square foot and some as low as 2.8 amperes per square foot[4] have been found to form a film satisfactorily, providing the aluminum had a good surface. A rough surface raises the current requirements, 6 amperes per square foot[4] being required for pieces spun or hammered without polishing. However, present practice utilizes increased current densities, affording better films and shortening the process.

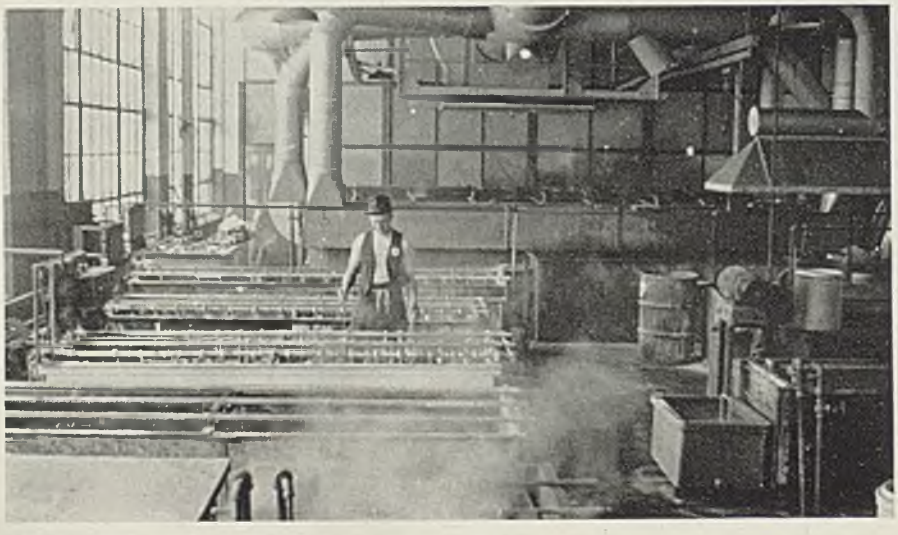
The National Bureau of Standards has developed an anodizing treatment for aluminum alloys which consists in anodizing the work at 40 volts in a 10 per cent chromic acid bath at 35 degrees Cent. for ½ to 1 hour.

Effective film formation in recesses has been demonstrated[4] by depositing a uniform coating on the interior of a tube 7 inches long and ¾-inch in diameter, using exterior electrodes. This excellent film formation characteristic of anodizing is of importance as it assures adequate protection against corrosion in the minute pores and cracks sometimes found in rolled aluminum. These, unless properly protected, give rise to bad pitting.

It is desirable to use a large bath or some means of cooling to carry away the heat produced by the current in the process as bath temperature has been found to affect the wattage consumed. For example, a typical series of tests[4] showed only 53 watt-hours required for a certain job with a bath temperature of 35 degrees Cent., while 72 watt-hours were required at 40 degrees and 107 watt-hours at 45 degrees. Thus a temerature difference of 10 degrees Cent. about doubled the power required. This illustrates the importance of keeping the bath temperatures under proper control.

Corrosion-fatigue is result of combined corrosion and repeated stress, the latter accentuating the "stress raiser" effect of the first small pits formed by corrosion. The resulting cumulative effect can reduce fatigue strength as much as 67 per cent. Toughness of the protective film thus is the primary requisite if it is to be effective in maintaining the high physical properties of the material

Fig. 2—View of large tank equipment in finishing department. Some is electroplating, others are for anodizing, cleaning and the like



The result of the anodizing treatment is a glassy adherent formation which does not affect the tensile strength of the material but does make it somewhat stiffer as the coating is more or less brittle. Some users follow the anodizing treatment by application of lanoline which has been found to improve the corrosion resistance.

Metallic Coatings: Since a metallic coating which is cathodic to the underlying aluminum actually accelerates corrosion upon perforation of the coating at any point, due to the electrochemical action, an effective metallic coating must be anodic to the aluminum alloy to which it is applied. The most satisfactory of metallic coatings have been found to be aluminum or aluminum alloys anodic to the base metal and fabricated integrally with it such as is found in Alclad 17S-T and Alclad 24S-T. Specimens of 14-gage Alclad 17S-T exposed[4] for eight years to continuous 20 per cent sodium chloride spray at room temperature without suffering any measurable loss in tensile strength are typical of the outstanding protection afforded.

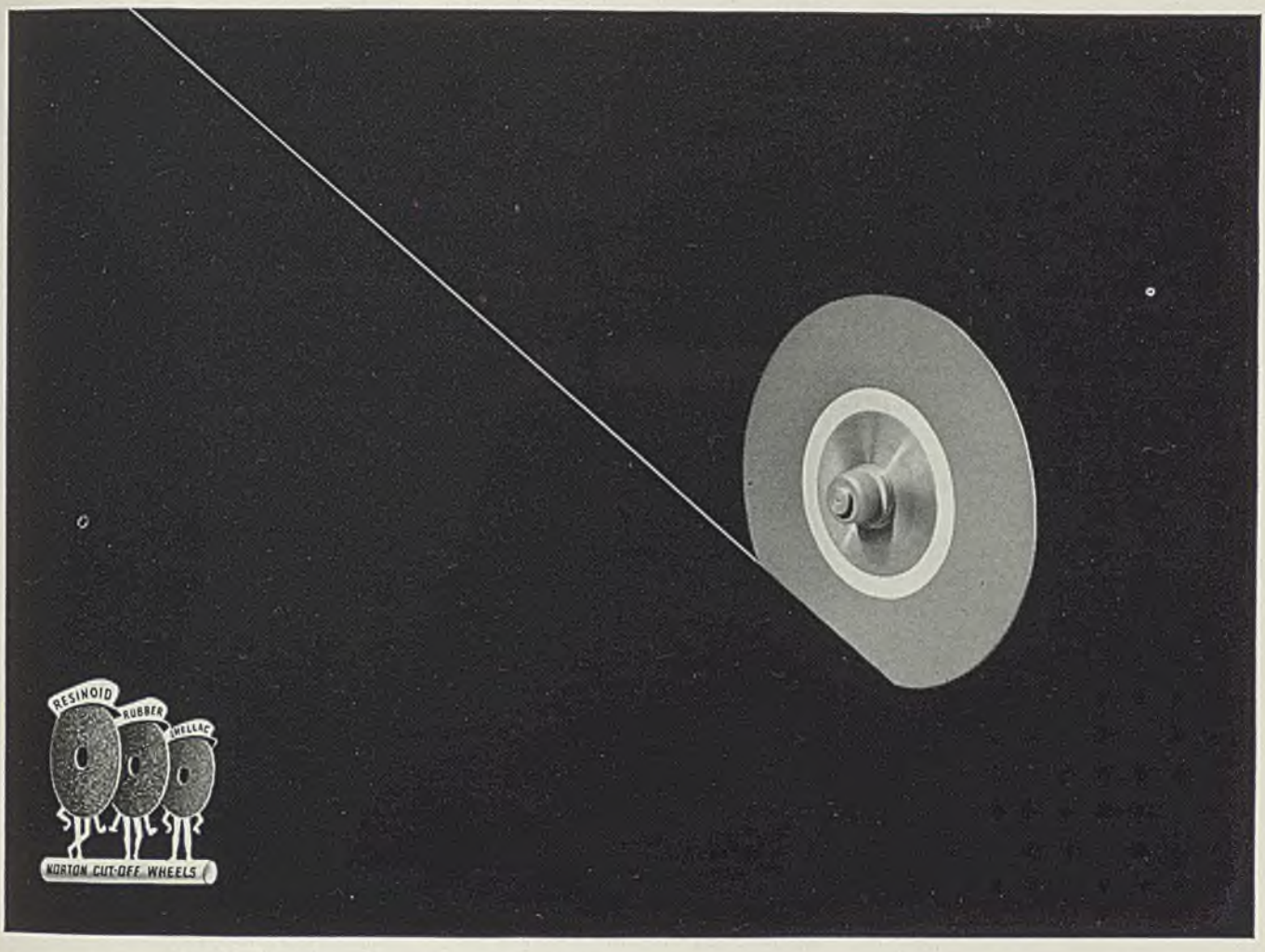
Resistance Graded: Aluminum alloys in the form of wrought sheet, tubing, extruded shapes, rivets, etc., are graded according to corrosion resistance from tests in army specifications No. 98-20009 as follows, the first having greatest corrosion resistance: Alclad 17S-T, Alclad 24S-T, 52S, 53S-O, 53S-T5, 53S-W, 53S-T, 2S-O, 2S-H, 3S-O, 3S-H, 17S-T, 24S-T. In fact, Alclad 17S-T and 24S-T have been found so highly corrosion resistant as to permit their use without protective coatings in many applications.

Other metallic coatings, however, afford excellent protection to aluminum. Electroplated zinc coatings, for instance, have shown exceptionally satisfactory results. Sprayed coatings of aluminum have completely protected aluminum-copper and aluminum-silicon cast alloys against a 20 per cent salt spray for four years[4].

Paint Coatings: Various types of paint probably are the coatings most widely used. Since aluminum has little natural affinity for any type of finish, a suitable preparation must precede application of the finish. The finish should be of an inhibitive type and the top coat should be highly resistant to moisture penetration.

Anodizing is the best known surface preparation for maximum paint adherence. It is particularly valuable on aircraft parts where section thicknesses are relatively small and where low factors of safety are used so little corrosion can be tolerated.

Of the inhibitive primers, zinc chromate types such as those covered by navy aeronautical specifica-



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tion P27b appear excellent as the zinc chromate acts as a corrosion inhibiter to maintain the passivity of the aluminum surface, thus preventing reaction with any solution which may diffuse through the top coat.

A particularly effective coating has been found to be that produced by anodizing process with the anodic film "sealed" by heating in a dichromate solution or by permitting chromic acid to dry on the surface. Then finished with a good grade of aluminum pigmented varnish, the resultant finish is highly resistant to relatively severe corrosive conditions and has withstood successfully severe tests for periods in excess of three years.

Aluminum paint with synthetic resin vehicle is excellent for top coats since the paint is not only highly impervious to moisture but the metallic film formed by leafing of the aluminum powder protects the vehicle from ultraviolet light and so extends its life.

The proceedures recommended above are for use under severe corrosive conditions or where maximum resistance to corrosion is desired, such as in aircraft work. Of course for other types of equipment there are a number of finishes that have proved satisfactory, including finish coats of oil-base paints, long oil varnish enamels and pyroxylin lacquers.

Practice at Curtiss

Now let's examine the practice employed at Curtiss and see how it fits in with the factors which have been pointed out as necessary for maximum protection against corrosion.

The metallic type of coating is employed for protection against corrosion on commercial and army aircraft, this protection being in the form of Alclad 17S and Alclad 24S sheet. The Alclad form of both of these alloys consists of the high-strength core with a layer of exceptionally pure aluminum on both sides made integral with the base material during manufacture. As has been pointed out and according to the listing of alloys according to corrosion resistance, the protection afforded by this type of material is sufficient for all ordinary corrosive conditions.

However, the natural resistance of the material is not relied upon entirely for that is supplemented by the following treatment: First the work is passed through a high-production continuous cleaning machine shown at the left in Fig. 1. This machine contains 35 racks or baskets hung on a chain which carries them continuously through the cleaning baths and drying oven. As the chain revolves at a low speed, the operator has ample time to load or unload the baskets at the station shown. Work first passes through an alkalizing cleaning solution, then through a hot water rinse. This is followed by a 5 per cent chromic acid dip at 140 degrees Fahr., in turn followed by a hot water rinse. Then the work passes to the top of the cleaning machine, where it travels through an air drying oven. Each basket is 4 feet long, 15 inches wide and 8 inches deep, so quite a volume of small parts as well as fairly large parts can be accomodated by the machine.

Practice at Curtiss is seen to combine the protection afforded by various treatments, the result being maximum resistance to corrosion—a resistance that retains its effectiveness even under severe corrosive conditions

For parts larger than can be accommodated in the cleaning machine, a series of tanks is provided in the large processing room, part of which is shown in Fig. 2. Cadmium plating equipment is also shown here.

Next, the parts are dipped in a zinc chromate primer of the type covered by navy aeronautical specifications P27. Parts then are loaded on the automatic drying conveyor at the loading station at the right in Fig. 1. This drier is in the form of numerous racks arranged to hold a large volume of small parts as they are carried around the drier on a continuous belt conveyor arrangement. It takes 9 minutes for the drier to make a complete turn —about 6 to 6½ minutes being sufficient time for the work to dry as it passes from the loading station near the extreme right in Fig. 3, moves toward the right end of the drier and returns on the back side of the unit to the unloading station at the left of foreground in this view.

Navy Craft Anodized

Some typical small parts can be seen in Fig. 3. This setup handles an amazing volume of small parts with exceptional efficiency.

All parts for navy aircraft including Alclad pieces are anodized to produce a surface with maximum resistance to corrosion. The anodizing bath is a 5 to 10 per cent chromic acid solution. The temperature of the bath is held at 95 degrees Fahr. plus or minus 4 degrees by automatic controls.

Voltage is increased rapidly to 40 volts, current densities from 7 to 8 amperes per square foot of surface area being employed. Work is held in the bath approximately 45 minutes. After anodizing, the work is rinsed in a tank of hot running water and then dried.

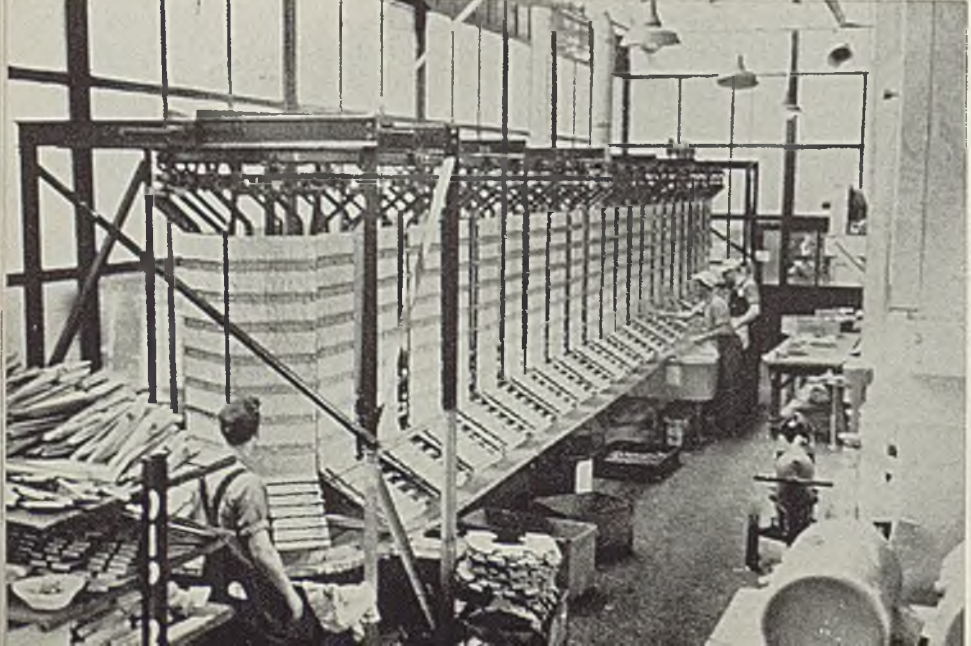
The anodizing produces an excellent base for subsequent paints. Many of the small parts are dipped in primer and dried on the air-drying conveyor in Fig. 3.

Electric generators include a 40-volt 1000-ampere unit for one anodizing tank and a 40-volt 800-ampere unit for a second anodizing tank. In addition, 1500-ampere and 400-ampere generators are used for miscellaneous plating. Also a 3000/1500-ampere 8/16-volt generator is used for plating hard chromium deposits.

In addition to anodizing aluminum, the metals finishing department also handles a variety of other work. All stainless steel parts, for instance, are passivated to remove any foreign materials from their surface. This treatment consists of soaking the work for 20 minutes in a 20 per

(*Please turn to Page* 102)

Fig. 3—Overall view of the conveyor drier. Dipping and loading station is at extreme right. Work passes around end at right and across back side of unit to be unloaded at end in left foreground



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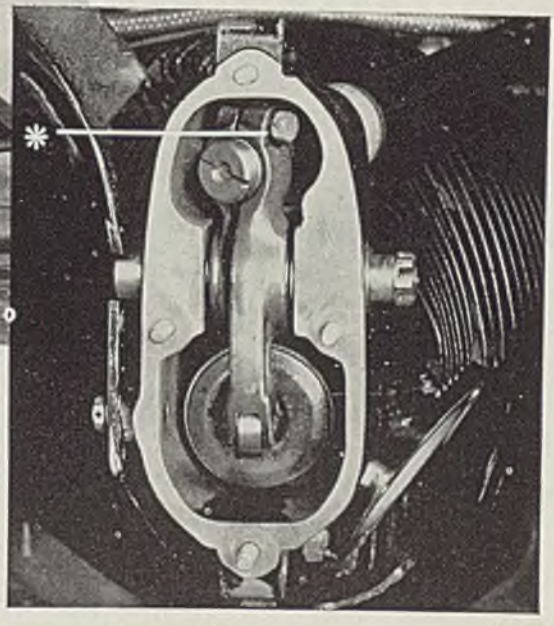

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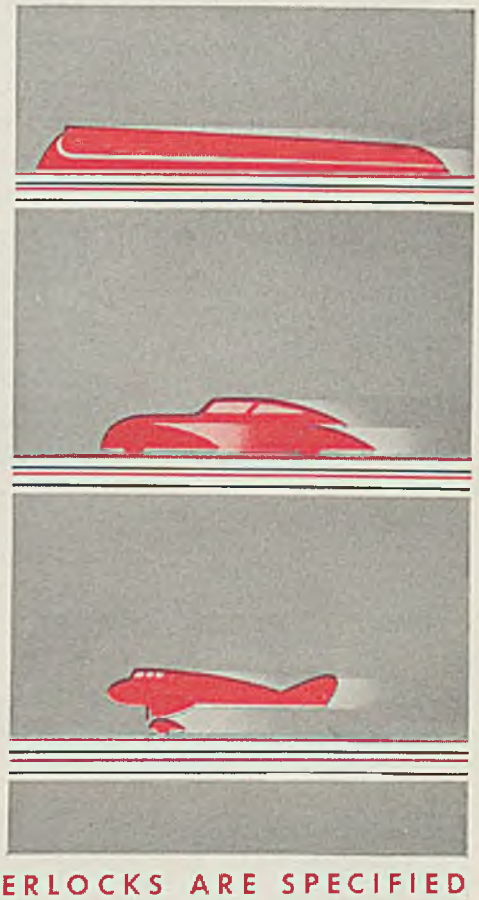

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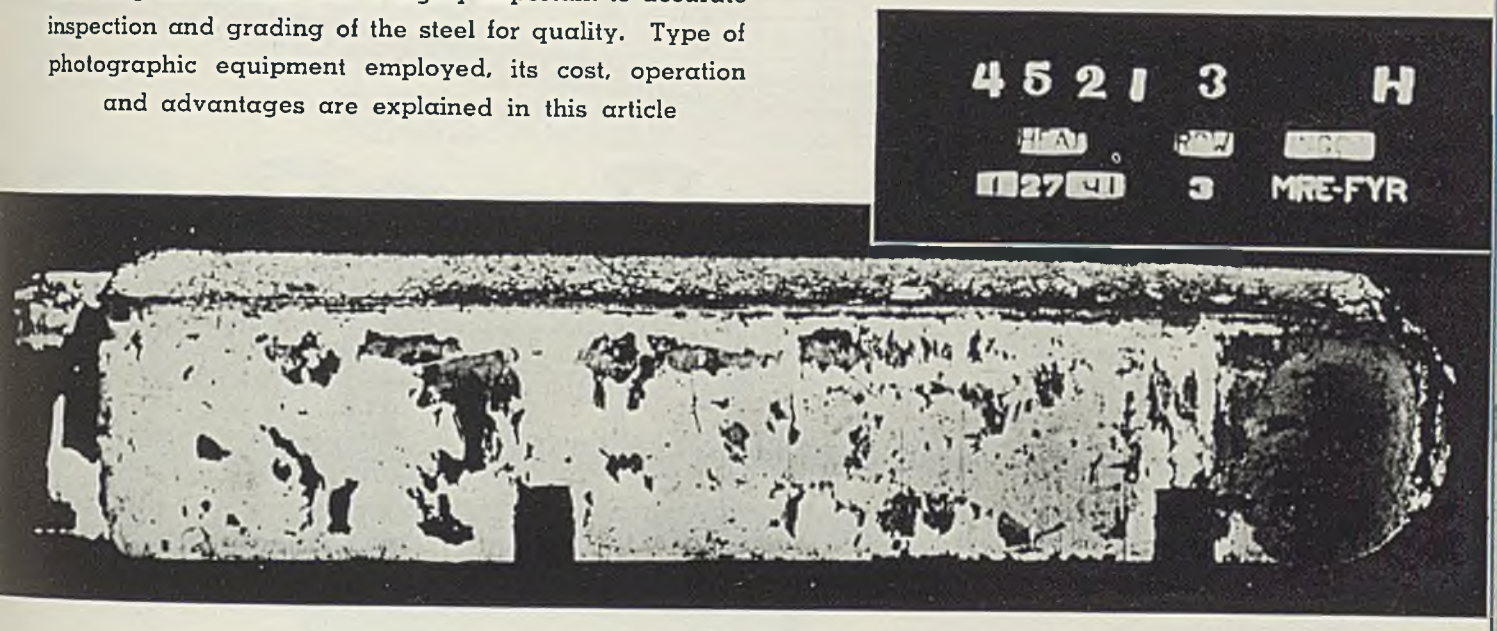
Ingot Photography

Visual control and written records of heats of steel covering a 24-hour period have been supplemented at an Eastern Pennsylvania steel plant by photography thus affording information that is highly important to accurate inspection and grading of the steel for quality. Type of photographic equipment employed, its cost, operation and advantages are explained in this article



Normal 23 x 23-inch Gathmann ingot, which weighs 8500 pounds, reduced about 50 per cent in cross section and edged up to enter the 12-inch blooming mill pass, butt first. No surface defects are visible on one side and on one edge; rolling temperature is uniform and fairly hot. Dark butt and dark patches on the surface are adhering scale. About 92 per cent of the ingots rolled are classified as normal or o.k. In the upper right hand corner is shown the "heat board" located near the front table of the blooming mill and within the field of the camera. The translucent data including the heat number, date, soaking pit row number, heater's initials, etc., appear on each film along with the ingot*

■ INGOT PHOTOGRAPHY is a term which, in the future, will grow in importance as an indicator of quality inspection in the production and control of production in the country's steel making—and perhaps other metal making plants. Ingot photography is what the term implies; the photography of each ingot of metal made, at such a time that it makes a record unquestionable and final, of the quality of the metal during the rolling and finishing procedure.

To obtain these photographic records, the Alan Wood Steel Co., Conshohocken, Pa., purchased a 35-millimeter De Vry camera known as "The Magic Eye". This camera is equipped with a single frame release and an electromagnetically operated shutter which remains closed when in the nonoperating position. It is equipped with a Wollensak 2-inch, F-1.5 lens and is loaded with Agfa reversible super-pan film.

The camera is located in a light tight booth, 3 x 3 x 6 feet, elevated about 15 feet above floor level about 30 feet away from the approach table serving the blooming mill and is focused on this section of the table at right angles to the material. Being elevated 15 feet it focuses on two sides of the ingot. Within the field of the camera is a "heat board" which, by means of translucent letters and numbers illuminated from the rear, carries the heat number, soaking pit row number, size of ingot, method of casting, date, turn number and heater's initials. This information is photographed along with the ingot. Also on the heat board are eight illuminated windows of graduated intensity. This, also appearing on the film, furnishes a comparison standard by means of which the apparent temperatures of the ingots may be determined. Shortly, there will be added an illuminated clock for time study data.

The photograph is taken by the roller in the pulpit who pulls a cord operating an electric switch which causes the electromagnet to trip the shutter. The camera then takes one picture and it has proven best to take the picture after the ingot has received 4 to 10 breakdown passes and when it is at rest before going into the 12-inch pass, as it is at this point that surface defects, if any, are opened up and readily visible.

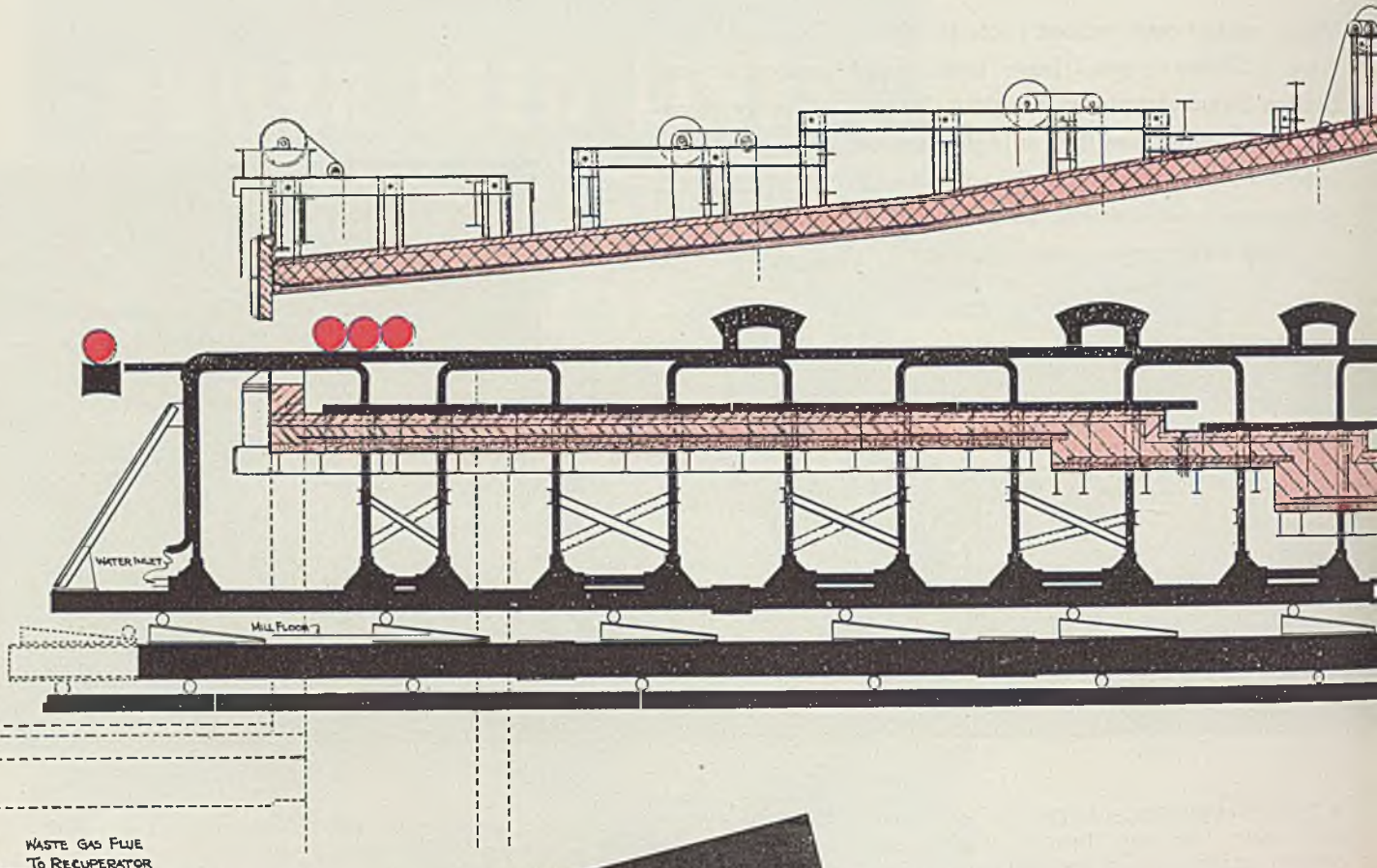
The film is removed and developed daily. The latter operation takes about 1½ hours, using the standard method as recommended by Agfa. The previous 24-hour rolling record then is reviewed by open-hearth and mill operators, fuel engineers and metallurgists. This review, requiring about ½ hour is accomplished by projecting the photographs on a 5 x 7-foot beaded screen with a standard single-frame projector.

This entire installation cost approximately $650.

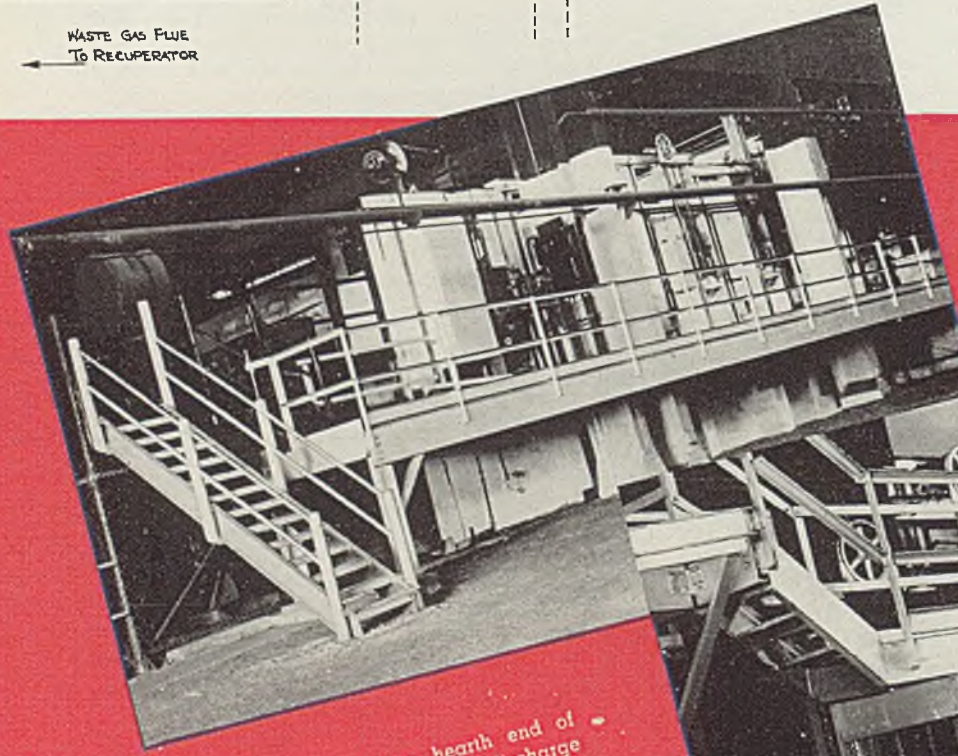
Ingot photography provides 24-hour observation and supplements

* Many hundred feet of film were examined for specific types of ingot defects. After location, the accompanying illustrations were made.

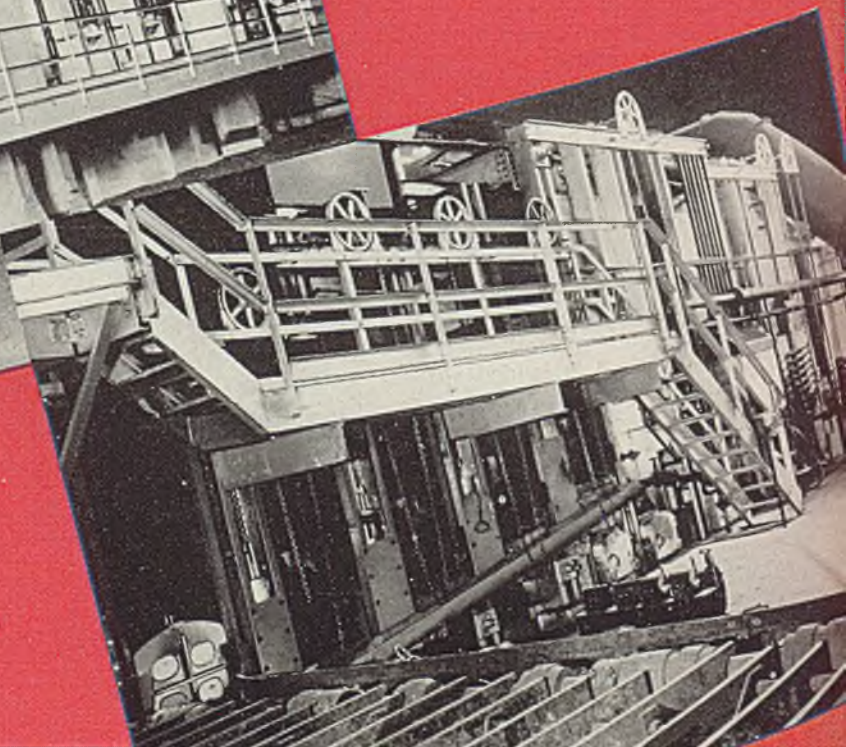
FURNACES WITH WALKING BEA



WASTE GAS FLUE
TO RECUPERATOR

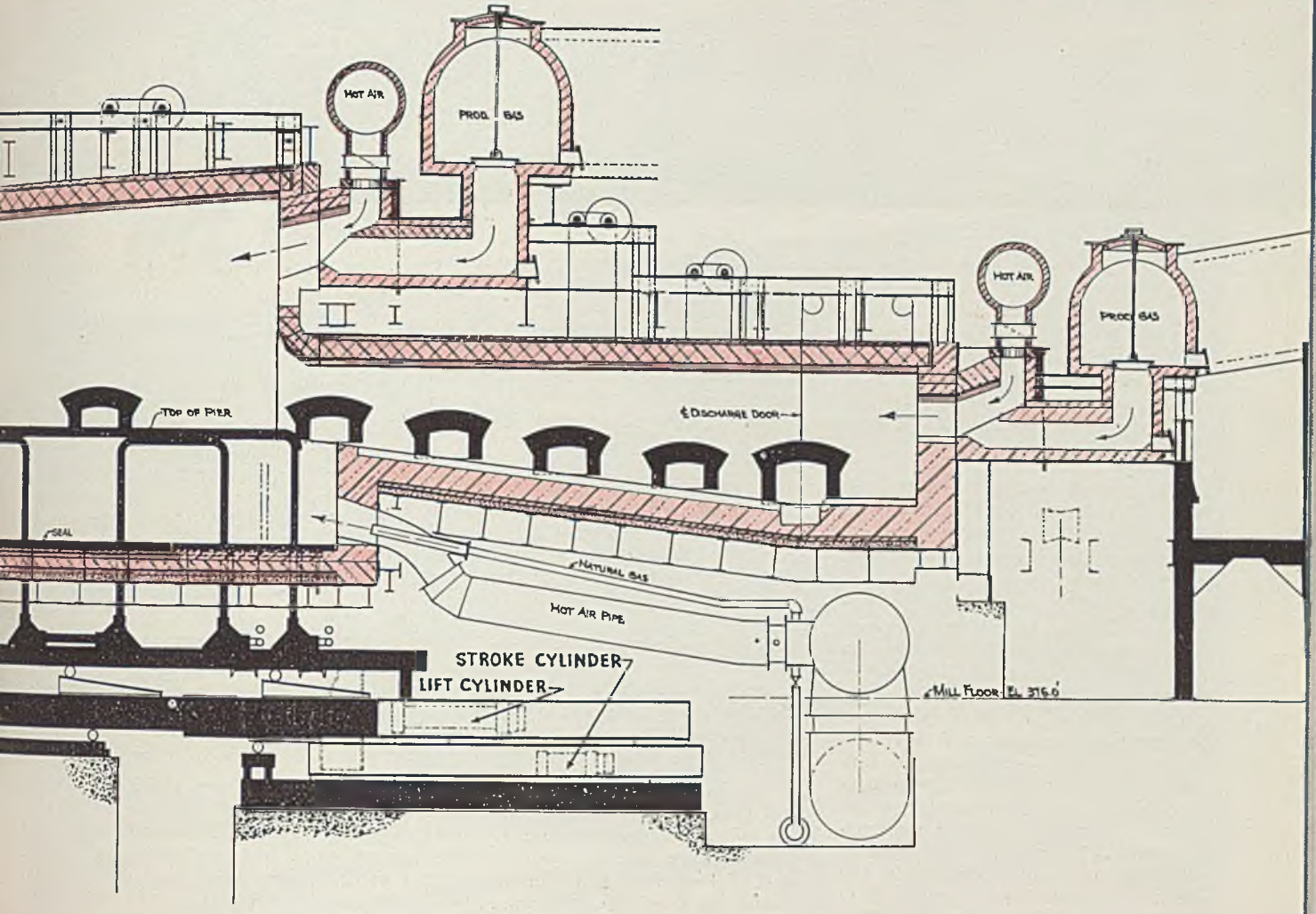


Above—Soaking hearth end of furnace showing side discharge door and transfer table.



At right—Side view of furnace looking from charge end.

CONVEYORS FOR HEATING ROUNDS



Marking a radical departure from conventional practice, the two Round Heating Furnaces each with a rated capacity of 50 tons per hour, at the new Youngstown Sheet and Tube Piercing Mill are equipped with Walking Beam Conveyors. It is believed that this is the first application of a walking beam conveyor at such a high temperature and on such a large scale . . . By means of the walking beam conveyor, the rounds are conveyed from the charge end to the inclined soaking hearth. From here the billets roll down the inclined soaking hearth to the discharge doors where they are pushed out the side of the furnace by means of a water-cooled peel to a common discharge table located between the two furnaces . . . There are two complete and distinct hydraulically operated walking beam conveyors in each furnace. These may be operated together or separately depending on whether the furnace is heating a single or double row of billets. The walking beam mechanism is constructed of water-cooled tubular members within the furnace. The water-cooled members are insulated with a refractory material to reduce the heat losses to a minimum and at the same time provide a radiant surface to the steel being heated thereby reducing the shadow on the steel . . . The use of walking beam conveyors in these furnaces has resulted in very marked, substantial savings in operating labor and fuel. Only six operators per turn are required for both furnaces. The fuel consumption is 150 to 200 pounds of coal (or equivalent) per ton heated, depending on tonnage and size of billet. The use of walking beam conveyors has also made possible more uniformly heated billets. The combination of these factors has materially reduced production costs . . . The new piercing mill is also equipped with a Surface Combustion reheating furnace and a Surface Combustion normalizing furnace.

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WHEREVER HEAT IS USED IN INDUSTRY

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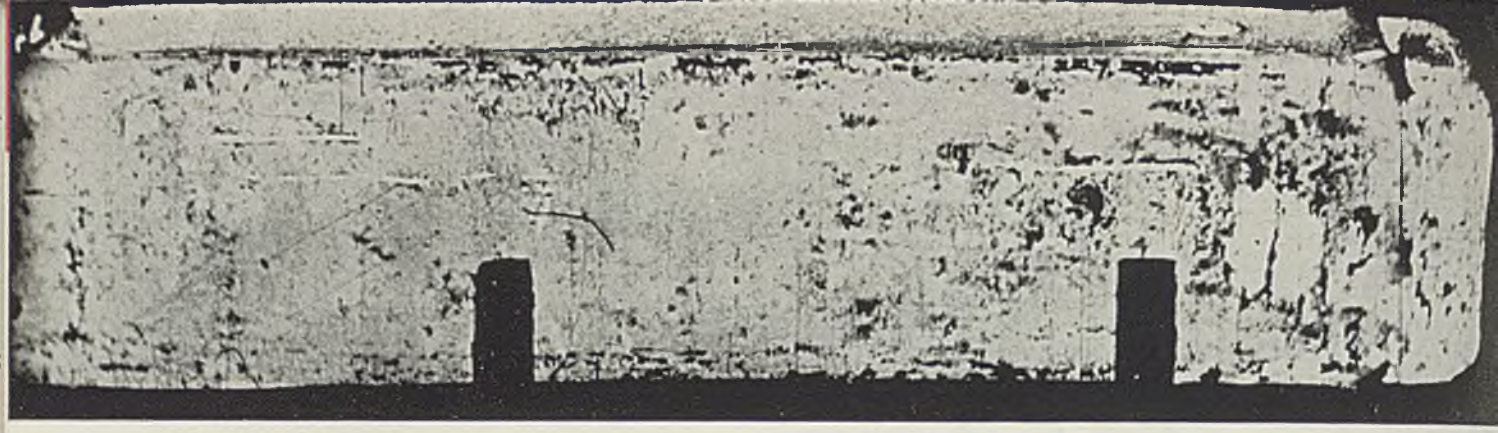


Rimmed steel, such as this 21 x 24-inch ingot, which weighs 8500 pounds, may "grow" in the mold because of high-carbon, manganese or silicon content or under-oxidation of the bath, too high pouring temperatures or too fast a pouring rate. The extra metal on the top of the ingot, above the pour line, has been displaced from the liquid interior of the ingot during solidification by the formation of gas bubbles caused by the ejection of soluable gases (usually nitrogen) late in the period of temperature drop. In this illustration the gas pockets are deep seated and do not affect the surface of the ingot. At rolling temperatures and pressures these blowholes weld up at this or later stages of reduction in cross section

visual control and written records with all information vital to accurate inspection and quality grading.

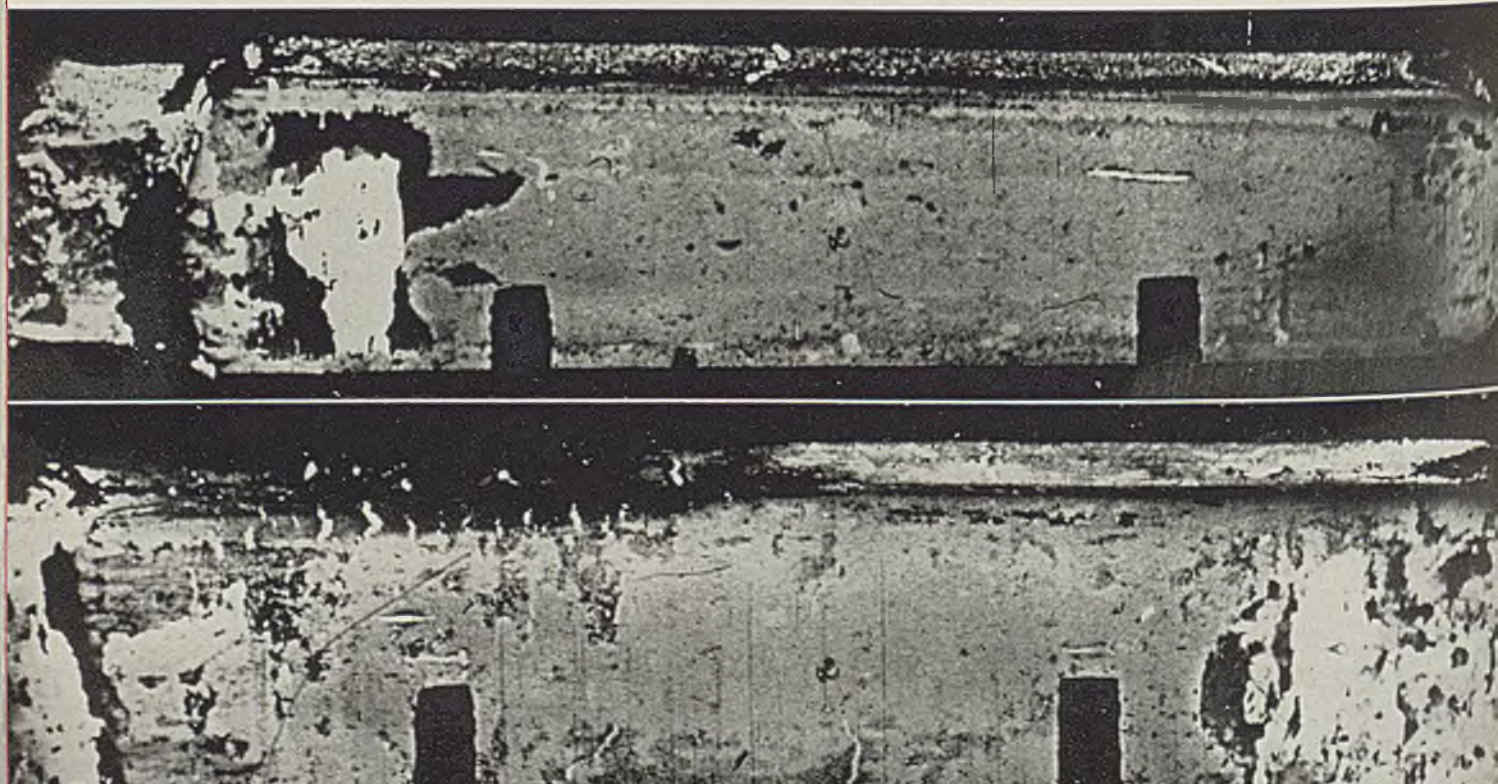
Written records have never yielded the desired results. Putting into words what is self-evident to the eye is difficult. Often the accuracy of the records has come under dispute with the word of an experienced operator being placed along side of that of a less experienced observer and recorder, and there has always been the possibility of failure to record what may be essential information. On the other hand, even though the recorded information should be sufficiently complete, the vital information is lost in the mass of detailed data unless it is subjected to careful scrutiny. The use of such records as a check on steel quality usually requires laborious back-checking. This procedure obviously, requires considerable nonproducing man power, the cost of which can only be charged partially to educational value of those employed to secure the data.

The Alan Wood Steel Co. installed ingot photography in the blooming mill in February, 1940 and since then there has been made a daily record of every ingot rolled, and the advantages gained have proved more than useful. To list a few, the photographs will provide; (1) a quick, obvious and concise record of the ingot quality as produced by the open hearth shop, showing clearly excessive rise, stop-pours scabs and other open-hearth defects,

(*Please turn to Page* 105)

Top, transverse cracks (crows feet, snakes) and other defects except scabs, which destroy the longitudinal continuity of the rolled section, show up on photographs as brilliant white due to the exposing hot, scale-free interior of the ingot. Defects, such as shown here, occur on about 6 per cent of the medium high-carbon, and 21 per cent of the low-carbon killed steels that are rolled. In this illustration the primary scale is practically removed but a secondary scale dulls the temperature

Bottom, when soluable gases are ejected during solidification of steel and form gas pockets before a fairly thick skin solidifies on the ingot, the gas bubbles at the butt of the ingot (left) fail to effervesce out and, as a result, form an insulating zone between the skin and core of the ingot which will overheat upon heating, and chill rapidly upon rolling, and thus exhibit dark corners and characteristic "necked-down" butts. An exaggerated case of this type of defect is found in lenticular blowholes so close to the surface of the ingot that it is impossible to reheat in conventional soaking pits without burning the surface outside the insulating zone of blowholes. Checked corners, crows feet and general surface discontinuities will result in the bottom half of this ingot, causing rejection of this portion of the steel at the hot shears



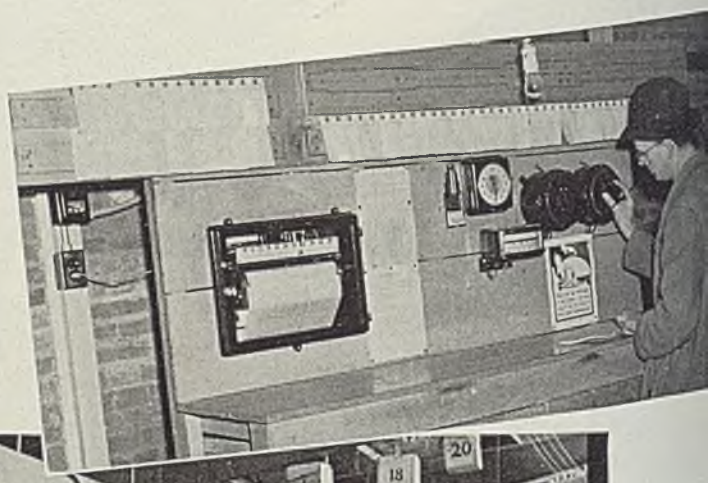
6,000,000 Bricks Yearly

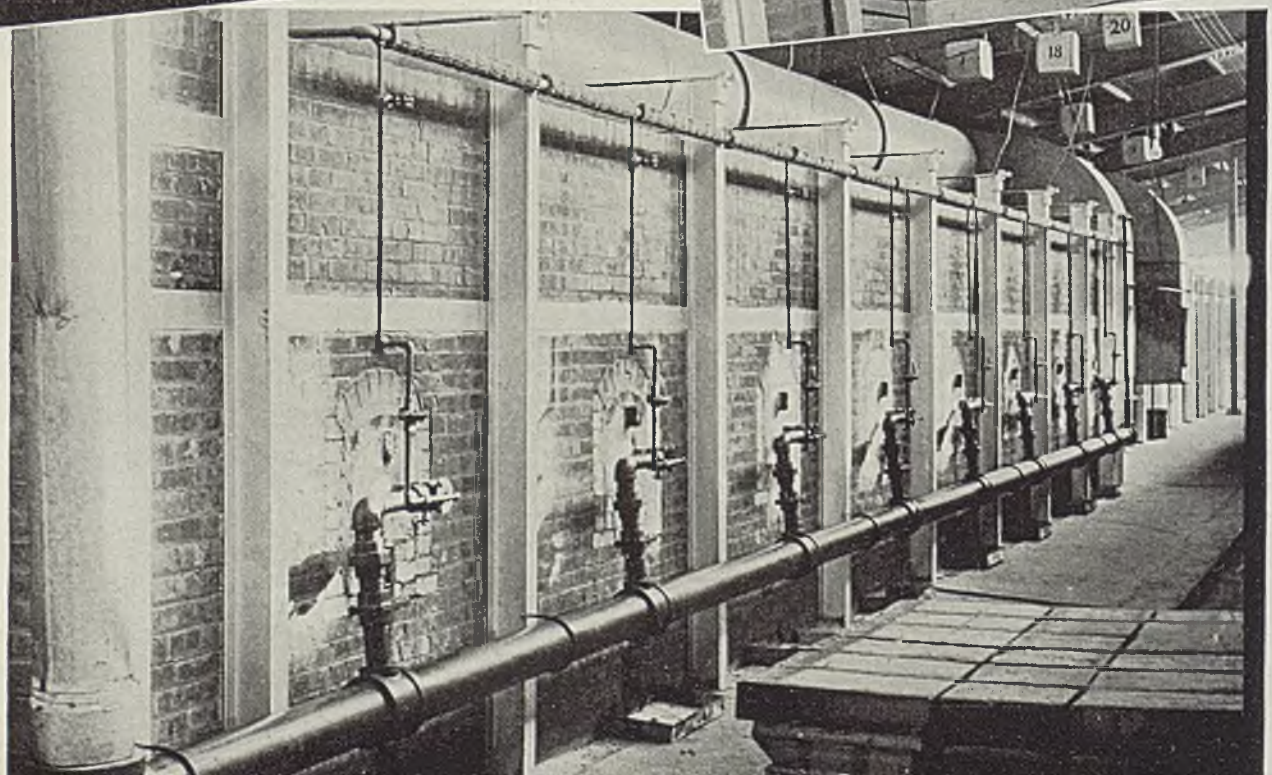
■ NEW continuous tunnel kiln of M. D. Valentine & Bro. Co., Woodbridge, N. J., typifies modern practice in the refractory brick industry. Nine of the older type, down draft, coal fired kilns also are operated here. Monthly capacity of these units, 500,000 standard 9-inch bricks, is duplicated by the single continuous tunnel kiln shown here. It is 234 feet long, includes a 90-foot drying zone, a 55-foot burning zone and 89-foot cooling zone. Bricks are carried through the kiln on cars 6 feet long, each holding 1100 standard-size units. Kiln holds 28 cars, dryer 27. A hydraulic pusher moves the car train forward automatically one car length each hour and a half.

Dryer temperature ranges from 120 degrees Fahr. at the entrance to 300 at the exit. Hot air from burning zone heats the dryer.

Eight burners on each side of the kiln maintain burning zone temperature of 2350 degrees Fahr. Bunker C fuel oil is preheated to 150 degrees by passing through coils on kiln crown. About 1200 gallons are consumed daily. A recording pyrometer and equipment at the central control station provide instantaneous readings at 20 points and a continuous record of burning zone temperature.

A forced air stream along the bottom of the kiln holds temperature in this area to about 250 degrees, thus protecting car wheels and bearings. Also these parts are protected from the high temperature above by a projection of the car top which fits into grooves on the tunnel walls. . . . After burning, temperature of brick is reduced gradually in the cooling zone. Bricks produced at this plant are high-silica refractory brick containing up to 85 per cent silica.





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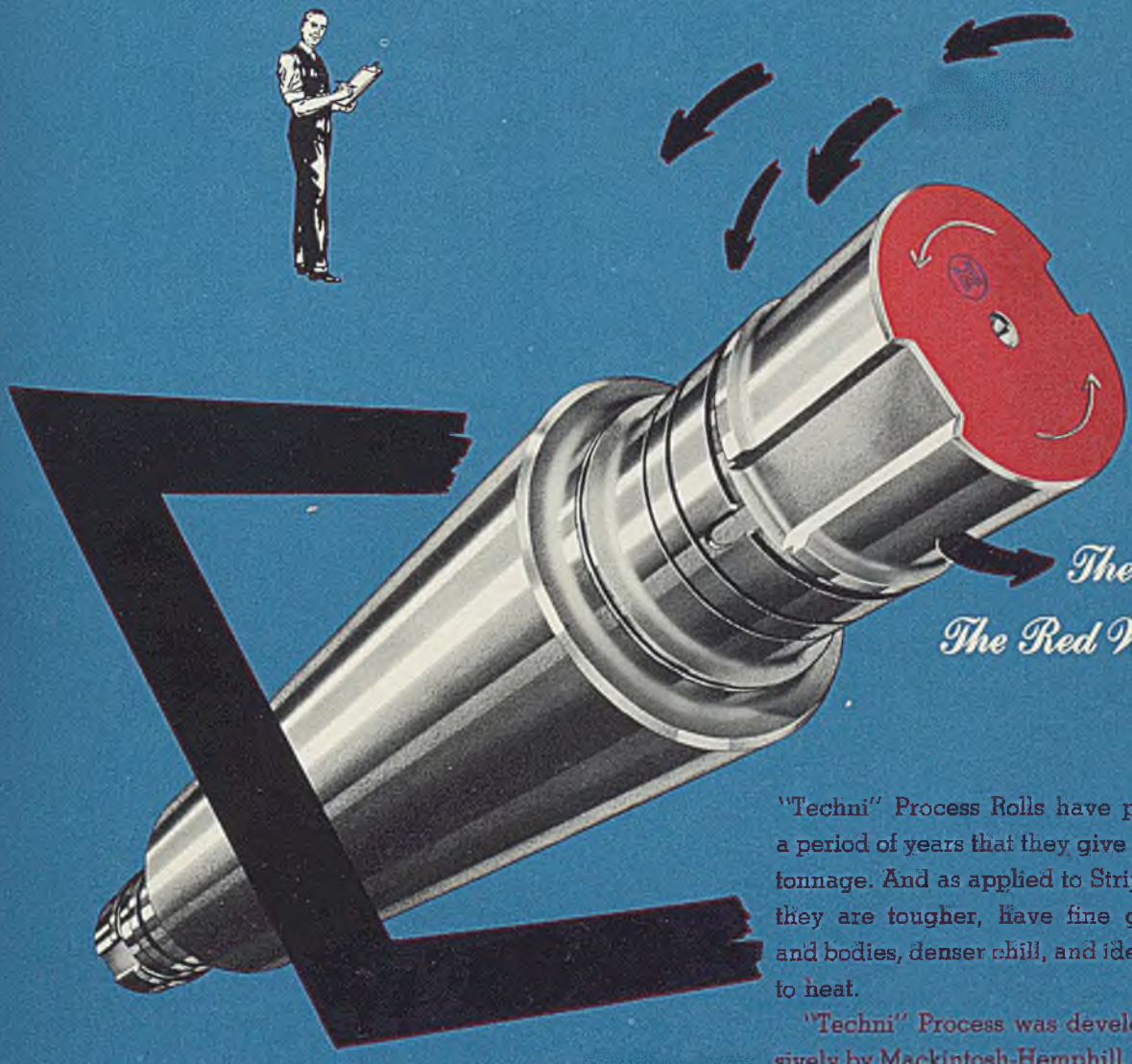

The Rolls with The Red Wabblers

"Techni" Process Rolls have proved over a period of years that they give exceptional tonnage. And as applied to Strip Mill Rolls, they are tougher, have fine grain necks and bodies, denser chill, and ideal response to heat.

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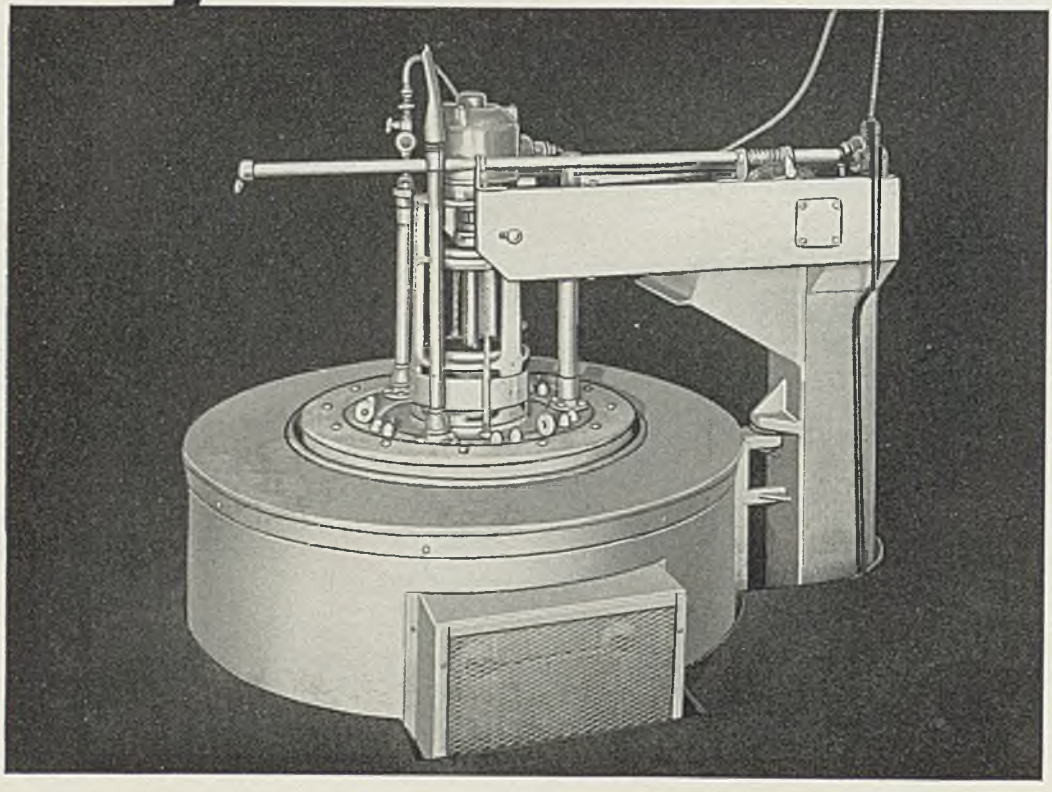
Experience COUNTS IN CARBURIZING



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Speeding Welded Steel Fabrication By Efficient Handling

Efficient handling layout takes work in one end of plant, fabricates it as it moves lengthwise and then crosswise to assembly conveyors which move it down to opposite end of plant. Much handling equipment of various types is employed

By FRED E. JACOBS

■ MATERIALS handling methods must of course be arranged to suit the requirements of a given plant. In cases where manufacturing and assembly operations are confined to one floor, the problem is simplified considerably. The shops of the Lincoln Electric Co., Cleveland, are all on one floor. A building 200 x 400 feet is occupied with various manufacturing departments so arranged that the materials flow through the shop with practically no backtracking.

Here a number of materials-handling operations in these shops are illustrated and described. The company, now in business over 50 years, first made electric motors. During the past 20 years, however, electric arc welding equipment has formed most of the output, Lincoln pioneering in this field as is well known.

Use Many Electric Trucks

Raw materials consist principally of bar stock, both flat and round, and steel sheets, running from 16 to 24-gage. This stock is received in freight cars shunted onto the company's private railroad siding and unloaded by a hand-operated overhead doublerail electric trolley crane which serves the entire stock room.

The steel is conveyed from the stock room to the various manufacturing departments by means of electric lift trucks, one of which is shown in Fig. 1. Some hand lift trucks, Fig. 2, also are used and prove quite convenient for short hauls. Fig. 2 also shows the steel skid platform, corrugated for strength, on which parts to be moved are placed.

Aside from their utility in transporting materials, these skids are often used for storing parts in process of construction. Thus in Fig. 3 are shown a number of rotors. Note the special frames on which the rotors rest. Clearance is allowed by the depth of the frames so they can be stacked one over another without danger of marring highly finished surfaces such as commutators and shaft bearings. Skids are converted to boxes simply by placing corrugated steel side boards on them to give the depth desired as shown in Fig. 1.

In various other instances special racks must be provided for accommodating parts in process of construction. The type of rack provided to accommodate rotor shafts is shown in Fig. 4. Without some such arrangement it would be diffi-

Fig. 1—Maximum flexibility is obtained by using pressed steel skids on which can be placed as many side sections as may be wanted to form a carrier of any convenient depth. Power trucks move work about and also tier for storage before and during various stages of processing

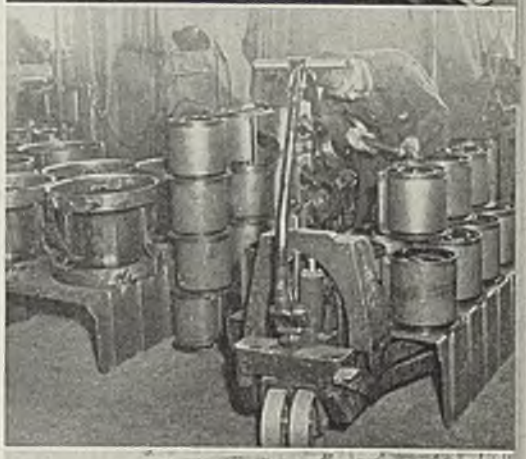

Fig. 2—Hand lift trucks prove convenient for short hauls. They use the same pressed steel skids that the power trucks handle, so are interchangeable throughout the entire plant

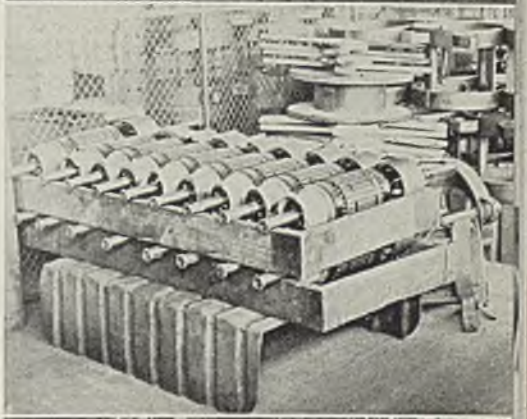

Fig. 3—Often special racks are utilized to aid in handling various parts such as these rotors. Used in conjunction with the steel skids, they make an interchangeable unit for hand or power hauling

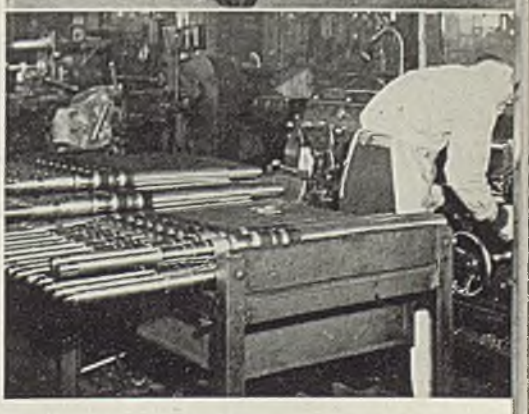

Fig. 4—Another type of special rack. This one aids greatly in the handling of shafts

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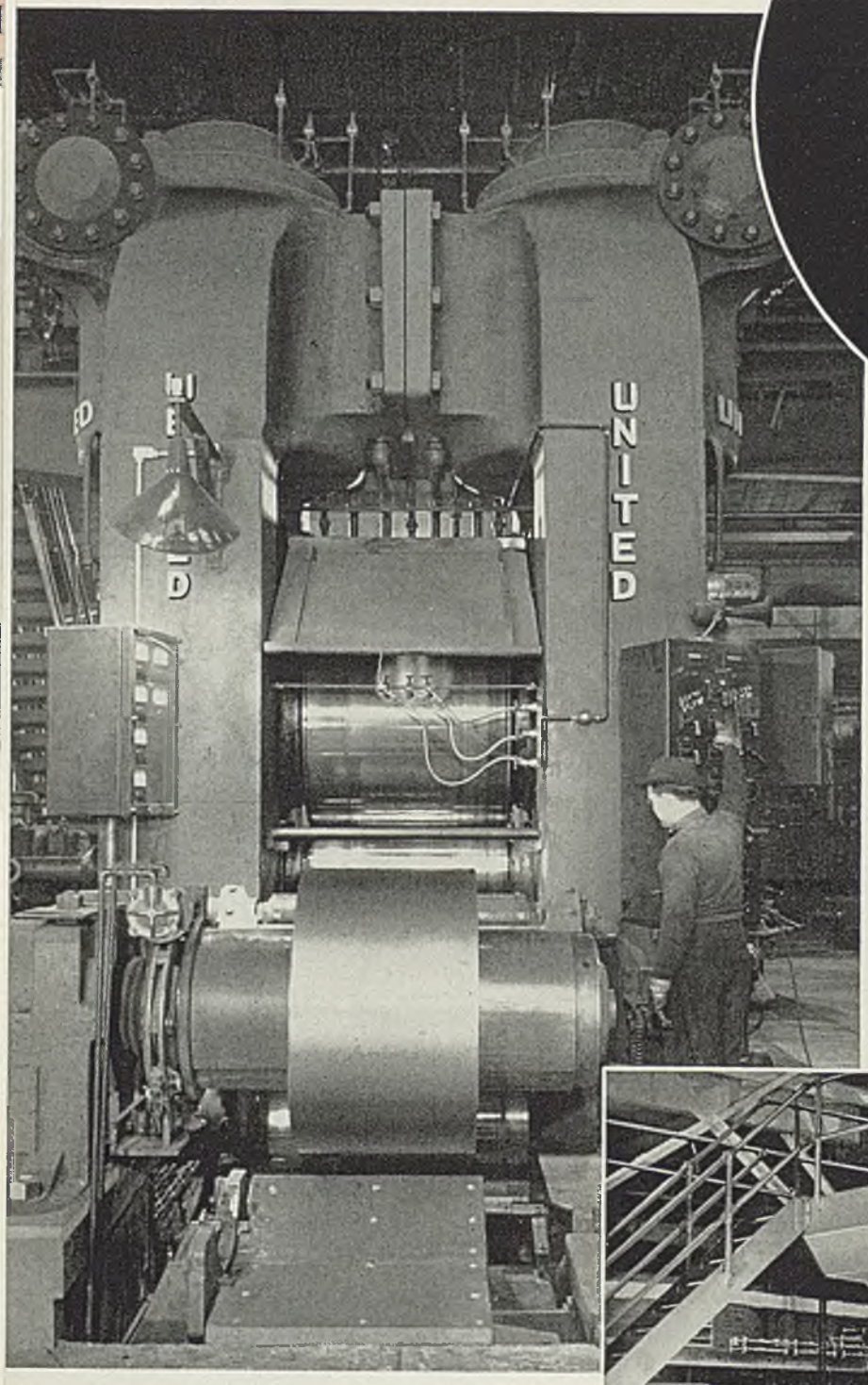

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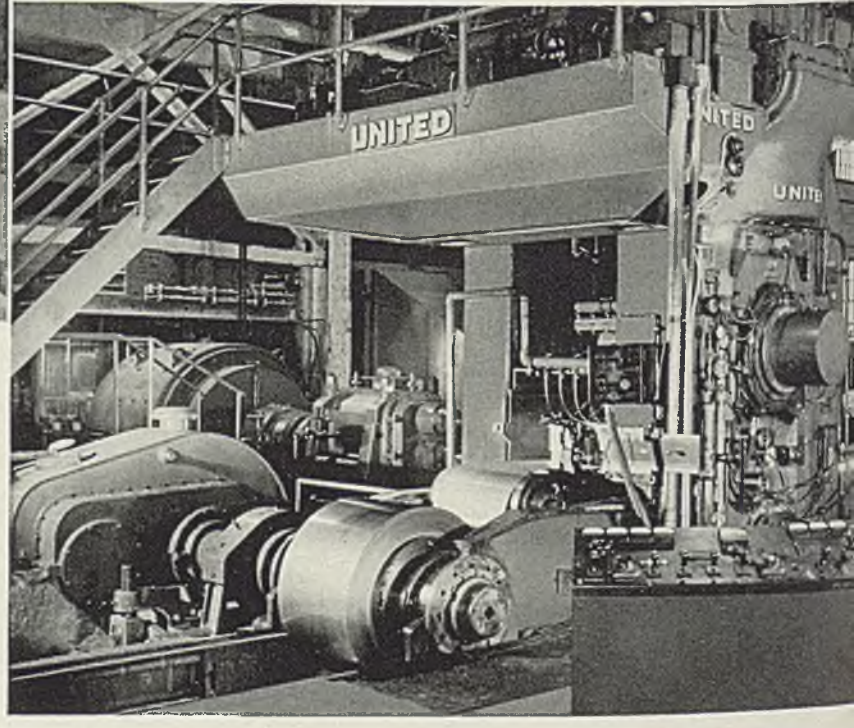

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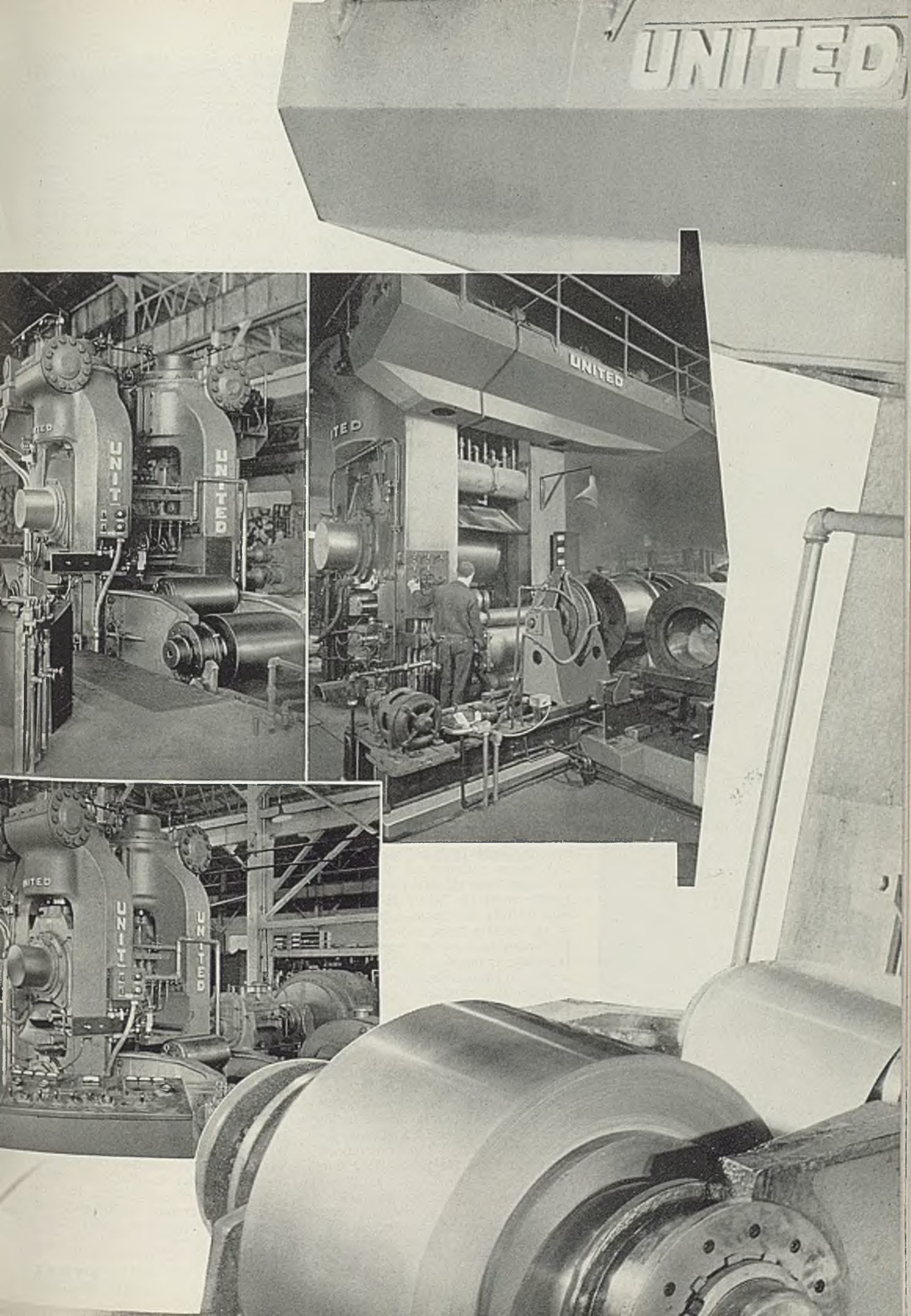
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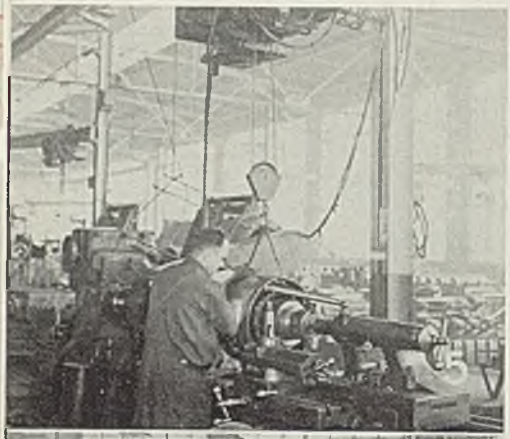

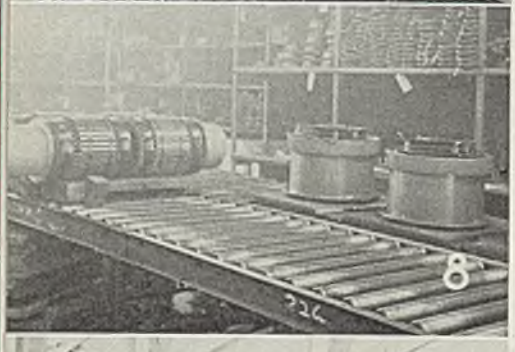

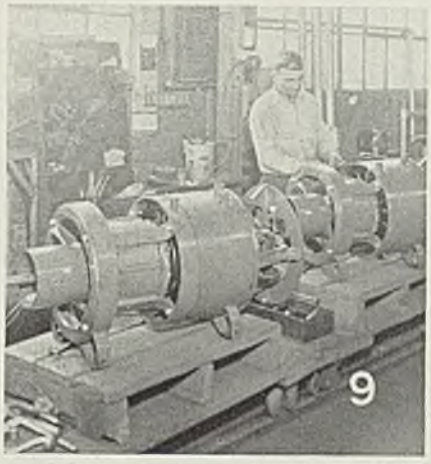

Fig. 5—Numerous jib cranes with electric hoists serve individual machines and aid movement of work into and out of the machines

Fig. 6—All the way through, handling receives careful attention as is shown by inclining this press to facilitate feeding and discharge operations. Note monorail hoist shown clearly in the background here

Fig. 7—This press employs a special roller-top feed table to facilitate handling of sheets into the dies. Nearby hoist serves adjoining area

Fig. 8—Here two roller conveyors carry finished parts from stock room to assembly conveyors

Fig. 9—Here 4-wheel dollies operate in angle iron tracks on the assembly line carrying heavy welder parts

Fig. 10—Another assembly line employs skids to move the work down a roller conveyor

cult to handle these parts without scarring finished surfaces. This is a bench-type rack with a cushioned surface and projecting ends to prevent the work from rolling off.

A large number of jib cranes are used throughout the shop to handle work too heavy to be lifted conveniently by hand. In Fig. 5 is an electric hoist mounted on a jib trolley to serve an engine lathe. Here the machinist has just slung a rotor in position between the lathe centers. Jib cranes are quite effective for such work.

Inclining Facilitates Discharge

Another good example of special handling equipment is shown in Fig. 6 where the operation consists of punching armature disks with a subpress die mounted in an inclinable press. The object of inclining the press is to permit the punching to slide out from the press after it is ejected from the die. It falls into a receptacle placed at the back of the press. As is shown, the press operator moves the sheet stock along a wood runway faced with sheet metal to allow the stock to slide readily. The runway extends several feet on each side of the press. The operator handles the stock twice inasmuch as two rows of disks are punched from each sheet.

While the setup shown in Fig. 6 operates well when handling comparatively light material, it is not so suitable for heavy stock. In such cases, a different arrangement shown in Fig. 7 is used. Here rollers are provided to facilitate feeding the sheet to the dies. Thus the fatigue element, so prevalent in most manual operations, is reduced to a minimum.

After various units are completed they are taken to the stock room, generally on platform lift trucks. From the stock room, finished units go to the assembly lines on one of two roller conveyors shown in Fig. 8. These are not gravity conveyors for the parts are pushed along by hand, to be used as needed by the workers.

Use Two General Assembly Lines

There are two general assembly lines. One is devoted to electrically driven equipment while the other serves units driven by internal-combustion engines as the company makes several varieties of welders. Fig. 9 is a view at the start of the assembly line devoted to electrically driven equipment. The principal units of these welding outfits consist of the power plant, either an electric motor or gas engine; a generator; a rheostat; and a control panel.

These units represent parts put in place as the welders pass down the assembly line. Referring to Fig. 9, notice that 4-wheel wood dollies are used to support the work. These dollies are pushed by hand along a steel track made of two pieces of channel iron which keep the dolly wheels in place at all times.

There is a paint spray booth through which the work passes in each line. Here parts not previously finished are sprayed.

After the welders are completely assembled, they are given a rigid test under actual working conditions. They then are crated for shipment. They may be shipped immediately, either by truck or in freight cars, or they may go into stock against future orders. The stock room is at the front of the plant and is served by an overhead hand-operated electric hoist on a double-rail trolley crane.

The roller conveyor in Fig. 10 is in the assembly department. It is used for those units that can be bench assembled such as the vertical welders shown in place on skids. This conveyor runs from the assembly department to the shipping department and store room of the plant.

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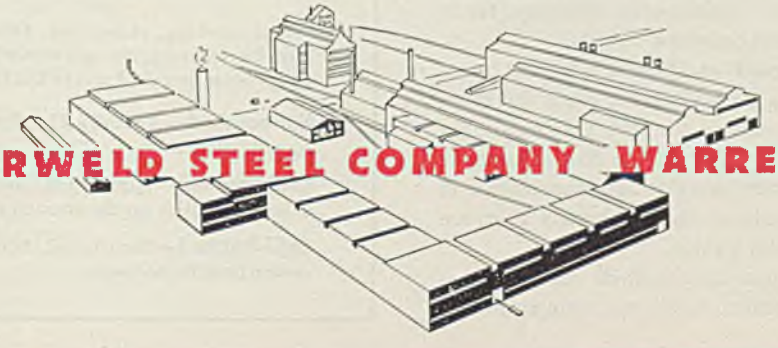
Two new top-charged electric furnaces have been added to Copperweld Steel Company's melting department, an increase in melting capacity of approximately 7000 tons a month. More annealing and heat-treating units and other finishing equipment have also been added. With this new equipment, working 24 hours a day, 7 days a week, we are making every effort to take care of our customers' needs for Aristoloy steels.



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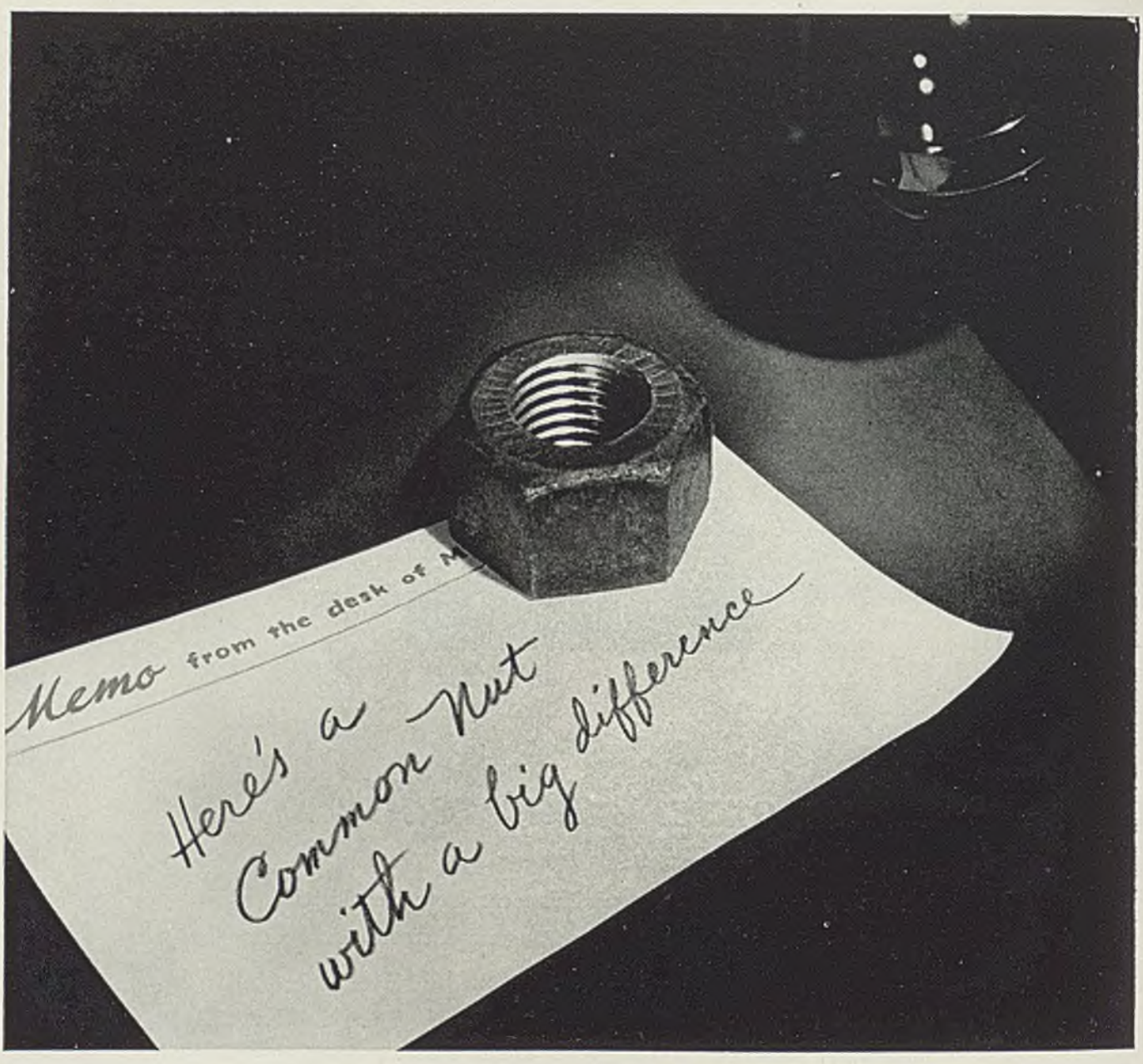


THIS Bethlehem nut may look like all other "common" nuts. But it actually is different. The difference comes in forming the hole of the nut.

The hole of ordinary nuts is punched out of the steel by brute force. This naturally weakens the grain structure, tends to cause cracks and strains, and defective threads.

In the Bethlehem Hot-forged Nut, the hole is formed by an unusual process which works the still-plastic metal out from the center toward the sidewalls of the die. This inevitably helps strengthen the grain structure of the finished nut. It smooths sides, sharpens corners, standardizes dimensions. It makes possible uniform, well-compacted threads that are capable of withstanding greater strains.

Bethlehem Hot-forged Nuts, despite their marked superiority over ordinary punched nuts, are surprisingly low in cost. Your regular distributor will supply you promptly from ample stocks.

HOW TO ORDER

When ordering, remember, these better Bethlehem Hot-forged Nuts, though made by an entirely different process, are sold under the three old class terms:

Hot-punched—Actually Hot-forged Nuts in the "as forged" state.

Cold-punched—Hot-forged and trimmed on the sides for a finish on the wrench surfaces.

Semi-finished—Hot-forged, trimmed, and machined on the bearing surfaces.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Die Castings of Different Basis Metals Combined To Aid Engineers

■ NO SINGLE die casting alloy or type of alloy rates above all others on all scores, according to the consensus of die casters who use the metals and are familiar with the problems involved with each. This was revealed recently by one of the largest producers in the country. If any alloy did, the users believe there would be no reason for using the others at all unless some scarcity of its ingredients made it unavailable in the quantities required.

Since this is true, the designer, in selecting the alloy to be used, should first list those properties which it must possess and those conditions which it must meet and then consider which of the alloys affords the best balance of advantages under these heads. In so doing, the accompanying table is exceedingly helpful for it rates each of the commonly used types of alloys in order of preference under each of 21 headings.

These headings include not only mechanical properties and physical constants but, what is often more important from certain standpoints, the relative casting properties and the cost of the dies and of the casting itself. In all cases, the numeral 1 indicates the highest rating, and the numeral 4 the lowest, unless otherwise indicated. Where ratings are the same, there is under this heading no ground for choosing one alloy over another.

It is significant that, although zinc alloys do not rate highest under any of the mechanical and physical propeties listed, they rank first in extent of use. The reason for this is that they rate highest in casting characteristics and lowest in cost per casting and in die cost. In general, zinc alloys are second only to brasses in mechanical properties. But as the brass die casting ranks highest in cost, it is lowest in extent of use, showing how commercial considerations often offset high rating under mechanical and physical properties.

Use of Capacitors Cuts Power Bill

■ Capacitors recently installed at the National Acme Co., Cleveland, have cut power costs as much as $315 per month and raised the operating power factor from 69 to 95 per cent. The plant's low power factor, a result of large numbers of induction motors operating under partial load, was responsible for the installation.

Because floor space is at a premium, these Westinghouse units totaling 720 kilovolt-amperes were installed up in the roof trusses on simple angle-iron frames. They are distributed in banks, one bank at each subpanel feeding a low power factor motor group, and are connected in the power circuit continuously.

Theory and Practice Of Applied Metallurgy

■ *Practical Metallurgy,* by George Sachs and Kent R. VanHorn; cloth, 567 pages, 6 x 9 inches; published by American Society for Metals, for $5.

This is a treatise on applied physical metallurgy and the industrial processing of ferrous and nonferrous metals and alloys. It presents both the theory and practice of making and shaping of the commercial metals and alloys, in a concise manner. In addition, the physico-chemical and physical relationships of metallurgy are discussed in a fundamental way.

Numerous references are listed, pointing to important and recent publications from which more detailed information can be obtained on any particular subject. Illustrations are carefully chosen to offer additional information.

In an appendix are assembled most of the binary alloy constitutional diagrams of commercial importance, accurately correlating the information on each diagram.

An index has been prepared with two objects in view, first, to make it easy to find information on any specific metal or alloy and, second, to serve as a dictionary.

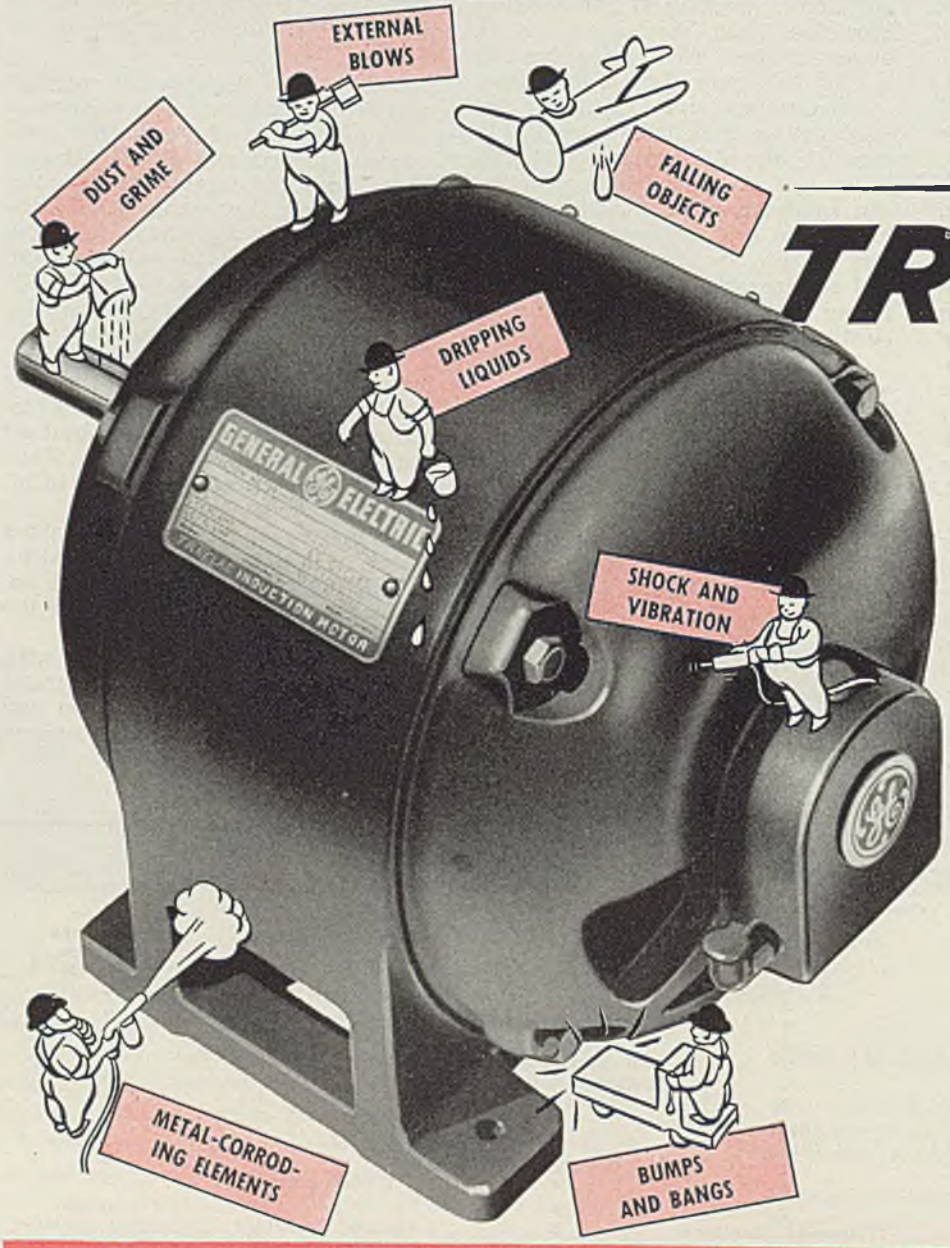
Selection-Chart for Die Casting Alloys

Comparative Ratings from Specific Standpoints

	Selection Factor	Aluminum Alloys ASTM Nos. 5, 7, 12	Brass	Magnesium Alloys ASTM Nos. 12 and 13	Zinc Alloys ASTM Nos. 21, 23, 25
Mechanical Properties	Tensile Strength	3	1 (strongest)	3	2
	Impact Strength	3	1 (toughest)	3	2
	Elongation	4	1 (most ductile)	3	2
	Dimensional Stability	2	1 (most stable)	3	3*
	Resistance to Cold Flow	2	1 (most resistant)	2	3
	Brinell Hardness	3	1 (hardest)	3	2
Physical Constants	Electrical Conductivity	1 (highest)	2	3	2
	Thermal Conductivity	1 (highest)	2	4	3
	Melting Point	2	1 (highest)	2	3
	Weight, per cu. in.	2	4	1 (lightest)	3
Casting Characteristics	Ease, Speed of Casting	2	3	2	1 (easiest)
	Maximum Feasible Size	1 (largest feasible)	2	1 (largest feasible)	1 (largest feasible)
	Complexity of Shape	1 (greatest possible)	2	1 (greatest possible)	1 (greatest possible)
	Dimensional Accuracy	2	3	2	1 (most accurate)
	Minimum Section Thickness	2	3	2	1 (thinnest)
	Surface Smoothness	2	3	2	1 (smoothest
Cost	Die Cost†	2	3	2	1 (lowest)
	Production Cost	2	3	2	1 (lowest)
	Machining Cost	2	3	1 (lowest)	1 (lowest)
	Finishing Cost‡	3	2	3	1 (lowest)
	Cost Per Piece§	2	3	2	1 (lowest)
Extent of Use at Present		2	4	3	1 (most used)

* Through the use of a low temperature annealing treatment, Alloy No. 23 can be made virtually stable in dimensions.
† Dies for casting the low melting point alloys are least expensive and have longest life.
‡ Includes polishing and buffing expense as well as ease of applying all types of commercial finishes, both electro-deposited and organic.
§ Based on die, material and fuel costs, production speed and machining and finishing costs.

THE MOTOR YOU ASKED FOR



NEW TRI/CLAD MOTOR

No other standard motor, we believe, has ever met the general-purpose requirements of industry with so well-balanced a combination of performance characteristics, convenience features, and provisions for protection. Integral-hp sizes up to 20 hp (at 3600 rpm), open or splashproof, are now available. Capacitor-motors up to 5 hp (at 3600 rpm) can also be furnished.

BUILT FOR PROTECTION FIRST...TO LAST

IS STRONG ON PROTECTION

Extra Protection
AGAINST PHYSICAL DAMAGE

A truly modern motor, you told us, must be able to withstand accidental blows, flying chips, dripping liquids, and occasional bumps in moving or mounting. That's how we built the Tri-Clad motor!

We made the frame and end shields of cast iron; used channel and rib sections to give ample strength where needed, without increasing the weight; cast the feet integrally with the frame to make them sturdy and rigid. We completely enclosed the upper portion and carefully baffled all ventilating openings to protect vital motor parts. We provided the bearings with cast-iron housings and made them dust tight. And the finishing touch—we give the motor a tough coat of paint that protects the metal parts against rust and corrosion.

The Tri-Clad motor is fully protected against the accidental ill-treatment some motors encounter all the time, and which *all* motors encounter some of the time. As a safeguard against production interruptions, as a prime factor in lowering costs, as an extra increment of value on machines you build, you'll find that this new motor means extra profit protection, too.

Be sure your next induction motors are Tri-Clad. General Electric, Schenectady, N. Y.

Extra Protection

AGAINST ELECTRICAL BREAKDOWN

New stator windings of Formex wire give extra protection internally against moisture, oil, abrasion, and heat aging. New synthetic impregnating and protecting varnishes make a rigid unit with a hard finish.

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AGAINST OPERATING WEAR AND TEAR

Sleeve bearings of new design have longer life and greater load capacity. The one-piece, cast-aluminum rotor winding, with fans cast integrally, is practically indestructible.

GENERAL ELECTRIC

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"Squeeze Riveting"

(*Concluded from Page 57*)

hot and cold rivets up to 1½ inches in diameter, larger rivets being driven hot except in rare instances.

A variation in the type and position of the work produces large differences in driving speeds. As many as 500 hot rivets have been driven in an hour with a pinch-bug type compression riveter, but it is doubtful that 100 per cent test-tight rivets can be driven at that speed as it is difficult to produce the proper pressure on the rivet when working this fast. Also the rivet is apt to be too hot when released. About 200 an hour would be considered good speed for properly driven hot rivets.

Drive Cold Faster: Cold rivets can be driven at a somewhat higher speed since the speed of cold driving has no effect as far as the quality of the work produced is concerned. It is simply a problem of developing in the machine the pressure it is necessary to apply to the rivets. With a heavy portable riveter weighing about 10 tons, it is possible in field work to obtain a rate of 150 1½-inch diameter rivets and 250 ¾-inch rivets per hour, including all delays.

Stationary compression riveters are widely used in shops where the work can be moved about easily, and portable units are used where the work is too large to shift around.

The high-speed mechanical riveters mentioned as method four are used chiefly on small rivets about ⅛-inch in diameter where much head strength is not required or where pressure-tight rivets are not necessary. These machines drive the rivets cold by "worrying" the head on them with the rotating action of a roughened die.

The use of tubular or split rivets, the fifth method, is largely connected with riveting fabrics, plastic materials and the like. The rivet and head are, of course, much weaker than a solid rivet of the same diameter. Tubular and split rivets are usually small in size and are driven cold. A forming die is used which flanges the tube or split rivet over to form a head, rather than an upsetting action being employed.

As to the results obtained with the various methods, we are concerned here only with the first three methods mentioned — hand driving with hand hammers or mauls, hand driving with pneumatic hammers and machine driving with compression riveters. These are the methods used in the general run of structural and plate work.

As will be shown next week, rivets can be driven cold in such a manner as to completely fill the hole and to countersink the metal near the rivet head slightly. This produces a rivet of great permanent strength, one that remains tight to stand great deformation without leaking—in fact, joints have been pulled apart, separating the rivet sections but with the broken rivet sections still fitting so tightly in their holes that no leakage occurred

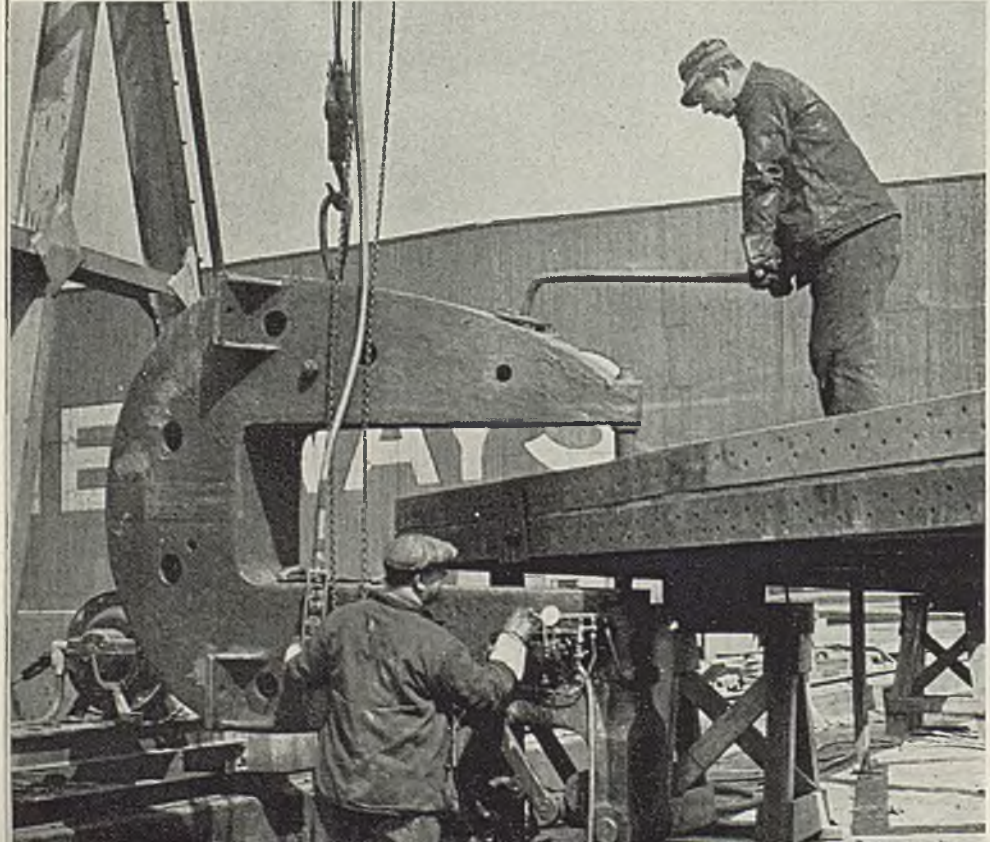
Rivets driven with hand hammers or mauls are equally as good as those driven with pneumatic hammers and have the same characteristics. Some old timers will claim they are better, but this is due probably to the difference in the type of head driven rather than in the driving method employed. The flat head driven with a maul as a rule is a tighter type of head than the button head so much driven with pneumatic hammers. With short grips—short distance between the two heads of the rivet—rivets driven hot with a hammer compare favorably with those driven by a compression machine if driven properly.

With long grips, the hole is not filled so well. For the general run of shop work the compression riveter can be relied upon to produce a better job, regardless of the length of the rivet driven. Also the likelihood of a poorly driven rivet is much greater with the hammer-driven method because once the rivet bends or the head starts to form, no more filling of the hole is accomplished. An old trick employed by riveters to get easier driving is to bend the rivet with the first blow of the hammer and then ask for shorter rivets because of an apparent excess of stock. The compression riveting machine, on the other hand, has the advantage that its dies are always aligned and the action is in a straight line. The squeezing action also will upset the rivet farther into the hole than the hammering action. Too, the rigidity of the machine tends to produce better work.

Cold versus Hot: One of the most interesting points about riveting is the results obtained with cold driving as compared to those with hot driving.

With hammer driving, particular-

Fig. 2—Closeup of an Osborne compression-type riveter working on a large frame at plant of the Dravo Corp., Pittsburgh. Rivets are being driven cold. The pressure is controlled automatically. The riveter is made portable by being hung from a gantry crane See overall view in Fig. 1. Pendant pushbutton control aids in moving the riveter from one rivet to the next. Man on top helps guide unit



ly with pneumatic hammers, the results from hot and cold driving are radically different. Where the grip, distance between the two rivet heads or length of finished rivet, is short and weight of the plunger or hammer is considerable as compared to the rivet, more or less of a pressure action is produced, and rivets up to ½-inch in diameter can be driven cold satisfactorily and will be found to fill the hole well.

With larger size rivets, however, cold driving with a pneumatic hammer will fill the hole for only about ⅛-inch in from the rivet heads. The dolly bar and rivet shank act as an anvil and the head will be peened on the rivet without any or with very little of the upsetting action necessary if the rivet shank is to spread out and fill the hole. Such a rivet will be tight only because of the pressure contact of the heads against the material riveted. Anything that disturbs this tight contact will cause the rivet to leak badly. Thus for work subject to heavy vibration and for structural work, such riveting would not be recommended. On the other hand, it will give satisfactory results for tank work where foundations can be made exceptionally stable. One large oil company has specified cold driving of large rivets with a pneumatic hammer for many years on their refinery work with good results. They favor cold riveting because it eliminates the fire hazard.

Driving rivets cold is quite different from driving hot rivets. The driver holds his pneumatic hammer away from the cold rivet so the die extends out of the hammer barrel ¼-inch or so and "worries" the head on the rivet, producing a peening action. Very shallow button heads on the order of the Liverpool head are usually driven on rivets over ½-inch in diameter, with flat heads on smaller sizes. A heavy dolly bar, weighing from 200 to 250 pounds, must be used to buck up the rivets. Driving rivets cold produces a heavy shock on the dolly bar and riveting hammer that is not experienced with hot rivets. Also, the driver may put his weight on a hot rivet and the metal, being plastic, is forced into the hole to a considerable extent. This, of course, is not true with the cold rivet.

Next Week: The article to be presented next week in this series will give a summary of the theory of riveting as developed by the author in an investigation of riveting characteristics in an effort to find a better and more economical method of driving. As a result of this study, it is recommended that hammer-driven rivets up to and including ½-inch be driven cold, and that larger sizes be hammer-driven hot; that the compression riveter be used to drive rivets cold in sizes up to 1½-inch and larger.

Hot Dip Galvanizers Meet In Pittsburgh; Discuss Problems

■ OVERHUNG by the zinc shortage the annual meeting of the American Hot Dip Galvanizers Association, held at Hotel William Penn, Pittsburgh, Feb. 28 and 29 exhibited many signs of the difficulties lying ahead as a result of the defense program and the unparalleled demand for spelter. Current conditions are attributed principally to lack of smelting facilities since there is sufficient ore available.

Principal paper on the technical program was presented by R. W. Sandelin, metallurgist, Atlantic Steel Co., Atlanta, Ga., on the influence of the base metal on hot dip galvanized coatings. Approximately 90 different types of steel were used in the studies. Variables considered were alloy content, grain size; cold work; heat treatment.

It was found that effects of silicon and phosphorus on coatings were potent. In general, coats applied during a ½-minute period were gray. Longer times in the bath produced brighter coats regardless of the metal content. However, increasing the content of silicon had the effect of increasing the weight of the coat and decreasing its adherence. There was one exception, where the silicon content ran between 0.20 and 0 25 per cent, the weight of the coat showed a slight decline. Where both silicon and phosphorus were present, the effects of silicon predominate when the content is greater than 0.05%. Where the silicon is less than that, or entirely absent, phosphorus causes extremely heavy coatings which are brittle. Adherence declines even more rapidly than in the case of high silicon. Color and appearance of the coat also varies with the varying proportion of phosphorus from light to dark gray as the quantities increase.

In the cases of metallic alloys including copper, manganese and titanium, varying amounts from zero to 0.7 per cent showed no appreciable difference in the coating. Carbon additions, however, had varying effects. The carbon was added in the form of graphite in the ingot mold, and showed little effects on adherence. When the sample was carburized, however, the weight of the coat increased and the color darkened.

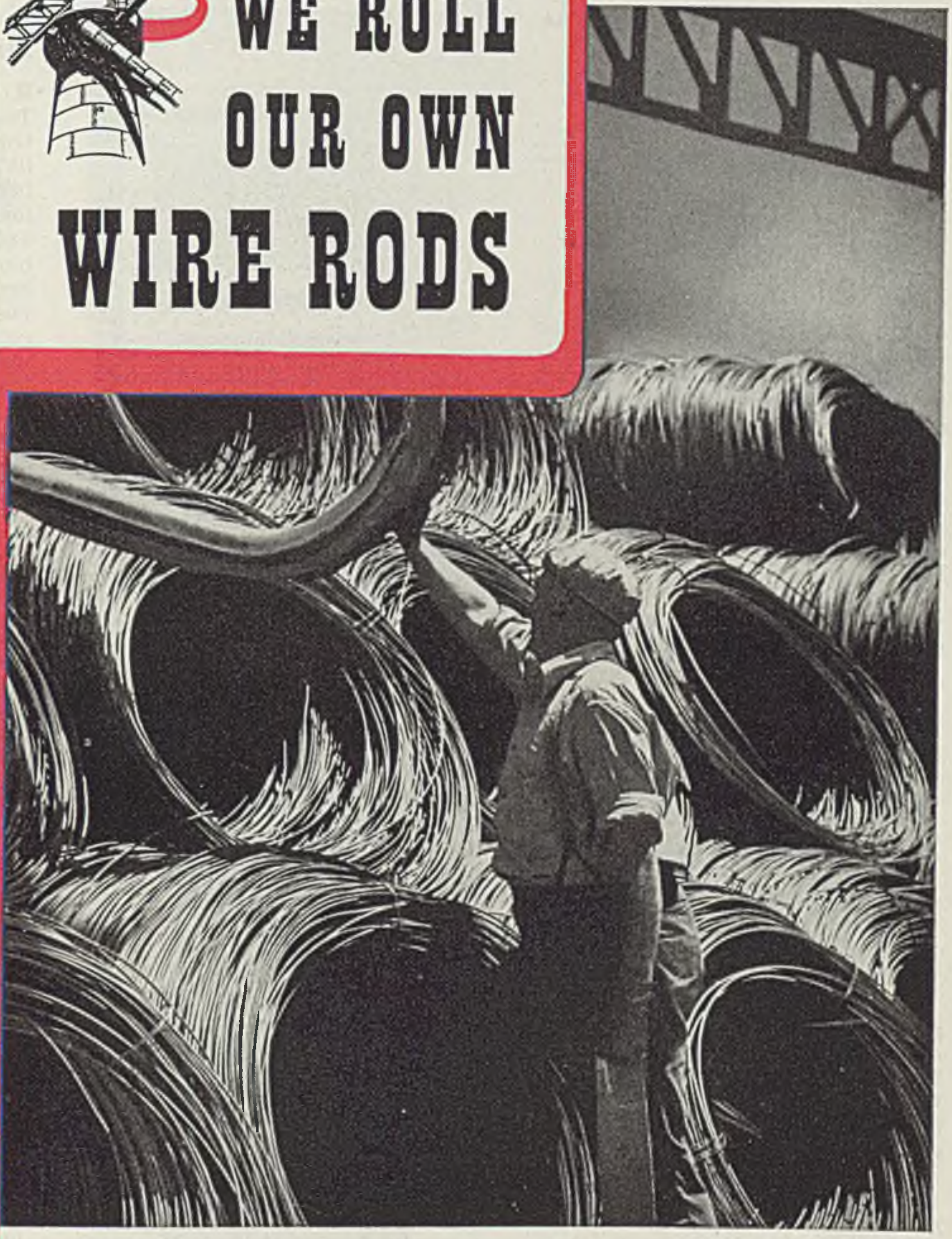
R. J. Kepfer, Grasselli Chemical division, E. I. du Pont de Nemours Co., Cleveland, reported on studies made of dilute muriatic acid and zinc ammonium chloride as prefluxes. The study was based on the amount of dross formation in galvanizing low carbon steel, using predip solutions of these two substances. Results of the research show variations based on the concentration of the solution used and on the elapsed time between dipping and galvanizing. In general, the study showed 60 per cent greater iron dissolved when using muriatic acid. By converting figures for iron dissolved to dross formation, an average dross savings of about 11 pounds per 5000 square feet of surface galvanized appears when using the chloride. Roughly, 55 to 60 pounds more dross was formed when using acid.

During its meeting the group re-elected its board of directors for the coming year. Members are: A. J. Blaeser, Joslyn Mfg. & Supply Co., Chicago; F. P. Auxer, National Telephone Supply Co., Cleveland; Phelps Ingersoll, Wilcox-Crittenden & Co., Middletown, Conn.; I. M. Herrmann, Acme Galvanizing Co., Milwaukee; T. M. Gregory, Hanlon-Gregory Galvanizing Co., Pittsburgh; J. B. Tate, Witt Cornice Co., Cincinnati and Clem Stein, International-Stacy Corp., Columbus, O.

This group elected the following officers for the coming year: F. P. Auxer, president; Phelps Ingersoll, first vice president; Clem Stein, second vice president. Stuart J. Swensson, Pittsburgh, was re-elected secretary-treasurer.

New Porcelain Combines Strength, Low Cost

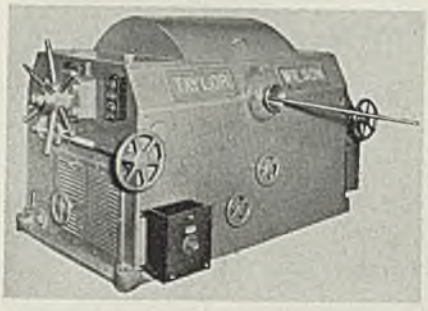
■ Electrical porcelain of a new type, known as Prestite, which has dielectric strength equal to that of wet process porcelain, with mechanical strength about 10 per cent greater under tension and cantilever loads, is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is impervious to moisture and has the same resistance to heat shock as other types of porcelain. Of lower cost and particularly adaptable for intricately shaped pieces, dimensions of this enamel can be held accurate within 1½ per cent.



Industrial Equipment

Straightening Machine

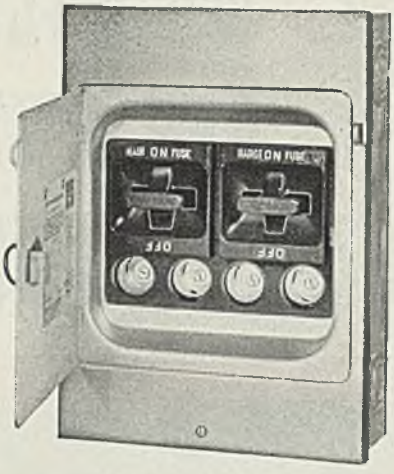
■ Taylor Wilson Mfg. Co., McKees Rocks, Pa., announces two new Nos. 2 and 2A straightening, sizing and burnishing machines especially useful in connection with aircraft tubing and other cold drawing requirements. These units feature fast roll change, quick positive setup as well as high production speeds. The No. 2 machine will handle bars from ¼ to 1½ inches and tubes ¼ to 1¾ inches. The No. 2A unit will handle bars from ¼ to 2 inches. Both machines run from 66 to 200 feet per minute, utilizing motors of 25 and 40 horse-



power respectively. They also incorporate adjustment wheels for lateral and elevation control, roll indicator and motor control; all are easily accessible to the operator. On both machines, power from the motor is transmitted through a Multi-V-belt drive. The drive is almost self-contained in the machines, and increases the floor space of both units but very little.

Range Switch

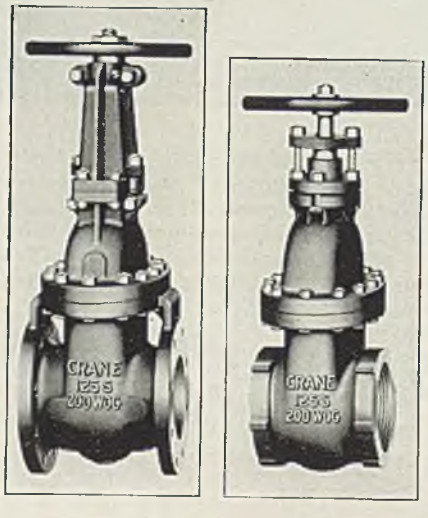
■ Square D Co., 6060 Rivard street, Detroit, announces a redesigned No. 33582 combination range switch which features 60-ampere 2-pole main and range circuits and 4-pole plug fusible circuits. It is furnished with solderless connectors throughout. The strong, light weight bakelite base may be reversed if it is desired to have the plug fuse circuits at the top. The interior may be removed by loosening one screw. The main and range fuse-breaks are entirely noninterchangeable, and have the words "main" and "range" molded in the bakelite. The surface cover is secured to the box by one screw; the flush cover is attached by four screws. This line of switches also includes a device with parallel main



and range 60-ampere circuits, 4-plug fusible circuits, and 100-ampere mains rating. Devices with 60-ampere mains, similar to the unit described above, are available with either 0, 2, 6 or 8-plug fusible circuits.

Wedge Gate Valves

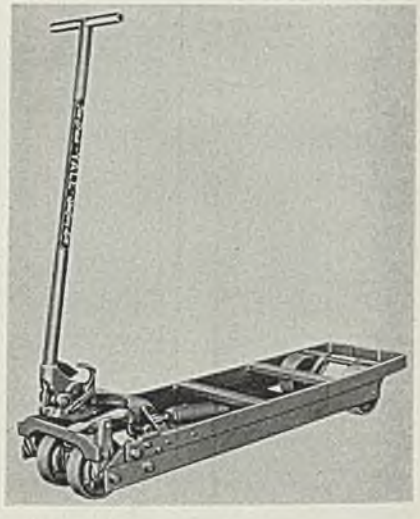
■ Crane Co., 836 South Michigan avenue, Chicago, announces a new and complete line of standard iron body wedge gate valves suitable for 125 pounds steam or 200 pounds cold working pressure. It includes both the brass trimmed and the all iron patterns with O. S. & Y. or nonrising stem, in sizes 2 to 12 inches, inclusive. Among the important features of these valves is the redistribution of body and bonnet materials, which eliminates all excess weight and yet complies with all



standard requirements. Handwheels are of strong malleable iron; deep stuffing boxes permit a generous amount of packing; the body-bonnet joints employ a flat gasket closely bolted together so that gasket compression is evenly distributed. The seat rings are of the shoulder type to retain tight contact with the body. All machine parts are precise in their fit and finish.

Hand Lift Truck

■ Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, has introduced a streamlined version of its single stroke Blue Streak hand lift truck for handling 2500-pound loads. It features a new type balanced tubular handle which has a handle balancing mechanism which keeps the handle in an upright position, preventing tripping, and relieving the operator of handle weight. A new counter-balanced load retaining hook for holding the load in positive lock while elevated is another innovation. The truck now has a shorter handle stroke, eliminating much of the

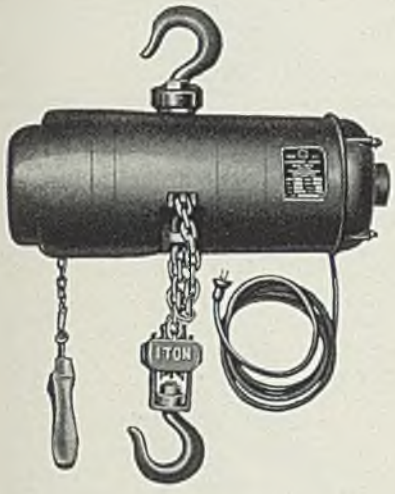


bending effort on the part of the operator. The self-locking lift hook requires only the slightest pressure on the treadle to engage the lifting frame. It also disengages automatically when the load is fully lifted. Loads may be elevated with the handle at any point within a 90-degree arc, and the truck, because of its 180-degree steer, can negotiate sharp turns. The steering column now operates inside a special steel bushing. Both the lifting mechanism and hydraulic release check are retained in the new model. It is available with either wide or narrow frames.

Electric Hoist

■ Chisholm-Moore Hoist Corp., Tonawanda, N. Y., announces a 1-ton light weight, portable plug-in type Comet electric hoist for all types of hoisting service. It is available with hook suspension or with a trolley attached for overhead conveyance. Special heavy-duty high-torque motors are supplied for either 110-volt lighting circuits or 220 or 440-volt power lines. The

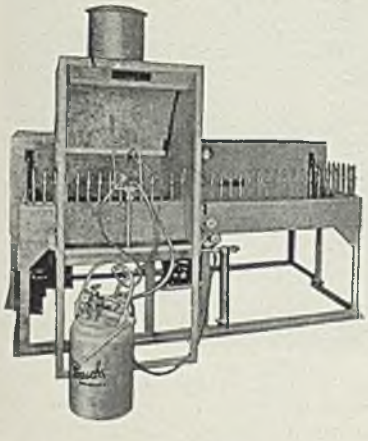
hoist is equipped with precision, double plate sealed, permanently lubricated ball bearings at all rotating points. The load brake is smooth and quick-acting, prevent-



ing "drifting" of the load. An emergency brake plus automatic upper and lower limits guards against hoist abuse and insures safety. "One hand" control provides convenience in operation.

Automatic Finishing Unit for Shells

■ Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, has introduced an automatic airfinishing and drying unit for application of black paint to 20 millimeter shells at a rate of 17,000 per 8-hour day. It includes special automatic aircoating and drying unit approximately 8 feet long by 3 feet 9 inches wide. This is equipped with a steel roller chain, supporting 164 revolving spindle assemblies, automatic off and on control for airbrushes, varying speed pulley and reducer to operate the chain at speeds of 4 to 9 lineal feet

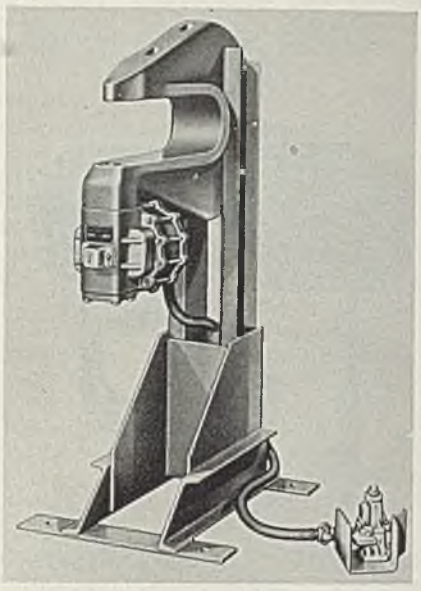


per minute, all mounted to a steel frame. The unit includes one drying oven approximately 8 feet long by 1 foot 8 inches wide by 1-foot 6 inches high, insulated with rock wool and equipped with electric strip heater, thermostatically con-

trolled to provide the required range in temperature. It also includes automatic airbrushes, Clamptight cover and exhaust unit with explosion-proof motor, spray booth and duct running to a fan.

Squeeze Riveters

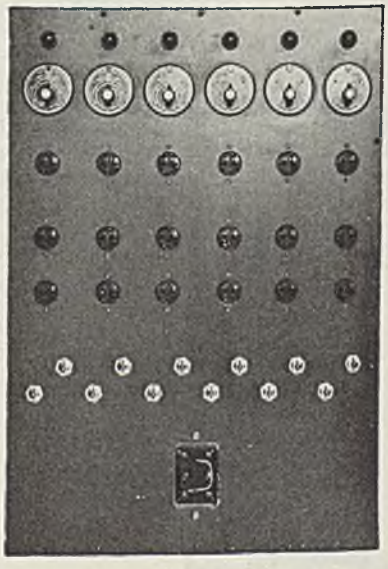
■ Hanna Engineering Works, 1765 Elston avenue, Chicago, has developed a new stationary pneumatic squeeze riveter of the pedestal type for aircraft subassembly riveting. It features a 20-inch reach, 6½-inch gap and is capable of exerting 10 tons on the rivet at 80 pounds air pressure. It is recommended for driving ¼-inch aluminum alloy rivets, although it is available in a variety of sizes and capacities. Its ram is actuated by a pneumatically operated mechanism of the wedge and roller type. The rated pressure of the riveter is exerted through a considerable portion of the 1½-inch ram travel. When the ram enters the uniform pressure zone its initial rapid travel is automatically reduced, permitting the rivet to flow and fill the hole with the forming of the rivet head following automatically. The long ram stroke makes it easy to get over certain parts of the assemblies such as stiffeners, etc., and avoids the necessity for removal of dies. The complete mechanism is demountable, permitting modifications in the yokes or frames as the work may necessitate. The



return of the piston is spring actuated, effecting economies in air consumption. The riveter is actuated by a foot-operated valve placed at a convenient position.

Control Board

■ R. W. Cramer Co. Inc., Centerbrook, Conn., designed a control board recently for use in conjunction with barrel tumbling operations of plastic parts. It consists of six electric time controlling switches capable of serving a large number of tumbling barrels. Each of these

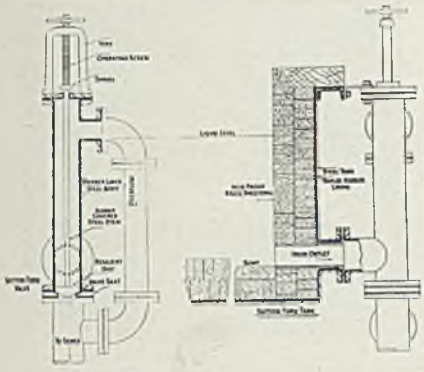


timers is designed to be set when the respective barrel is put into operation, and to stop the operation automatically when that barrel reached the "critical period" thus preventing breakage. The control board enables an operator of any tumbling barrel to "plug in" on the "not busy" timer when he starts operations. By the use of this equip-

ment, engineers of a plastic manufacturer were able to eliminate approximately 70 per cent of the breakage.

Pickling Tank Valve

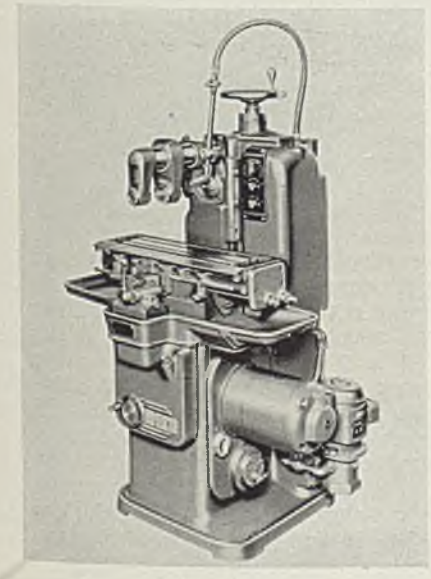
■ B. F. Goodrich Co., Akron, O., announces a new combination rubber-lined outlet and overflow valve for steel pickling tanks. Installed entirely on the outside of the tank, it uses a wheel and screw attached to the valve stem to raise and lower the valve disk. It can be fitted to existing pickling tanks, or built into



the construction of new ones. Provision also is made for automatic overflow at a predetermined level. The valve is fitted with a low-cost replaceable, resilient, rounded disk which snaps over a circular plate at the lower end of the stem and provides an absolute seal when brought into contact with the rubber-covered seat ring. The valve is covered by Patent No. 1,947,257.

Milling Machine

■ Sundstrand Machine Tool Co., Rockford, Ill., has introduced a new

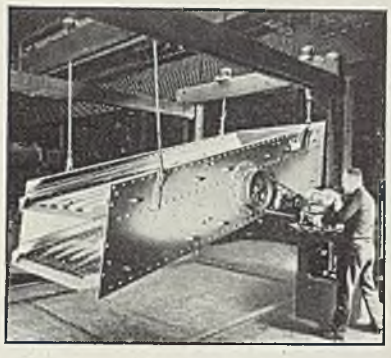


and smaller No. 00 Rigidmil for milling small parts. Powered by a ¾-horsepower spindle motor, it is available in two models—one equipped with a power feed as illustrated and one with hand feed. The power feed machine has a hydraulically actuated table. This makes possible a wide range of automatically controlled table cycles including 2-way cycles and skip feed. Climb or conventional milling can be done either separately or in combination. The table has a maximum stroke of 8 inches and a rapid traverse rate of 400 inches per minute. Both feed and rapid traverse strokes can be regulated. Two feed ranges also are available—one from ½ to 37 inches per minute, and the other from 1¼ to 66 inches per minute. Any desired feed rate within the range of the machine can be secured by adjustment of a feed selector dial which furnishes a direct dial reading in inches per minute. One of the features of the machine is the wide range of spindle speeds possible with the high ratio head. The ratio between the high and low speeds is 42½:1 which makes possible the machining of practically all types of materials. Heads are available in two models—A, with speeds from 57 to 2415 revolutions per minute and B, with speeds from 85 to 3600 revolutions per minute. The head is designed so that one set (two) of pick-off gears provide four speed changes, and the four sets of

standard gears furnished with each machine supply 16 possible speed changes. The head is of the independently motor-driven type. The machine itself is of one piece construction and is provided with automatic lubrication to all moving parts. The same basic units as the hydraulic feed machine are embodied in the hand feed machine. It, however, can be converted to power feed at small cost.

Vibrating Screen

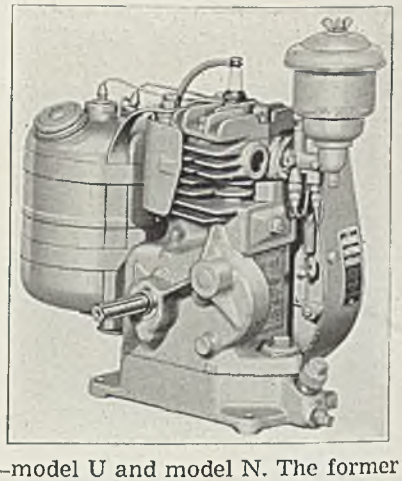
■ Crushing & Cement division, Allis-Chalmers Mfg. Co., Milwaukee, has developed a new Ripl-Flo vibrating screen which, with its new principle of operation, vibrates the entire screen body in rapid, circular, gyratory motion. The motion is derived from an eccentric shaft working with the unbalanced force of the counterweighted flywheels. The screen's operating characteristics make it especially suitable for screening coal, coke, sand, gravel, stone, ore, chemical products and other granular materials. It consists of two steel side plates spaced apart by welded steel deck supports, with the operating mechanism enclosed in a tubular housing between the decks. Fine adjustments for balance are made in the flywheels externally. One of the flywheels combines the Texrope drive sheave through which power from an electric motor is applied. The flywheels themselves, however, do not gyrate. The power required is very low, and the drive is smooth. Of the inclined type, the screen may be supported by cables attached to an overhead structure or to existing overhead building member. Structural floor mounted bases can be provided if preferable. The screen is available in single and double deck types in sizes up to and



including 6 x 14-foot. The single deck unit is designed to permit easy changeover to a double deck screen.

Gasoline Engines

■ Briggs & Stratton Corp., Milwaukee, announces two new additions to their line of small gasoline engines

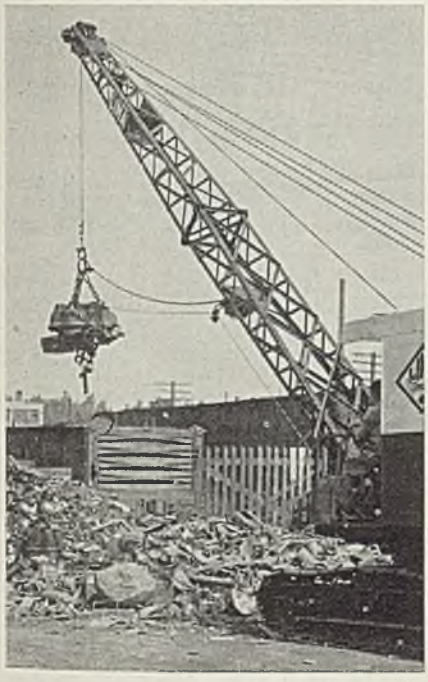


—model U and model N. The former is a compact unit rated at 1 horsepower with a speed range of 2200 to 3200 revolutions per minute. It has a 2 x 2 bore and stroke with a piston displacement of 6.28 cubic inches. Its 5-pint fuel tank is mounted vertically beside the cylinder block rather than on top and a specially designed suction carburetor is used to draw the fuel. The model N has the same piston displacement but develops up to 2 horsepower at 4000 revolutions per minute under test. It uses a float-feed carburetor which is fed by gravity system from the 2-quart fuel tank mounted above the cylinder

block. It is a higher speed engine than the U type, and was designed to meet the demands for a more powerful small engine. Both models are of the air-cooled, 4-cycle, L-head design. The model U also is available with gear reductions of 6:1 and 2:1, while the model N is available in special types incorporating gear reduction of 6:1 and 2:1; direct mounting crankcase, machined and tapped with ball bearings on the drive side. A high tension magneto is built into the flywheel which is both moisture and dust-proof. A pump supplies lubrication to all moving parts.

Ingot Handling Crane

■ Lima Locomotive Works Inc., Shovel and Crane division, Lima, O., is now furnishing the ¾-yard Paymaster crane with a special generator attachment for magnet operation. When equipped with this attachment the crane handles scrap iron, ingots, etc. The crane itself is a light weight, flexible streamlined machine, designed for general construction, brick plants, supply yards, industrial plants, railroad work and truck crane service.



Welders, Chipping Hammer, Brush

■ Chicago Mfg. & Distributing Co., 1928 West Forty-sixth street, Chicago, has introduced a new C-B combination welders' chipping hammer, with wire brush attachment for chipping, cleaning and brushing welds. The wire brush is held on the end of the handle with two split aluminum castings held together with a dove-tail shaped metal retainer. Feature of this arrangement is that the wire brush can be replaced when worn. The combination unit weighs 1 pound. The hammer head is 5½ inches long, drawn out to a chisel and drift point.

Truck Crane

■ Northwest Engineering Co., 29 East Jackson boulevard, Chicago, announces a new truck crane of 15 tons capacity. It features a "feather-touch" clutch control which shifts the clutches through the power of the engine, retaining the feel of the load. Its swing clutches are of the uniform pressure type. The unit can be equipped with " power up and power down" boom hoist—an independent boom hoist functioning as its name implies in raising or lowering the boom, free or under load with power either booming up or down. A single lever is used to control the functions of boom hoisting, boom lowering and braking. An engine throttle control also is provided, allowing the engine to be slowed down over a wide range of speeds.

Protective Finishes

(*Concluded from Page 72*)

cent solution of nitric acid held at 140 degrees Fahr. Then the parts are rinsed, first in cold water and then in hot water, followed by drying.

Various steel parts are given coatings which may include nickel, copper, cadmium or hard chromium. All exposed fittings are cadmium plated, rinsed and dipped in a 5 per cent solution of chromic acid at room temperature. This is followed by cold and hot rinses and drying. All steel parts are magnaflux tested.

Coatings Combined: Practice at this plant thus is seen to embody all the treatments recommended where corrosion resistance must be developed to the highest possible point, as not only is the anodizing process employed, but this is followed by a "sealing" primer and, as the final surface, various types of top coats including synthetic resin aluminum paint are employed.

Because joints and crevices and abutting surfaces where fittings are mounted together must also be protected, all details of assemblies are anodized and primed prior to assembly. The only occasional exceptions to this rule are a few Alclad parts. As was pointed out previously, this is because the Alclad material has such extremely high natural corrosion resistance.

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2—Influence of Stress on Corrosion, D. J. McAdam Jr., Tech. Pub. No. 417, A.I.M.E., 1931, p.1.

3—Corrosion of Metals Used in Aircraft, Willard Mutchler, Research Paper RP1316, Journal of Research, National Bureau of Standards, v. 25, July, 1940.

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6—Anodic Oxidation of Aluminum and Its Alloys as a Protection Against Corrosion, G. D. Bengough and J. M. Stuart, Great Britain, Dept. Sci. Ind. Research, 1926, p. 40.

7—Protection of Aluminum Alloys, F. C. Pyne and Wm. L. Fink, Aviation, Feb., 1936, v. 35, p. 30.

Materials Handbook in Its Fourth Edition

■ *Materials Handbook*, by George S. Brady; fabrikoid, 591 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York, at $5.

In its fourth edition, this is an encyclopedia for purchasing agents, engineers, executives and foremen. The first edition, published in 1928, grew out of the author's need for a quick reference to basic data on all kinds of industrial materials while serving as American trade commissioner in three foreign countries. Later as managing editor of two industrial trade papers, the author extended the classification to cover primary requirements of industrial executives, designers, architects and builders of mechanical equipment and plant.

Materials are arranged alphabetically, as in an encyclopedia, expediting search for any material. An appendix contains numerous tables, definitions of engineering terms and other data of importance in connection with the body of the work.

Arc Welding Practice From German Viewpoint

■ *Arc Welding Handbook*, by Karl Meller; cloth, 210 pages, 4¾ x 7¼ inches; distributed by Chemical Publishing Co. Inc., New York, for $3.50.

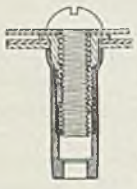
The object of this handbook, by a Berlin engineer, is to enable the operator to understand the processes involved in arc welding and to utilize the results of research in improving and simplifying his work. It also is useful to foremen and others intrusted with training of welders and of assistance in assuring their progress.

Develops New Rivet For Blind Attachments

■ A new patented fastener for blind attachment known as the Lok-Skru fastener is announced by Dill Mfg. Co., 700 East Eighty-second street, Cleveland. Developed with the co-operation of aircraft engineers and approved for specified uses on United States government projects, its use provides a new cost saving and safety advantage to aircraft manufacturers and other industries.

Its simplicity of applying is stated to reduce labor over 80 per cent. It only requires the drilling of one hole, and no "flush-heading" is necessary. One man, with a specially designed tool, can apply these fasteners quickly with positive certainty that they are properly set.

Screws for attachments applied to Lok-Skru fasteners are securely



New blind rivet now used in aircraft construction

locked by the "squeeze" principle. Oil or heat will not affect the locking device.

The fastener handles metal in gages from 0.010 to 0.185 in three sizes. Attachment screws of 8-32 and 10-32 sizes also may be used. Some of the uses of this new development on aircraft include the attachments of nacelle, wing and horizontal stabilizer fillets, interior upholstery panels, de-icer shoes, exhaust tail pipe fairing and shielding, wing tip to wing, hand hole covers, window and door frames, miscellaneous fairings, conduit boxes, etc.

Vitamin A Pays Big Dividends

■ In speaking before the eighth annual convention of the Institute of Cooking and Heating Appliance Manufacturers recently in Cincinnati, Ralph F. Bisbee, supervisor of quality control at Westinghouse's merchandising division, Mansfield, O., told how quality control develops the use of widely separated devices to improve products and reduce selling prices.

"By feeding vitamin A to workmen," Mr. Bisbee said, "more than $5000 a year for the past three years was saved through reduction of the number of 'off-color' parts in assembling electric ranges."

Good example of the results of quality control is the reduction of rejects on the assembly line due to mismatched colors in the assembly of doors within the frames of electric ranges. Improved seeing conditions, the result of a so-called "tunnel of light" which has mercury-vapor indirect lighting, giving 200 foot-candles intensity at the tunnel's middle, was one of the more important items which helped reduce color mismatching rejects from more than 3 per cent to an average of 1.7 per cent during the 12-year period ending in 1935.

Desiring still further reduction, it became evident that the personal equation played a vital part in this problem. Investigation disclosed that the sensitivity of the human eye is dependent on the changes that take place in a substance called "visual purple," which is contained in the eye's retina. In order for the eye to maintain its sensitivity, the amount of this visual purple substance changed must be continually replaced, or regenerated. It was this fact that paved the way for the entrance of vitamin A therapy, for it was found that if the rate of regeneration of visual purple is below normal, the use of vitamin A therapy will bring it up to, or higher than normal in almost every case.

With this retinal fatigue preventative, the seeing accuracy of the

inspectors was improved to such a degree that rejects on the assembly line have now been reduced from the 1935 average of 1.7 per cent to an average of only three-tenths of one per cent for the last 36 months.

Technical Manual on Ingot Brass and Bronze

■ *Ingot Brass and Bronze;* loose leaf binder, sheets 8½ x 11 inches; compiled and published by Non-Ferrous Ingot Metal Institute, 308 West Washington street, Chicago, for $5.

This is a technical manual prepared by the institute, to which supplemental material, including technical revisions have been added from time to time. Purchasers will receive these additional pages free for two years from Dec. 1, 1940.

This first edition contains six sections, dealing with such subjects as the economy and utility of ingot brass and bronze; nomenclature and classification; discussion of physical properties, including definitions of terms relating to testing methods; elaborate data on each of the institute's 23 standard alloys, including complete chemical specifications, average physical properties, instances of utility applications and cross-references to specifications sponsored by various technical societies and governmental bodies. There are many tabulations of miscellaneous specifications on brass and bronze ingots and castings currently in use by these bodies, with convenient references as to where and at what price complete original specifications may be obtained.

A section is devoted to discussion of foundry practice and valuable suggestions for maintenance of adequate foundry records.

Aluminum Foil Container Protects Meat Shipments

■ Meat now may be shipped in a flat aluminum foil envelope lined with Pliofilm and kept fresh for periods up to six months or more according to Reynolds Metals Co. Inc., Richmond, Va.

The metal foil exterior of the envelope is said to protect the meat from exposure to light, preventing it from becoming rancid. The Pliofilm inner lining of the package insures an air-tight seal, and helps prevent escape of the carbon dioxide gas which is directed into the envelope before it is sealed. The gas also retards the development of mold.

Specifications Call for Hull, Strausser Test

■ The Hull and Strausser test for determining local thickness of electrodeposited coatings of zinc, cadmium, tin and copper is now included in several federal specifications, according to a recent bulletin issued by E. I. du Pont de Nemours & Co., Wilmington, Del. It has been adopted for electro-tinned coatings and is also a practical, rapid method for determining deposit thickness of du Pont high-speed copper.

The method of the test is based on the principle, advocated by Clark and later modified by Hull and Strausser, of dropping a corrosive solution onto the plated article and timing the interval to when the base metal becomes visible. The corrosive solution is of such strength that each elapsed second represents 0.00001 inch of deposit (0.000005 inch for copper). Comparing this method with the immersion test, this is more economical to make, gives more consistent results and can be used to test pieces too large to immerse.

The test apparatus comprises a 250-milliliter separatory funnel connected by rubber tubing to a glass stopcock, the lower end of which is drawn to a tip with an orifice similar to that on the average buret.

Ingot Photography

(*Concluded from Page 78*)

if any, (2) a similar record of snakes, cracks, cobbling or other mill defects and (3) a visual and clear record of heating practice with cold ingots, hot ingots and unevenly heated ingots more readily than by the naked eye, because of the inherent character of the film to increase light contrasts. In addition to these operating advantages, there are others such as the economical and easily obtained records for research, handling of complaints, determination of soaking pit fuel efficiency and rate of heating and for the behavior of new steels or new methods of making steels during rolling.

Illustrations accompanying this article depict the obviousness with which these data are obtained.

Use of photographic records has helped clear up a potential "bottleneck" in plant production facilities. On the common grades of steel intended for rolling in the finishing mill, the management is normally confronted with one of two alternatives: Either all the material from the blooming mill must go through the inspection yard, already extended to capacity with the higher quality steels for defense purposes, in which case a lot of valuable time and space is consumed on handling steel so free of defects that it does not require surface preparation in the intermediate stage; or, the management must assume the gamble of passing semifinished heats of steel on to the finishing mill—heats which might be below normal quality standard. With ingot photography used to control inspection, many of the common grades of steel can be loaded directly for the finishing mills, and in cases where the camera shows substandard quality, these cars are diverted for intermediate inspection and billet conditioning.

The methods of photographic recording of steel surface quality, heating variables and major open-hearth defects and deviations from good practice have been worked out so successfully at the Alan Wood Steel Co. that the procedure is being introduced into many other major steel producers' plants and will, without a doubt, be extended to new applications.

New Propeller Blade Has Good Possibilities

■ A new propeller blade recently brought to the attention of technicians at the Air Corps Materiel Division, Wright Field, O., is under development at present, according to a recent Air Corps News Letter. Although the plan form, thickness ratios and airfoil sections of this blade follow conventional lines, the method of construction is different.

Standard blades now in use are either solid or hollow. In the solid type, any load imposed upon the blade is distributed throughout its entire mass. In the hollow type, the load is carried by the outer shell. In the new blade, designed by Riley Propeller Co., an integral core, usually a forged steel slab, has sufficient stiffness and thickness to carry the entire loads imposed upon the blade. One end of this slab is forged round to form the blade shank. Sufficient rubber is then vulcanized on the slab, in a die, to form the required airfoil and thickness ratio.

Advantages of this construction are: Contingent upon close forging tolerances, it lends itself readily to high-speed production methods. Bent blades can be straightened. In spite of the high bond strength between rubber and steel (approximately 400 pounds per square inch), the rubber can be stripped off readily. The steel core may then be annealed, straightened, heat treated and new rubber applied.

Steel Castings Manual Carries Authority

■ *Steel Castings Handbook*, compiled by Steel Founders' Society of America, Cleveland; semiflexible fabrikoid, 503 pages, 6 x 9 inches; price, $2, from the society.

This volume has been in preparation for several years, its aim being to provide a helpful text for all concerned in production of steel castings and their application in industry. It is designed as an answer to queries relating to the advantages of steel castings in mechanical structures and assemblies; service of steel castings to the engineering industries; information available to steel castings designers; knowledge an engineering graduate should have about products of the steel foundry, and others of this sort.

Sources of material are co-extensive with the industry and include literature on the subject and much unpublished information made available through this volume.

The book is dedicated to the engineering profession and is offered as a reference book, a dependable manual, for use by all interested in the creation of improved industrial and mechanical structures of highest quality.

The text is well illustrated, and much tabular matter is carried. A comprehensive index aids in finding a desired subject.

Gulf Oil Announces Two New Bearing Greases

■ Gulf Oil Corp., Gulf building, Pittsburgh, reports two new lines of lubricating greases for ball and roller bearings. Both have a high melting point and are specially prepared for resistance to oxidation and separation.

One, designated Anti-Friction grease, is recommended for heavy-duty service. The other, Precision grease, is recommended for lighter duty and higher speeds. According to the company, these greases are produced with a relatively smooth nonfibrous texture. They are available in a wide range of consistencies for any method of application or operation condition. These consistencies were recently recommended by the National Lubricating Grease Institute which went into effect March 1, 1941.

Reaffirms Practice on Machine, Lag Bolts

■ Division of simplified practice, National Bureau of Standards, announces that simplified practice recommendation R169-37, "Machine, Carriage and Lag Bolts," has been reaffirmed without change by the standing committee of the industry.

This recommendation, as promulgated in 1937, covers standard stock production sizes of square-head machine bolts, hexagon-head machine bolts, square-neck carriage bolts and lag bolts. Copies of this recommendation may be obtained from the superintendent of documents, Government Printing office, Washington, for 5 cents each.

Develops Recording Chart For Continuous Use

■ Improved recording instrument charts made for continuous re-use are reported by Permochart Co., 525 Chestnut road, Sewickley, Pa. Made of Vinylite plastic, they will not curl, are nonflammable and are oil, gasoline and grease resistant—the previous day's ink record being easily removed from the surface with a damp cloth. Because they are in use over a long period of time, their centers are reinforced to prevent deterioration, even from holding devices using sharp projections. They are guaranteed for daily use over a period of two years under normal working conditions, and are made for all types of recording instruments which use circular charts. Special charts, however, can be made upon request.

<< HELPFUL LITERATURE >>

1. Adjustable Speed Drive

Reliance Electric & Engineering Co.—8-page illustrated bulletin No. 310 announces electric adjustable-speed drive for alternating current circuits. Photographs show applications of drive to balancing machines, automatic lathes, and other small units from 1 horsepower up.

2. Chambering Machine

Pratt & Whitney division, Niles-Bement-Pond Co.—4-page illustrated bulletin No. 454 is devoted to description of No. ½B gun barrel chambering machine which performs complete precision operation of chambering a gun barrel to receive cartridge. Complete specifications are listed.

3. Temperature Charts

Fedders Manufacturing Co.—4-page form, "Time Saver Charts", contains four charts for quick, accurate figuring of temperature rises for various operating conditions. Charts, reprinted from "Fedders Type K Heating Coils", catalog are produced on heavy stock protected by celluloid-like finish which prevents soiling.

4. Industrial Brushes

Fuller Brush Co.—8-page illustrated bulletin on "Steelgript" brushes for industrial and engineering needs shows standard and special designs for use in all types of equipment requiring brushes. Flexibility of brushes permits shaping and adaptation to any machine application.

5. Air Circulating Equipment

Wagner Electric Corp.—18-page illustrated catalog No. FU-41 contains sales and application data on air circulating and ventilating equipment. Dimensions, features, motor and fan capacities, prices, and suggested applications are enumerated.

6. Electric Vibrators

Syntron Co.—8-page illustrated bulletin No. 283 describes with diagrams and text application of electric vibrators to all types of hopper and chutes for feeding materials. Lists specifications and dimensions for vibrators and vibratory packers, and for controllers.

7. Driveway Sentry

Sendell Specialties Co.—4-page illustrated bulletin, "The Sendell Driveway Sentry," describes construction and installation of driveway signal system for industrial plants and other locations where it is essential to know of any approaching vehicular traffic. Price schedule for all models is given.

8. Heat Transfer Units

Young Radiator Co.—20-page illustrated catalog No. 4540 contains technical information for designers and engineers on blast and commercial heat transfer units for heating and tempering air in modern blast systems of heating. Units can be used in drying rooms, dry kilns, paint spray booths and finishing rooms. Tables and graphs are included.

9. Heavy Duty Refractories

Norton Co.—24-page illustrated bulletin Form No. 803 enumerates features and physical properties of heavy refractories consisting of bricks, plates, fabricated muffles, heavy tubes, batts, saggers, burner blocks, and miscellaneous shapes for furnaces. Refractory cements of fused alumina, silicon carbide and fused magnesia are described.

10. Transformer Application

Westinghouse Electric & Manufacturing Co.—8-page illustrated bulletin No. 211 tells how to apply CSP power transformers. Economic advantages of unit-substation transformers are explained with reference to reliability, flexibility, and cost per kilovolt-ampere installed. Adaptability to existing systems, overload capacities, and installation requirements are discussed.

11. Foundry Mechanization

Allis-Chalmers Mfg. Co.—16-page illustrated bulletin No. B-6092 describes and pictures types of equipment for foundry mechanization. Included are mechanical shakeouts, sand conditioners, cupola blowers, air compressors and vacuum pumps, electric motors for all applications over one horsepower, and multiple Vee belt drives. Views of actual industrial installations are shown.

12. Car Type Furnaces

W. S. Rockwell Co.—4-page illustrated bulletin No. 403 explains, with views and diagrams, electric and fuel fired car type furnaces for stress relieving of welded steel products and gun forgings, for heating large forgings or castings, and large quantities of metal packed in boxes or pots. Details of burners, arrangement of chambers, and working openings are shown.

13. Tear-off Device

Leeds & Northrup Co.—2-page illustrated bulletin N-163 (1) describes daily-tear-off device which makes potentiometer recorder strip charts as easy to file as round charts. Full sized facsimile of strip chart from Micromax boiler temperature recorder is included.

14. Boiler Plant Service

Engineering & Construction division, Koppers Co.—2-page bulletin Form D-6 is devoted to description of company's boiler plant service which includes designing, preparing specifications for, and building complete industrial power plants. Company also makes steam and electric power surveys. Photographs show typical installations.

15. Hand Feed Milling Machine

Sundstrand Machine Tool Co.—4-page illustrated bulletin, "No. 00 Hand Feed Rigidmil", presents features of small hand feed milling machine for light operations. Tells how hand feed may be converted to power feed at relatively low cost. Cutaway view of head shows double center drive which provides wide range of spindle speeds for machining steel, cast iron, brass and aluminum.

16. Gas Cutting Machine

Air Reduction Sales Co.—12-page illustrated bulletin No. ADC-614A announces portable, motor driven, gas cutting machine for use on steel sheets, plates, billets and forgings. Action photographs show machine being used to prepare plate edges and for cutting of circles and straight line bevels, structural shapes and templates.

17. Surface Hardening

Chapman Valve Manufacturing Co.—6-page illustrated broadside, "Chapmanizing," discusses theory of surface hardening process and how it is done. Lists recommended applications and gives tables of parts upon which process is being used successfully. Map shows commercial heat treaters licensed to use method.

18. Marine Insulation

Owens-Corning Fiberglas Corp.—15-page illustrated booklet, "Glass That Serves Ships," is non-technical presentation in pictures of marine insulation. Shows passenger ships, cargo vessels, fireboats, and other smaller craft equipped with Fiberglas for insulation and fireproofing. Photographs show material in process of manufacture.

19. Pipe Couplings

Pittsburgh Pipe & Coupling Co.—48-page spiral-bound catalog No. 41 contains extensive information on all types of forged seamless steel pipe couplings. Tables give dimensions, approximate weights, recommend working pressure, thread data, finish, and method of manufacture. Sectional diagrams amplify tables. Action photographs show various stages in process of manufacturing.

STEEL
Readers' Service Dept.
1213 West Third St.,
Cleveland, Ohio

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HELPFUL LITERATURE

(Continued)

20. Foundry Equipment

Whiting Corp. — 4-page illustrated broadside pictures cupolas, crane hoists, pouring ladles, air furnaces, duplexing equipment, annealing ovens, hydro-blast tumblers, side blow converters and inclined skip chargers. Photographs of company personnel are included.

21. Globe Valves

Reading-Pratt & Cady division, American Chain & Cable Co.—4-page illustrated bulletin No. 531-P describes full plug type globe valves. Large sectional view shows details of construction. Tables list sizes, prices, dimensions, and recommended applications.

22. Floor Dye

Flexrock Co.—4-page illustrated pamphlet is color chart of "Colorflex" acid, alkali, fire resistant floor dye. Color chips show shades in which product is made. Instructions for applying are given, together with recommended usages.

23. Metal Cutting Saws

Peerless Machine Co.—8-page illustrated bulletin No. 51 discusses features and construction details of metal cutting saws. Machines have patented four-sided saw frame and backing-plate blade support. Tables give specifications of three standard sizes.

24. Arc Welding

Lincoln Electric Co.—8-page illustrated bulletin No. 430 is an engineering discussion of arc welding of rail-ends. Objective, principles, how to obtain maximum life for rail-ends, specifications, and procedure are some of the subjects covered.

25. Potentiometer

The Bristol Co.—16-page illustrated bulletin No. 507 sets forth details of "Pyromaster" recording potentiometer which is offered as pyrometer, tachometer, resistance thermometer, and millivoltmeter. Large photographs show models, construction features, wiring diagrams, and applications.

26. Industrial Cleaning

Cowles Detergent Co.—4-page pamphlet describes "Dryorth" technically anhydrous sodium orthosilicate for heavy duty cleaning jobs. Product is suggested for use in automotive, sheet and strip steel manufacturing, and petroleum processing industries.

27. Metal Spraying

Metallizing Engineering Co.—6-page illustrated bulletin is pictorial presentation of stages in manufacture of "Metco" metallizing guns. Features of equipment as well as typical applications are shown. Map outlines location of distributors, offices, and warehouses.

28. Gear Lead Checker

Michigan Tool Co.—4-page illustrated bulletin No. 1204 outlines features of improved "Sine-Line" lead checker which is designed to locate gear troubles by checking spiral lead rather than the helix angle. Features of machine and method of gear checking are enumerated.

29. Case Hardening Baths

A. F. Holden Co.—4-page technical bulletin announces new alignment of case hardening baths. Control of breakdown rate, reactions, chloride ratio and stability are explained in text and graphs. Photographs of case hardened macro-sections are shown, and types of baths are listed.

30. High Nickel Alloys

International Nickel Co.—6-page illustrated bulletin contains basic information on mechanical, corrosion resistance and other properties of rolled nickel, "Monel," and other high nickel alloys. Uses, composition, physical constants, availability, fabrication, and corrosion resistance data for each type of alloy are presented.

31. Cold Sawing Machine

Motch & Merryweather Machinery Co.—8-page illustrated bulletin describes No. 3 hydraulic feed cold sawing machine. Photographs show machine in operation, spindle drive construction, and segmental saw blades. Complete specifications and features are listed.

32. Cast Iron Pulleys

W. A. Jones Foundry & Machine Co.—8-page illustrated catalog No. 69A describes standard construction of iron pulleys and gives tables of dimensions, weights and prices for single arm, solid and split; and for multiple arm, solid and split cast iron pulleys.

33. Welding Rods

Eutectic Welding Alloys, Inc.—2-page folder lists low temperature welding rods that can be used for cast iron, all types of steel, bronze, brass and copper, cast and sheet aluminum, magnesium and its alloys, and nickel and monel. Approximate fusion temperature and color for each weld are given.

34. Alloy Parts

Ampco Metal, Inc.—illustrated data sheet No. 86 tells of alloy parts used in line of "Link-Belt" shovels, draglines, cranes, and similar excavating material handling equipment. Metal of various grades is used for bushing track power rollers and turntables and for boom hoist worm gears on large power shovels.

35. Distribution Transformers

Allis-Chalmers Manufacturing Co.—16-page illustrated bulletin No. B-6125 covers distribution transformers in sizes ranging from 37½ to 200 kilovolt-amperes, designed for standard voltages of 2400 to 69,000 volts. Dimension sheets, construction data, and design features are listed.

36. Industrial Chemicals

Monsanto Chemical Co.—20-page illustrated bulletin No. P-115 gives physical properties and suggested applications of group of industrial chemicals for use as flame-retarding ingredients, plasticizers, as thermostat control medium, softeners, solvents, solid plastics, lubricants, and other purposes. Diagrams and tables amplify text.

37. Precision Balances

Roller-Smith Co.—8-page illustrated bulletin describes line of precision balances recommended for rapid and accurate determination of weight of small objects or materials where number of weighings of approximately same value must be made. Instruments for measuring surface tension of liquids, assaying purposes, and general accurate weighings are explained.

38. Non-magnetic Steel

Jessop Steel Co.—4-page pamphlet, "Jessop Non-magnetic Steel," gives information on machinable austenitic non-magnetic steel developed for electrical industry. Listed are electrical and physical properties, approximate analysis, working and fabricating data, and applications.

39. Baking and Drying Ovens

Despatch Oven Co.—12-page illustrated bulletin No. 51 is descriptive of line of baking and drying ovens for synthetic enamels, lacquers, varnishes, paints enamels and japans. Schematic drawings and photographs show theories of heat distribution used in ovens and also typical installations.

40. Motor-starting Switches

General Electric Co.—4-page illustrated bulletin No. GEA-2234C tells of features, construction, overload protection, and installation of manual motor starting switches for control of fractional horsepower motors. Switches for special conditions are also included.

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No More Steel Preference Ratings for the Present

Report of Gano Dunn to President reassures government and industry. Machinery fatigue is new problem.

MARKET IN TABLOID ★

Demand
Brisk.

Prices
Steady.

Production
Up 1 point to 97½.

■ PROBLEMS of the steel industry multiply, though none are considered unsolvable. Though occasionally some maker notes a temporary letdown in demand the over-all picture is one of continuing record-breaking buying. Though many expect an ease of pressure in second half such is not yet in sight. An epidemic of "machinery fatigue" has developed on a mild scale. Strikes hinder in several areas and shortages of certain coating and alloying materials cut production in several instances, such as galvanized sheet manufacture which has fallen 4 points in a week to 77 per cent.

On the brighter side is the fact that consumers have places on order books by now for the major part of their 1941 requirements which should ease future purchasing. Moreover the United States is merely in a state of defense rather than actual war, which means that materials are being accumulated and not destroyed, hence without need for continual replenishment, except of course where exports to Britain are involved.

An important development of the week is that no more steel preference ratings are being named, a change which resulted from President Roosevelt's declaration of Feb. 28 that there would be no need for priorities on steel for the present. It is learned, further, that the preference ratings named in the past resulted from misunderstanding, since preference ratings can be given only to items on the critical list—and steel at no time has been thus classified. Although there will be no further preference ratings on steel, at least in the immediate future, volunteer cooperation in taking care of essential requirements will continue, so that to a large extent the net effect will be about the same as under a preference ratings system.

The bulk of steel orders is now for late third quarter delivery. Many consumers are now turning in specifications for fourth quarter, this being possible where needs are well standardized, as in bolt and nut manufacture. On only very few items can second quarter steel still be purchased. Promised deliveries on current orders range from three weeks for wire rope to eleven months for several makers of galvanized sheets, the shortage of zinc limiting the latter.

New shipbuilding programs will require an additional 1,000,000 tons of steel over the next year or more. This includes about 550,000 tons of plates, shapes and bars now being distributed for 200 government cargo ships. An option on 100 more of the same type is pending, requiring 275,000 tons of steel. An option for 60 more vessels for the British, to be built here and needing 180,000 tons of steel, also pends.

Tin plate demand has become exceedingly brisk to make up for lost time, though with some producers still able to promise delivery in two months. Canned food needs for armed forces intensifies buying.

Some steel users have implied that they are willing to buy for 1942 delivery, but producers are not yet ready. Automobile makers surprise the steel trade by both the long-protracted spell of buying and the large tonnages constantly purchased, the buyers perhaps fearing cutting off of civilian supplies.

A leading steelmaker has averaged up delivery promises, finding them five to seven months. Concrete bars and structurals are three to four months; light steel six to seven months, except where coated, when deliveries range from ten to twelve months.

Consumers of forging billets, who formerly purchased much rerolling billet tonnage at $34, mill, no longer can get rerollers and must pay $40 for forging billets, equivalent to a $6 rise.

Pig iron production in February was an all time record for the second month of a year at 4,203,557 net tons but on a daily basis production fell 0.26 per cent to 150,127 net tons. A net loss of three furnaces for the month left 202 operating on Feb. 28.

Automobile production for the week ended March 8 was scheduled to drop 635 units to 125,915, which compares with 103,560 for the same 1940 week.

Steel ingot production last week gained 1 point to 97½ per cent. Rises occurred at Pittsburgh by 2 points to 98, Chicago by 1 point to 100 and Buffalo by 2½ points to 93. Birmingham dropped 10 points to 90 per cent and Cincinnati 2½ points to 95. Unchanged were: Eastern Pennsylvania at 95, Wheeling at 88, Cleveland at 85½, New England at 92, St. Louis at 93, Youngstown at 97 and Detroit at 92.

Among STEEL's price composites finished steel was unchanged at $56.60, but iron and steel rose 3 cents to $38.26 and steelworks scrap gained 5 cents to $19.96.

COMPOSITE MARKET AVERAGES

	Mar. 8	Mar. 1	Feb. 22	One Month Ago Feb., 1941	Three Months Ago Dec., 1940	One Year Ago Mar., 1940	Five Years Ago Mar., 1936
Iron and Steel	$38.26	$38.23	$38.23	$38.22	$38.30	$37.07	$33.20
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	52.32
Steelworks Scrap	19.96	19.91	19.91	19.95	21.37	16.47	14.48

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Mar. 8, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.25
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.225	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅝-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Mar. 8, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.95	$24.34
Basic, Valley	23.50	23.50	23.10	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.84	24.34
No. 2 fdry., del. Pgh., N. & S. Sides	24.69	24.69	23.69	23.69
No. 2 foundry, Chicago	24.00	24.00	23.75	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	24.06	23.56	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.715	25.215
Malleable, Valley	24.00	24.00	23.60	23.00
Malleable, Chicago	24.00	24.00	23.75	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	24.17	23.35	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt, steel, Pitts.	$20.75	$20.75	$22.75	$17.05
Heavy melt, steel, No. 2, E. Pa.	18.50	18.50	19.75	15.90
Heavy melting steel, Chicago	19.50	19.25	20.70	15.50
Rails for rolling, Chicago	23.75	23.75	25.00	18.25
Railroad steel specialties, Chicago	23.25	23.55	23.95	18.40

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$5.50	$4.75
Connellsville, foundry, ovens	6.00	6.00	6.00	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00
Sheets	19.00

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c--2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c
Detroit, delivered 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.20
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅝ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller 68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2½"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell. prem. fdry.	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	...	...	.....
Sharpsville, Pa.†	24.50	24.50	24.50	25.00
Sparrow's Point, Md.	25.00	...	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.‡	24.50	24.50	24.50	25.00
Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.12	.....	...	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	...	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	...	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	.....	.....	.....
Newark, N. J., from Bethlehem.	25.53	26.03	.....	.....
Philadelphia from Birmingham.	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, 97c (water); Oakmont, Verona, $1.13; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher. †Some sellers quote $23.00 on malleable and foundry; $22.50 on basic; $24.00 on bessemer. ‡Some sellers quote $23.00 on foundry, malleable, basic; $24.00 on bessemer.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium. 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c

88% chrome, cont. tons. 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Struc-tural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.20	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.75	4.25	6.00	3.75	3.75	5.60	3.75	6.40	5.40	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85		8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2 ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0 ††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	17.00
New Eng. del. No. 1	18.00-18.50
Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	19.50
Chicago, auto, no alloy	18.50
Cincinnati, dealers	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†17.00-17.50
Detroit, No. 2	†16.00-16.50
Eastern Pa., No. 1	20.00
Eastern Pa., No. 2	18.50
Federal, Ill., No. 2	16.50-17.00
Granite City, R. R. No. 1	17.50-18.00
Granite City, No. 2	16.50-17.00
Los Ang., No. 1 net	14.50-15.00
Los Ang., No. 2 net	13.50-14.00
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	21.00-21.50
Pittsburgh, No. 1	20.50-21.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	17.50-18.00
St. Louis, No. 2	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1	15.00
Toronto, dirs., No. 1	12.25-12.50
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	19.00-19.50
Chicago, factory	18.50-19.00
Chicago, dealers	17.50-18.00
Cincinnati, dealers	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.50-18.00
E. Pa., new mat.	20.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	13.50-14.00
San Francisco, net	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.50-18.00
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	12.50-13.00
Toronto, dealers	10.00-10.50

SHEET CLIPPINGS, LOOSE

Chicago	13.50-14.00
Cincinnati, dealers	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	16.00
Buffalo, No. 1	19.00-19.50
Chicago, No. 1	18.00-18.50
Cincin., No. 1 deal.	14.25-14.75
Cincin., No. 2 deal.	7.75- 8.25
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	†16.50-17.00
Valleys, new, No. 1	20.50-21.00
Toronto, dealers	7.00- 7.50

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	14.00-14.50
Cincinnati, dealers	10.00-10.50
Cleveland, no alloy	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	15.00-15.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.50-16.00
St. Louis	11.00-11.50
San Francisco	5.00
Toronto, dealers	†8.75- 9.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	16.00-16.50
Cleveland	14.50-15.00
Chicago	14.75-15.25
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.50-13.00
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.50
Buffalo	14.50-15.00
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Eastern Pa	14.00-14.50
Detroit	†12.50-13.00
New York	†10.50-11.00
Pittsburgh	17.00-17.50
Toronto, dealers	†8.75- 9.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†12.50-13.00
Chicago, elec. fur.	20.00-20.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	13.50-14.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†10.75-11.25
Buffalo	14.50-15.00
Chicago	14.25-14.75
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Detroit	†12.50-13.00
E. Pa., chemical	17.50-18.00
New York	†11.50-12.00
St. Louis	10.00-10.50
Toronto, dealers	†8.75- 9.00

RAILROAD SPECIALTIES

Chicago	23.00-23.50

ANGLE BARS—STEEL

Chicago	23.00-23.50
St. Louis	21.25-21.75

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	24.00-24.50
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	27.00-27.50
St. Louis	21.50-22.00

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	27.00-27.50
Chicago (3 ft.)	23.25-23.75
Chicago (2 ft.)	24.25-24.75
Cincinnati, dealers	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	24.00
St. L. 2 ft. & less	23.50-24.00

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00
Buffalo	22.00-22.50
Chicago	19.50
Cleveland	24.00
Pittsburgh	22.00
St. Louis	19.50-20.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.00-14.50
Cincinnati, dealers	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	13.75-14.25
Cincinnati, dealers	12.75-13.25
Eastern Pa	20.00-20.50
New York	†13.00-13.50
St. Louis	14.00-14.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	14.00-14.50
St. Louis, No. 2	16.25-16.75

FORGE FLASHINGS

Boston district	†13.50-14.00
Buffalo	19.00-19.50
Cleveland	18.50-19.00
Detroit	†16.50-17.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	23.50-24.00

LOW PHOSPHORUS

Buffalo, plates	26.00-26.50
Cleveland, crops	26.00-26.50
Detroit, thin gage	†19.00-19.50
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50
Toronto, dealers	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	23.50-24.00
Cleveland	22.00-22.50
Eastern Pa.	25.50-26.00
Pittsburgh	26.50-27.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	19.00
Boston	†18.50-19.00
Chicago	23.50- 24.00
New York	†19.00-19.50
Eastern Pa.	26.00-26.50
St. Louis	21.50-22.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	25.50-26.00
Eastern Pa.	27.50-28.00
St. Louis	25.75-26.25

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	19.50-20.00

SHAFTING

Boston district	†19.50-19.75
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	19.50-20.00

CAR WHEELS

Birmingham iron	18.00
Boston dist., iron	†16.50-17.00
Buffalo, steel	24.50-25.00
Buffalo iron	20.50-21.00
Chicago, iron	20.00-20.50
Chicago, rolled steel	22.75-23.25
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.00-23.50
Eastern Pa., stel.	26.50-27.00
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	27.00-27.50
St. Louis, iron	21.00-21.50
St. Louis, steel	21.50-22.00

NO. 1 CAST SCRAP

Birmingham	18.50
Boston, No. 1 mach.	†19.00-19.50
N. Eng., del. No. 2	19.25-19.50
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.00-22.50
Chicago, agri. net	19.00 19.50
Chicago, auto net	19.50-20.00
Chicago, railr'd net	19.00-19.50
Chicago, mach. net	21.00-21.50
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†19.00-19.50
Eastern Pa., cupola	24.50-25.00
E. Pa., No. 2	22.00-22.50
E. Pa., yard fdry.	22.50-23.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	22.50-23.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	19.50-20.00
St. L., No. 1 mach.	20.50-21.00
Toronto No. 1 mach., net dealers	†21.50-22.00

HEAVY CAST

Boston dist. break.	†17.50-18.00
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†19.50-20.00
Detroit, break.	†17.50-18.00
Eastern Pa.	22.50
Los Ang., auto, net	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†14.50-15.00
Buffalo	17.50-18.00
Chicago, net	14.25-14.75
Cincinnati, dealers	13.00-13.50
Detroit, net	†13.00-13.50
Eastern Pa.	20.00-20.50
New York fdry.	†14.00-14.50
St. Louis	15.00-15.50
Toronto dealers, net	†17.50-18.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	23.50-24.00
Cincin. agri., deal.	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	23.00-23.50
Los Angeles	12.50
Pittsburgh, rail	25.50-26.00
St. Louis, R. R.	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	
So. African, 48%	57.00-60.00
Indian, 49-50%	60.00-63.00
Brazilian, 46%	54.00-55.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 110, 111

Pittsburgh—Sheet mill operations were off slightly last week and are expected to drop a little more this week, due to mechanical difficulties in production lines. Output is now slightly less than 90 per cent. Galvanized sheet rate is off another three points to 74 per cent as a result of zinc shortages. New specifications are heavy as there is considerable anxiety in Detroit circles over inability of producers to ship as much tonnage as has been specified.

Cleveland—Prevailing promises to deliver are six to seven months; in case of galvanized sheets several sellers report eleven months, though others can make prompter delivery. Coated products are not guaranteed as to delivery because of shortages of coating and alloying materials. Persistent buying by automobile makers surprises makers, who expected a saturation point by this time.

Chicago—With automobile and automotive parts industries still pushing for sheets and strip, mills are beset with substantial orders and pressure for deliveries. General sheet demand also is good, and mill deliveries are becoming more extended. Hot-rolled sheets, 20 gage and lighter, are in September delivery; 18-gage and heavier, in November; cold-rolled and enameling iron in December.

Boston—Forward buying of cold narrow strip has not slackened, incoming volume still exceeding shipments and capacity with rollers' backlogs tending upward. Most tonnage now being booked is for third quarter delivery at open prices. Hot strip deliveries are gradually lengthening, reflected in cold-finished shipments.

New York—Sheet specifications are being placed for shipment over the remainder of the year although some sellers refuse to enter formal orders for fourth quarter and in at least one instance for third quarter. Many sellers now have little to offer before the middle of August. An increasing percentage of specifications is for defense work, but most manufacturers of non-military products had anticipated requirements substantially.

With the automotive trade placing large forward orders and specifying heavily, narrow cold strip volume continues to reach mills in excess of shipments and capacity. Only in spots are there openings for second quarter shipments.

Philadelphia—Sheet backlogs accumulate as third and fourth quarter tonnage continues to come in. Some mills have little open capacity before October and most producers find it

increasingly difficult to give accurate delivery promises. On shipments beyond mid-year hot-rolled sheet capacity is especially limited.

Buffalo—Mills still find it necessary to reject much forward coverage demand to keep backlogs from becoming too greatly extended. Bookings run into third quarter. Efforts are being made to satisfy regular customers.

Cincinnati — Demand for sheets has not slackened although mills have practically filled second quarter books. Third and fourth quarter business has not been entered, but buyers are offering tonnage without exacting delivery promises. Commitments on galvanized are being met, although there is a trend toward provisional acceptance of new galvanized tonnage, dependent on zinc supplies. Defense priorities are more frequent, without serious encroachment on other deliveries.

Toronto, Ont.—Heavy automotive buying is responsible for accumulation of sheet orders, and is reflected in increased buying in the United States. Other consumers also are showing interest and buying is gaining steadily. War priority orders, however, are responsible for most of the business and also are favored in delivery.

Birmingham, Ala.—Not only have sheets held close to the recent high in production for the first few weeks of this year, but current orders have approximated or surpassed production. Output is close to capacity now. A comfortable production of strip is reported.

St. Louis—Demand for sheets and strip continues brisk. Railroad equipment builders have figured prominently in recent orders. Covering for second quarter is reported quite thorough, and mills look for some relaxation in delivery about mid-March.

Plates

Plate Prices, Page 110

Pitsburgh—Some trouble in semi-finished mills has created a little tighter situation in plates temporarily, although this will be cleared up shortly. Deliveries continue to be longest on alloy plates and wide sections.

Cleveland—Orders are made up mostly of small tonnages. Sales are made chiefly for August and September delivery. Several makers are ostensibly out of the market but will sandwich in orders for regular customers.

Boston—Plate specifications by shipbuilders are heavier, and, with contracts wider spread to include small yards, no immediate improvement in deliveries for miscellaneous consumption appears possible. Buyers in the latter classification are placing protective orders with little prospect of shipment under 14 weeks on most sizes and widths with wider plates and alloys extended beyond that period.

New York—Pressure for plates continues, with deliveries further extended into third quarter. Some producers have little tonnage available now before late August. An exception is preference business which is being pushed ahead of orders less essential to national defense, and which is increasing. The general expectation is that delivery will become tighter before it begins to improve. Some interests expect the situation to become particularly complicated late in second quarter. By that time shipyard requirements are likely to reach a peak and fabricators and jobbers who find they have not anticipated their requirements sufficiently, are expected to be hard hit.

Philadelphia—Plate producers are not accepting all available business but yet are unable to match orders with shipments. Deliveries vary among producers and specifications,

from 25 to 50 weeks. Foreign buyers find it difficult to place orders, reflected in the general market of 2.70c, f.a.s., on export tonnage. Demand for large tank work is more active and shipyard requirements have not yet reached the expected peak.

Birmingham, Ala.—No slackening in bookings or production, is evident in plates. Mills still have a large backlog and orders approximate deliveries.

Seattle—Heavy tonnages are being delivered by intercoastal vessels for shipyards in Oregon and Washington and further orders are pending. Small jobs are numerous and shops report capacity operations as a rule.

Toronto, Ont.—Orders for plates, continue at a record rate with most current buying going to United States producers. Steel Co. of Canada Ltd., Hamilton, Ont., is completing its new plate mill which will go into production late this month. Heavy demand is reported from shipbuilders which are assembling materials in connection with the shipbuilding program for the British government.

Plate Contracts Placed

260 tons, gas-holders, contract 5, Coney Island sewage treatment plant, New York, to Pacific Flush Tank Co., Chicago; E. W. Foley Inc., Brooklyn, contractor.

Unstated tonnage, elevated steel water tank, Fort Jackson, S. C., to Chicago Bridge & Iron Co., Chicago, $9,900.

Unstated tonnage, two 20-ton (45-foot) steel barges, quartermaster, Washington, to Robins Shipbuilding & Welding Corp., Delanco, N. J.

Plate Contracts Pending

200 tons, navy, schedule 5234, delivery Mare Island, Calif., Lukens Steel Co., Coatesville, Pa., low.

Bars

Bar Prices, Page 110

Pittsburgh—Bar buying continues without abatement, although there are apparently fewer cases where buyers are faced with need for immediate delivery. Delivery specifications are understood to cover the remainder of this year, although most tonnage has been placed at an open price with delivery at mill convenience purely because of the delivery situation.

Cleveland — Both carbon and alloy bars are being sold chiefly for August delivery and later, all previous deliveries being sold out. In some cases where consumers' needs are well standardized, such as in bolt and nut manufacture, specifications on fourth quarter delivery are now being received by makers.

Chicago—Bar orders are about as heavy as the past few weeks. Chief demand is for alloy grades. Some

concern is expressed over inability to obtain adequate nickel supplies, and consumers are figuring what substitutions may be made. Thus far, specifications have not been changed. Some grades of flat bars are in October and November delivery, and rounds in November and December.

Boston—Bar orders now being booked are for second and third quarter delivery, mostly the latter on alloys unless earmarked for defense contracts. More volume is developing for the latter with voluntary preferential ratings being applied. Sellers are not taking all business offered and tonnage in some instances is being referred to mills for acceptance.

New York—An increasingly difficult phase of the delivery situation is the matter of mill allotments. Instead of mills offering to protect regular customers on indicated needs for a three-month period, even where specifications are offered, they are in many cases making allotments considerably shorter. Demand has expanded so rapidly that many mills claim they have little choice but to ration tonnage in this limited fashion, especially where it involves deliveries well in the future.

Philadelphia—Merchant bar backlogs have increased further on more extensive buyer coverage. Little material is available for delivery before the middle of third quarter. Sellers are attempting to regulate sales according to buyers' previous requirements, but this is difficult in view of variations in consumer operations. Armament needs are steadily becoming more prominent.

Birmingham, Ala.—Bars are moving actively. Merchant bars are in good demand. Concrete reinforcing bars are especially active.

Toronto, Ont.—Merchant bar orders are appearing in large volume and it is reported that February sales topped the high record of January. Mills have increased production and are carrying backlogs running into second half.

Pipe

Pipe Prices, Page 111

Pittsburgh — Although standard pipe delivery to consigned stocks is better than flat-rolled or bar mill products, jobbers, particularly in eastern sections, indicate there is still much to be desired. Deliveries are still out of sight on alloy mechanical tubing and orders pour in faster than they can be filled. No change is reported in pressure tubing.

Cleveland—Pipe is one of the few items on which reasonable deliveries can be promised. Merchant pipe still comes from producers' stocks and is available within a few weeks where extra engineering is not involved. On line pipe 60 to 90 days is common delivery. Producers expect that in a few months merchant pipe demand will slow down as by that time, defense structures should be completed.

Boston—Merchant steel pipe buying improves gradually, construction requirements for defense, housing and miscellaneous structures being heavier. Mill prices are firm and resale transactions slowly gain strength. Industrial demand for tubing is steady, including alloys, on which deliveries are more extended. Cast pipe purchases reflect seasonal influences.

Birmingham, Ala. — Pipe plants are holding generally to the five-day week. An accumulation of miscellaneous orders is responsible for the steady production.

Steel Pipe Placed

Unstated tonnage, 180 18-foot lengths, 20-inch i.d. dredge discharge pipe, United States engineer, St. Louis, to Treadwell Construction Co., Midland, Pa., $30,960, bids Feb. 11, inv. 89.

Steel Pipe Pending

210 tons, 24-inch Arlington, Mass.

Cast Pipe Placed

200 tons, 8 and 10-inch, for Pendleton, Oreg., to Pacific Cast Iron Pipe Co., Provo, Utah.

100 tons, 4 and 6-inch for Pullman Wash., to Marckmann & Williams, Seattle, for Central Foundry Co., New York.

Cast Pipe Pending

380 tons, 12 and 16-inch, for Seattle; Hugh G. Purcell, Seattle, low.

300 tons, Marine Drive improvement, Bremerton, Wash.; L. Coluccia, Seattle, general contractor.

170 tons, 4 to 10-inch and fittings, for Waterville, Wash.; bids to John Thomas, clerk, March 17.

Rails, Cars

Track Material Prices, Page 111

Domestic freight car awards of 5508 units in February compare with 15,169 in January, which was the largest total since October, 1939, when 19,634 cars were placed. The total for the first two months is 20,677, against 1507 in the corresponding period last year, 2262 in the same period of 1939 and 234 in the first two months of 1938. Further comparisons follow:

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
2 mos.	20,677	1,507	2,262	234
March		3,104	800	680
April		2,077	3,095	15
May		2,010	2,051	6,014
June		7,475	1,324	1,178
July		5,846	110	0
Aug.		7,525	2,814	182
Sept.		9,735	23,000	1,750
Oct.		12,195	19,634	2,537
Nov.		8,234	2,650	1,232
Dec.		7,181	35	2,581
Total		66,889	57,775	16,303

March has started off moderately well and with several fairly sizable lists under contemplation, it may surpass the February total. One of the largest inquiries involves 1500 cars for the Baltimore & Ohio, on which bids on 1400 were to have been opened March 4. However, the opening date has been indefinitely postponed to permit car builders more time to figure. It is expected that bids will be in the latter part of next week.

Locomotives Placed

Atchison, Topeka & Santa Fe, two 5400-horsepower freight locomotives and one 2000-horsepower diesel-electric passenger locomotive, to Electro-Motive Corp., La Grange, Ill.

Chicago, Burlington & Quincy, five 44-ton diesel-electric locomotives, to Davenport-Besler Corp., Davenport, Ia.

Chicago Great Western, four diesel-electric locomotives to Electro-Motive Corp., La Grange, Ill., and one to General Electric Co., Schenectady, N. Y.

Chicago & North Western, five 2000-horsepower diesel-electric passenger locomotives, four to Electro-Motive Corp., La Grange, Ill., one to American Locomotive Co., New York.

E. I. Du Pont de Nemours & Co. Inc., two 400-horsepower diesel-electric locomotives, to Vulcan Iron Works, Wilkes-Barre, Pa.

Lone Star Cement Corp., two 180-horsepower diesel-mechanical locomotives, to Vulcan Iron Works, Wilkes-Barre, Pa.

Navy, six 300-horsepower diesel-electric locomotives, to Vulcan Iron Works, Wilkes-Barre, Pa.

New York Shipbuilding Co., one 0-4-0 locomotive, to Vulcan Iron Works, Wilkes-Barre, Pa.

War department, 22 locomotives, comprising fifteen 20-ton gasoline-mechanical locomotives, five 35-ton diesel-electric locomotives and two 30-ton mechanical locomotives, to Davenport-Besler Corp., Davenport, Ia.

Car Orders Placed

Baltimore & Ohio, 1000 seventy-ton gondolas, 500 each to American Car & Foundry Co., New York, and Bethlehem Steel Co., Bethlehem, Pa., previously reported let to unstated builders.

Bethlehem Steel Co., fourteen 100-ton flat cars, to own shops at Johnstown, Pa., for use at those shops.

Central Railroad of New Jersey, 500 fifty-ton hopper cars, to own shops at Elizabethport, N. J.; in addition to 500 fifty-ton hopper cars, 50 cement cars and 50 cabooses, recently placed with Reading, Pa., shops of the Reading Co., an affiliated railroad.

Chesapeake & Ohio, 20 all-steel passenger coaches to American Car & Foundry Co., New York.

Norfolk & Western, 15 coaches, to Pull-

man-Standard Car Mfg. Co., Chicago.

Pere Marquette, 100 fifty-ton automobile box cars, to Ralston Steel Car Co., Columbus, O.

Pere Marquette, 400 all-steel box cars, 100 each to American Car & Foundry Co., New York; General American Transportation Corp., Chicago; Pullman-Standard Car Mfg. Co., Chicago; Greenville Steel Car Co., Greenville, Pa.

John A. Roebling's Sons Co., ten 70-ton high side gondolas, to American Car & Foundry Co., New York.

Car Orders Pending

Baltimore & Ohio, 100 caboose cars; in addition to 1400 cars recently noted as up for bids.

Chicago, Rock Island & Pacific, 25 covered gondolas.

Great Northern, 500 box cars, bids asked.

Navy, six 30-ton flat cars, with armor plate flooring, for operation at White Plains, Md.; bids March 11.

Union Pacific, 500 stock cars.

Buses Booked

Pullman-Standard Car Mfg. Co., Chicago: 35 trolley coaches, for Boston Elevated Railways, Boston.

Wire

Wire Prices, Page 111

Pittsburgh—Merchant wire demand is not as heavy as had been anticipated. Producers here are well filled up on manufacturers' wire items. In addition, virtually all merchant wire products are galvanized, and while shortage in zinc has not caused important decline in wire galvanizing operations, it has hampered this activity to a certain degree. The situation in zinc is so tight that new merchant wire business is not being encouraged by some manufacturers.

Cleveland — Wire rope, on which immediate shipments could be promised recently, has slipped to a two or three weeks delivery. Heavy demand for hawsers for the Great Lakes fleet, which will resume operations in a few weeks, is noted. Nails and plain manufacturers' wire can still be bought for second quarter, with nails sometimes to be had in 60 days.

Chicago—Orders for merchant wire products are picking up somewhat as jobbers build up stocks in anticipation of spring farm buying. Manufacturers' wire continues in strong demand and mills are operating at close to capacity.

Boston — Wire mills are sold through second quarter on some products. Incoming volume continues heavier than shipments and production, the latter being hampered in spots by limited rod supplies. Pressure for deliveries is unabated and more preferential ratings are appearing for defense contracts.

New York—Although mills in some instances are refusing galvanized tonnage and somewhat restricted by rod supplies, incoming wire volume continues heavy, ahead of shipments, with little decline in aggregate orders. Considerable business now being taken is for late second and third quarter delivery.

Birmingham, Ala.—Wire products are being turned out at close to capacity. Current bookings are not quite equal to the peak, but remain substantial.

Tin Plate

Tin Plate Prices, Page 110

Pittsburgh—Specifications on tin plate continue to flood the market, with buyers attempting to cover as far in advance as possible. Mill operations are being stepped up and the rate this week is estimated at 75 per cent, and still moving up.

Chicago—Tin plate situation is strong, with heavier tonnages being placed as canmakers prepare for a record production period, based on tremendous needs for the government for foods for army and navy forces.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 111

Cleveland—Orders are in larger aggregate than in February, which

had shown improvement over January. Moreover producers see steady improvement for several months. The Navy recently placed the largest order since the World war for bolts and nuts with a Cleveland manufacturer. Each week a greater proportion of orders is for defense.

Shapes

Structural Shape Prices, Page 110

Pittsburgh—Inquiries and orders are active, principally for defense. Backlogs show no signs of declining yet as new business is developing at a rapid pace.

Cleveland—Plain structurals can still be delivered in four months, among the promptest steel products. Awards and inquiries on fabricated have quieted considerably though much work is still being figured. Tonnage placed is running only half the volume of January.

Chicago—Last week was the third in which structural awards were extremely light. A number of projects are approaching the closing stage. Fabricators are well engaged but could use material faster than they are able to get it from mills.

Boston — Limited plain material orders for second quarter are being booked by one structural mill at 2.55c, delivered, Boston, or $3 a ton higher than the general market. Deliveries are promised in eight weeks and slightly under on some sizes. Inquiry and contracts are lower temporarily with shipbuilding extensions and private industrial plant additions furnishing most.

Philadelphia—Shape deliveries are holding their own and mills believe the worst of the shipping delays are now over with prospects for better delivery by spring or early summer. Fabricators and producers still have heavy backlogs but pending tonnage is relatively moderate. Defense projects lead the latter.

Buffalo — While inquiries have tapered from the recent peak, numerous jobs are still to be awarded soon. Fabricators have been unable to reduce backlogs and are pressing for deliveries, which are now twelve to fifteen weeks.

Seattle—Shops are mainly interested in making as prompt deliveries as possible with all facilities operating at capacity. Standard Steel Fabricating Co., Seattle, has taken 300 tons involved in various contracts including two state bridges, Seattle armory and other work.

Toronto, Ont.—Structural shapes showed some falling off during the past couple of weeks, but prospective orders are heavy. Awards for the past week mostly were in lots under 300 tons, while several contracts are pending for war construction projects which call for 1000 to 8000 tons each. Total business pending is approximately 20,000 tons.

Shape Awards Compared

	Tons
Week ended March 8	16,196
Week ended March 1	34,101
Week ended Feb. 22	23,782
This week, 1940	13.210
Weekly average, 1941	38,324
Weekly average, 1940	28,414
Weekly average, Feb.	27,743
Total to date, 1940	201,965
Total to date, 1941	383,238

Includes awards of 100 tons or more.

Shape Contracts Placed

5750 tons, curb angles, department of purchase, New York, to Phoenix Bridge Co., Phoenixville, Pa.

2100 tons, crane and shipways, Cramp Shipbuilding Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1120 tons, beam bridge, state highway department, Trinity river, Dallas, Tex., to Capitol Steel & Iron Co., Oklahoma City, Okla.

1000 tons, welding and storage building, Bath Iron Works, Bath, Me., to Bethlehem Steel Co., Bethlehem, Pa.

630 tons, power house and spillway operating bridge, Cherokee dam, Jefferson

Behind the Scenes with STEEL

No Geniuses

■ The post cards from the big quiz last week keep on coming in and no one yet has scored 100. But enough 90's have depleted our dwindling stock of two-bit stogies to have us worried. Among them is Robt. E. Schalliol of American Foundry Equipment Co. whose little woman wished him all kinds of luck but warned him in no uncertain terms he'd have to smoke it at the office if he won. Everyone who can get away with a nice big cigar at home, please raise his hand.

Hizzoner

■ In every steel company there is somewhere a man charged with the job of answering screwy requests. To him goes a constant flood of letters asking for information, samples, pictures, and all manner of *res immateria*. Some are legitimate, some the result of ignorance of the industry, and a substantial number from ordinary crackpots. One received the other day by Jones & Laughlin Steel Corp. was not from a screwball however, but from the Hon. Cornelius D. Scully, Mayor of Pittsburgh. His honor wanted a sample of iron ore, immediately and in a hurry. Without delay the J. & L. question-answering service went into action, procured a sample from the ore pile, boxed it neatly and hustled it over to the mayor. Later came the explanation—Mayor Scully had received a letter from a schoolgirl up in New England asking for the sample, and like all good politicians, he was making good.

Superman

■ And in another town near Pittsburgh not long ago one of the local high school teachers called up the mill superintendent and requestetd a sample of steel, to take its place in a display of the industrial output of the town. Not wishing to cause too much trouble, the teacher said he would come down to the mill and pick up the sample whenever it was ready. The boss told him to come ahead and when he arrived, there it stood in all its glory—an 18-foot ten-inch angle, weighing a hefty half-a-ton.

Undressed Ghosts

■ Paul Mallon really got "behind the news" the other day in his column. Wrote Mr. Mallon: *Many a Jap has been found wandering naked or dead in dark alleys and outside the city walls.* Hard to stop, these Japs.

Metal Farmers

■ Did you ever hear of a "horsetail weed?" Neither did we until the other day one of our more conversational luncheon companions started talking about "Geobotony"—a new science of metal harvesting. As we get it, gold, tin and other valuable metals show up in this horsetail weed and by burning the weed and analyzing the ash, the content of metals in the soil can be readily determined. He insists "metal farmers" are now growing whole acres of the stuff, piling it in cars, and smoking their corn cob pipes while the fire does their work, with nothing left to do but reclaim the valuable metals. Maybe so.

Well Placed

■ Names that suit the job dept. —Jim Wood is president of the Thos. E. Coale Lumber Co., Philadelphia.

From The Front

■ Private Oscar Purkey to his Ma: "The bundle containing pajammers arrived okay and I am now one of the few men in camp who don't sleep in his underclothes. You wud think the army wud issue pajammers to soldiers on account they have been part of men's night clothing for years but I guess General Grant didn't wear them so the army don't recognize 'em yet. I wish you wud pick plainer colors next time as the boys are all kidding me and asking who I think I am Looshush Beebe."

SHRDLU.

City, Tenn., Tennessee Valley authority, to American Bridge Co., Pittsburgh.

600 tons, state highway viaduct, McKeesport, Pa., to American Bridge Co., Pittsburgh.

575 tons, bridges and repairs, various locations, Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh.

450 tons, plant addition, Vanadium Corporation of America, Niagara Falls, N. Y. to Bethlehem Steel Co., Lackawanna, N. Y.

400 tons, asphalt plant, Manhattan, to Lehigh Structural Steel Co., Allentown, Pa.

395 tons, sheet piling, flood prevention, Paducah, Ky., U. S. engineers, C. E. Carson Co., Chicago, contractor, to Carnegie-Illinois Steel Corp., Chicago.

390 tons, sheet steel piling, U. S. Coast Guard, Belle Isle, Detroit, to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Dredge & Dock Co., Cleveland.

300 tons, state bridges, Seattle armory and other projects, to Standard Steel Fabricating Co., Seattle.

267 tons, highway bridge, Missouri state highway department, Rocheport, Mo., to Clinton Bridge Works, Clinton, Iowa.

260 tons, telephone building, Passaic, N. J., to Hudson Structural Iron Co., Newark.

225 tons, fuse-loading plant, Reynolds Corp., near Macon, Ga., to Lehigh Structural Steel Co., Allentown, Pa.; V. P. Loftis, Charlotte, N. C., contractor.

223 tons, state highway bridge, Warwick, Okla., to Kansas City Structural Steel Co., Kansas City, Kans.; bids Feb. 11.

200 tons, state highway bridge, Golden Ring, Md., to American Bridge Co., Pittsburgh.

193 tons, sheet steel piling, Sherwin Williams Co., Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.; Merrill-Chapman-Scott, contractors.

150 tons, hangar, Milwaukee, to Worden-Allen Co., Chicago.

150 tons, state bridge B-1 of 82-3-15, C-2, Dearborn, Mich., to American Bridge Co., Pittsburgh.

132 tons, state bridge, Royalton, Waupaca county, Wisconsin, to American Bridge Co., Pittsburgh; bids Feb. 18.

130 tons, bulkhead extension, naval air base, Quonset Point, R. I., to Phoenix Bridge Co., Phoenixville, Pa.; Merritt-Chapman & Scott and George A. Fuller Co., New York, joint contractors.

126 tons, steel piling, Santa Barbara county, California, to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, bear trap repair parts, Neville Island, Pa., army engineers, to American Bridge Co., Pittsburgh.

105 tons, bridge repairs, New York, New Haven & Hartford railroad at Boston, to Berlin Construction Co., Berlin, N. H.

100 tons, plant addition, Worthington Pump & Machinery Co., Buffalo, to Austin Co., Cleveland.

100 tons, general hospital, war department, Atlanta, Ga., to Calvert Iron Works, Atlanta; Griffin Construction Co., Atlanta, contractor.

Unstated tonnage, portable experimental steel girder bridge unit, with five center and two end sections, engineers corps, Ft. Belvoir, Va., to Stupp Bros. Bridge & Iron Co., St. Louis, $13,400.

Shape Contracts Pending

2700 tons, assembly shop, Long Beach, Calif., for government.

2600 tons, No. 3 press plant building, Midvale Co., Nicetown, Philadelphia.

1800 tons, boiler and turbine rooms, unit 18, Fisk station, Commonwealth Edison Co., Chicago.

1600 tons, Holston river bridge, Morristown-Bear Station, Tenn., Tennessee

Valley authority.

1500 tons, building, Cleveland Graphite Bronze Co., Cleveland; bids March 6.

1200 tons, runway for open-hearth cranes, Philadelphia, for navy.

1037 tons, improvement Los Angeles river channel, section 7; bids to U. S. engineer Los Angeles.

1000 tons, factory, King Machine Tool Co., Cincinnati.

950 tons, bridges, various locations, Baltimore & Ohio railroad.

925 tons, addition to Bayside station, Green Bay, Wis., Wisconsin Public Service Corp.

750 tons, two overpasses, Camp Funston, Kans., for government.

730 tons, sheet steel piling, flood control, Massillon, O.; bids March 27.

700 tons, crane runways, No. 4 drydock, Drydock Associates, Philadelphia navy yard.

675 tons, structural steel and transfer buildings, Solvay Process Co., Hopewell, Va.

625 tons, plant addition, Sterling Engine Co., Buffalo; to be rebid.

600 tons, girder spans, Loop, Pa., Baltimore & Ohio railroad.

500 tons, three buildings, National Analine & Chemical Co., Buffalo.

475 tons, sheet steel piling, dock, Standard Oil Co., Toledo, O.; Great Lakes Dredge & Dock Co., Cleveland, contractor.

450 tons, sheet metal shop annex, New York Shipbuilding Corp., Camden, N. J.

375 tons, apartment house, Arthur Weiser, New York.

375 tons, also 71 tons, reinforcing steel, grade crossing elimination, Sewaren, N. J.; Hogan-Gaul Construction Co., Red Bank, N. J., low, $209,980.63; bids Feb. 28, Trenton; bids on Raccoon Creek bridge, same date, rejected.

325 tons, manufacturing building, Air Associates Inc., Bendix, N. J.

250 tons, dried pulp warehouse building, Amalgamated Sugar Co., Nyssa, Oreg.

225 tons, building, Quaker City Chemical Co., Conshohocken, Pa.

210 tons, building, National Folding Box Co., New Haven, Conn.

200 tons, manufacturing building, King-Seeley Corp., Washtenaw county, Michigan.

175 tons, office building, Flintkote Co., East Rutherford, N. J.

150 tons, boiler plant and laundry building, Greenwich hospital, Greenwich, Conn.

140 tons, building, Torrington Mfg. Co., Torrington, Conn.

131 tons, state bridge, Porter county, Indiana; bids Feb. 25.

130 tons, channel waiers, Quonset Point, R. I., for navy.

125 tons, grade crossing elimination, Delaware, Lackawanna & Western railroad, Danforth road, Madison, N. J., also 50 tons reinforcing steel; bids March 21, state highway department, Trenton.

120 tons, enclosed retail market, Brooklyn, N. Y., for New York City.

Unstated, bombing targets; bids to Puget Sound navy yard, Wash., March 5.

Unstated, Alcoa substation, Wash.; bids to Bonneville project, Portland, March 10.

Unstated, trolley hoists and cable cars, Coulee project; bids to Denver, March 13; spec. 1481-D.

Unstated, towers, Bonneville-Oregon City power line; C. J. Montag, Portland, low for general contract.

Reinforcing

Reinforcing Bar Prices, Page 111

Pittsburgh—Available time on bar mills for production of reinforcing steel continues to dwindle. For the most part, new business is under the defense program, although some regular commercial business is developing. Most bar producers are covering jobber customers so that small lot buyers find it much easier to obtain steel.

Cleveland — Principal inquiries are for mesh for WPA work. Flood control, river straightening and home developments are also taking fair tonnages. Deliveries can be promised in three or four months.

Chicago—Despite the fact that few reinforcing jobs have been awarded here and few have come out for bidding, most sellers are busily engaged. In a few instances, suppliers are virtually out of the market, and seeking no additional tonnage with mill capacity engaged far ahead.

Boston—For three housing projects, reinforcing steel contracts for 1500 tons have been closed and a second Providence, R. I., group, about 900 tons, closes March 15. Small-lot buying for industrial plant extensions is fairly active, but bridge

and highway requirements are light.

Philadelphia—Except for 400 tons to be placed shortly for work at the Cramp shipbuilding yards pending concrete bar tonnage is confined to small lots. Awards are light but a fair tonnage is in prospect. Delayed deliveries contribute to price firmness.

Seattle—New business is developing in small tonnages, no important projects being up for figures. Mills are struggling with 90-day backlogs and are doing their best to meet demands of buyers. Mills report heavy and steady demand for merchant bars, about four times the normal tonnage being rolled.

Reinforcing Steel Awards

5000 tons, 1400 housing units, Coco Solo and Balboa, Panama, Department of Yards and Docks, Navy Department, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Leonard Construction Co., Chicago, contractor.

3400 tons, powder plant for Hercules Powder Co., Radford, Va.; divided, 1000 tons to Truscon Steel Co., Youngstown, O., 1400 tons to Carnegie-Illinois Steel Corp., Pittsburgh, 1000 tons to Concrete Steel Co., New York; through Mason & Hanger, New York.

2500 tons, naval base, Newfoundland, to Jones & Laughlin Steel Corp., Pittsburgh, through Merritt, Chapman & Scott and George A. Fuller Co., New York, joint contractors.

2000 tons, naval air base, Trinidad, British West Indies, to Bethlehem Steel Co., Bethlehem, Pa.; James Stewart Co., contractor.

1500 tons, 151 powder magazines, proving ground, war department, Savanna, Ill., E. M. Rocco, Freeport, Ill., contractor, divided between Truscon Steel Co., Youngstown, O., and Sheffield Steel Corp., Kansas City, Mo.; bids Feb. 7.

600 tons, housing project, Cambridge, Mass., to Concrete Steel Co., New York, through C. J. Maney Co., Boston.

450 tons, plant, Coca Cola Bottling Co. of Chicago, Chicago, to Bethlehem Steel Co., Bethlehem, Pa. This is addition to like tonnage for another plant, same company, also to Bethlehem as reported in STEEL, Feb. 10.

420 tons, flood prevention project, Paducah, Ky., United States engineers office, Louisville, Ky., C. E. Carson Co., Chicago, contractor, to Ceco Steel Products Corp., Chicago.

400 tons, defense housing, unit 4, Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa., through Beacon Steel Products Co.; Cauldwell-Wingate Co., contractor.

300 tons, buildings, torpedo station, Keyport, Wash., to Truscon Steel Co., Youngstown, O.; J. W. Bailey Construction Co., Seattle, contractor.

240 tons, state highway project, Wethersfield-Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; D. Arrigoni, Middletown, Conn., contractor.

213 tons, parking deck, Boston Store, Milwaukee, Siesel Construction Co., Milwaukee, contractor, to Joseph T. Ryerson & Son Inc., Chicago; bids Jan. 31.

180 tons, fuse-loading plant, Reynolds Corp., near Macon, Ga., to Virginia Steel Co., Richmond, Va.; V. P. Loftis, Charlotte, N. C., contractor.

157 tons, mesh, WPAP inv. 1 W 730, Toledo, O., airport, to Bethlehem Steel Co., Bethlehem, Pa., through O. W. Merrell Supply Co., Columbus, O.

137 tons, bureau of reclamation, invitation 329881, Tucumcary, New Mex., to Sheffield Steel Corp., Kansas City, Mo., through Capitol Steel & Iron Co., Oklahoma City, Okla.

125 tons, addition to plant of Brier Mfg. Co., Providence, R. I., to Truscon Steel Co., Youngstown, O.

100 tons, boiler house and storage, Wright Aeronautical Corp., Lockland, O,. to Pollak Steel Co., Cincinnati; F. Messer & Son, contractor.

Unstated tonnage, nine shipways, yard shops and miscellaneous structures, Todd-Bath Shipbuilding Corp., South Portland, Me., to Bancroft-Martin Rolling Mills Co., South Portland; Sanders Engineering Co., Portland, contractor.

Concrete Bars Compared

	Tons
Week ended March 8	**17,722**
Week ended March 1	**7,274**
Week ended Feb. 22	**10,325**
This week, 1940	**3,679**
Weekly average, 1941	**10,669**
Weekly average, 1940	**9,661**
Weekly average, Feb.	**9,402**
Total to date, 1940	**71,680**
Total to date, 1941	**106,689**

Includes awards of 100 tons or more.

Reinforcing Steel Pending

5000 tons, Fort Green housing project, Brooklyn, N. Y.; bids March 18.

4000 tons, naval base, Little Planentia Harbor, Newfoundland; Merritt-Chapman & Scott, contractor.

2250 tons, improvement, Los Angeles river, section 5; bids to U. S. Engineer, Los Angeles, also 49,000 square feet steel mesh reinforcement.

1000 tons, Roger Williams homes project, R. I.-1-2,744 units; bids March 15, Housing Authority, Providence, R. I.

1000 tons, airplane engine plant, Buick Motor division, General Motors Corp., Chicago; bids March 10.

730 tons, improvement Los Angeles river channel, section 7; bids to U. S. Engineer, Los Angeles; also 300 tons steel sheet piling.

721 tons, Panama Canal schedule 4881; bids March 11.

400 tons, Cramp Shipbuilding Co., Philadelphia; bids in.

400 tons, plant additions, Florsheim Shoe Co. Inc., Chicago; bids March 10.

380 tons, local protection project, Massillon, O., United States engineers office, Huntington, W. Va.

368 tons, flood control, Massillon, O.; bids March 27.

300 tons, building, United Drug Co., Chicago; A. Epstein Co., contractor.

250 tons, offices, United Air Lines Corp., Chicago.

250 tons, Longview place housing project, Decatur, Ill.; bids in. George Solitt Construction Co., Chicago, low on general contract.

190 tons, navy yard, Norfolk, Va., req. 13-1401; bids in.

180 tons, Reserve street bridge, St. Paul, Minn.

180 tons, procurement division, treasury department, Baltimore; bids in, inv. 235-3721.

139 tons, Trumbull Homes, Warren, O., Charles Shutrump & Sons Co., Youngstown, O., contractor; bids Feb. 25.

128 tons (including gates) canal structure, Deschutes, Oreg., reclamation

project; San Orino, Portland, contractor.

113 tons, mesh, WPA inv. 6 W 1050, Columbus, O. airport, Ben Tom Supply Co., Columbus.

100 tons, dormitory, University of Delaware, Newark, Del.; H. E. Baton, contractor.

Unstated, storage building plant extension, Crown-Willamette Paper Co., Camas, Wash.; J. E. Haney, manager; bids soon.

Unstated, concrete warehouse, garage and shop building, Bonneville dam; bids to U. S. engineer, Portland, March 14.

Unstated, control house, Walla Walla, Wash., for Bonneville project; Vlesko & Hannaman, Astoria, Oreg., contractor.

Unstated, state bridge, Gillam county, Oregon; Leonard & Slate, Multnomah, low.

Pig Iron

Pig Iron Prices, Page 112

Pittsburgh — Production in the Pittsburgh district during February showed slightly less than January tonnage, principally because of the fewer number of working days. With 43 stacks active, the district output in March will probably top any month thus far. Although there is some interest in prices, it is probable that no formal announcements will be made for second quarter, but current contracts will continue to be filled at the present price. It is fairly certain that none of the existing low priced contracts will continue beyond the end of this quarter. Sellers of both foundry and basic iron indicate that they will continue on the present basis, unless forced to change by factors not now visible; this last presumably applies principally to the labor situation. Coke supplies apparently are ample for the moment, although there is some talk of a tight situation in spite of increasing production.

Cleveland—With apparently sufficient supply, the main problems is equitable distribution. Sales and shipments hold to the high rate of February. It is expected that forthcoming opening of books for second quarter will be done unostentatiously and perhaps without defining prices sharply. More contracts are being written at price in effect at time of shipment.

Chicago—Pig iron shows greater tightness as demand increases and consumers press for deliveries. Foundries still are increasing melting operations as orders for castings expand. Shipments are moving freely. Little change is observed in coke demand and by-product ovens are operating at 100 per cent.

Boston—Foundry melt is near capacity with pig iron consumption maintained. Buying is light, producers refusing second quarter tonnage, and activity is confined largely to shipments against contracts. Supplies are frequently allocated and the trend tends toward more frequent small shipments to individual consumers.

New York—Most leading pig iron sellers here doubt if prices for second quarter will be named much before the end of this month, as there is disposition to await the outcome of labor negotiations in the bituminous industry. However, sellers may not be able to adhere to their present policy of refusing to accept business for second quarter much longer, although it appears true that most consumers have sufficient tonnage under contract to carry them over.

Philadelphia—Pig iron shipments are being pushed to the limit of available supplies but some consumers still are concerned over adequacy of previous commitments and seek additional tonnage. Most sellers are out of the market except for occasional small fill-in lots. No intimation is given of future prices. Foundry operations are gaining, with malleable plants particularly busy.

Buffalo—Melters are still receiving prompt shipments but pig iron producers report reserve stocks are dwindling. Books are still closed for second quarter as efforts are made to stem unwarranted forward buying.

Cincinnati—The foundry melt tends heavier and pig iron supply is tighter than two months ago, when shipments from stocks of a northern furnace were heavier than immediate needs of regular customers. An Armco furnace may be shifted to merchant iron this month but the tonnage available for the open market is debatable.

St. Louis—Aside from a tendency to grow tighter, the pig iron situation remains unchanged. Increase in melt continues, but is less marked,

as numerous mills and foundries are reaching top capacity. Blast furnaces are keeping customers regularly supplied for current requirements.

Birmingham, Ala.—Steady at capacity, except for one furnace, Ensley No. 5 of TCI being down for relining, leaving 17 furnaces active.

Toronto, Ont.—Inquiries for merchant pig iron is heavier although there is no substantial increase in deliveries by producers. Production of pig iron is down about 10 per cent, from its peak for the year, owing to blowing out of one stack at Sault Ste. Marie for repairs. General scarcity of cast scrap has created problems for melters and some have been trying to fill in with pig iron.

Scrap

Scrap Prices, Page 114

Pittsburgh—The market here is stagnant, awaiting outcome of negotiations on differentials. Until the differential question is settled, there will be little movement of scrap in this district, although there is a ready market and, in fact, some producers are worried about supplies. Blast furnace material has been active and has sold at prices reported to cover a wide range.

Cleveland—Prices are unchanged and supplies are light and decreasing. Closing of the New York Central list revealed that no long rails were offered, short rails, in two-foot lengths, bringing $26.55. Baltimore & Ohio awarded all its long rails to rerolling mills.

Chicago—Iron and steel scrap trading is light, with mills making no purchases and brokers experiencing difficulty in procuring sufficient material to fill orders. Foundry grades show considerable strength and prices on some items have advanced 50 cents to $1 a ton.

Boston — With several grades firmer, including heavy melting steel for Central Massachusetts delivery and cast for foundry consumption, some further readjustments in prices would appear likely, based on $21, Pittsburgh, for No. 1 steel. To cover orders brokers have been paying $18 and slightly better, delivered, Worcester, and are asking up to this quotation on new business. Despite better prices and fairly active demand, the more active grades are not coming out freely.

New York—Shipments of steelworks and foundry grades are limited only by available supplies, with scrap coming out less freely than expected. Most shipments are against orders, with some scattered buying. Prices are unchanged and firm for

most part. Although $23.50, Pittsburgh, was suggested recently by the defense commission as not unduly high for rails for rolling one eastern road received $25 this week. Rerollers are in short supply but the situation may be eased next month when new rail laying is undertaken.

Philadelphia—Prices tend upward, under influence of restricted supplies. Cast grades, railroad specialties and blast furnace scrap share in the latest advances. Heavy melting steel is unchanged but the consumers' market is nominal to a certain extent, as dealers are forced to cover orders at a loss. Foundry grades are particularly strong, with some melters turning to cut structurals to supplement scant supplies of short rails. Philadelphia navy yard received $19.16, f.o.b. cars, for 400 tons of No. 1 heavy melting steel.

Buffalo—Reflecting a tighter supply situation, prices on steelmaking grades of scrap rose 50 cents a ton on the basis of a sale of approximately 5000 tons to a leading melter. This carried No. 1 heavy melting steel to $21 to $21.50 a ton.

Detroit—Steadily increasing foundry activity, has accentuated demand for foundry scrap, available in only limited amounts, with the result that prices have soared, in many cases being purely nominal, although a general advance of $1.50 per ton is made in quotations. In the face of shortage of material, substitutions are being made. No. 1 heavy melting steel is being cut into shorter lengths to be sold as foundry steel, bringing about $1 a ton over the price for heavy melting. Structural steel scrap in some cases is being used instead of short rails, which bring premiums. There is widespread scrambling for foundry material. Heavy auto cast is practically nonexistent. No. 1 cupola cast brings as high as $20 a ton.

Cincinnati — Scrap supplies are tighter, increasing difficulty in meeting specifications against mill contracts. Pegged prices on rails, and the general heavy demand combine to restrict supplies normally attracted to this district.

St. Louis—Except for three or four price revisions, mainly to adjust with outside quotations, the market for iron and steel scrap remains steady. Buying activity is confined almost exclusively to covering by brokers who participated in the recent sale of heavy melting steel. Offerings are in fair volume. The movement of country scrap has declined slightly, owing partly to weather conditions.

Toronto, Ont.—Some of the pressure has come off cast scrap and the current consumers' price is between $25.00 and $25.50, net ton, delivered, Toronto. Supplies generally are scarce and several dealers still are short for contract deliveries.

Birmingham, Ala.—Scrap is moving well. While prices are unchanged this week, a highly unsettled condition is reported in the market locally.

Seattle—Cast scrap is in strong demand and although supplies are low, dealers are co-operating to serve the needs of local foundries and other buyers. Shipments to Canada have been discontinued to care for defense projects. Steel scrap is active. Stocks are fair but receipts are not large as prices are not attractive.

Warehouse

Warehouse Prices, Page 113

Cleveland — Special demand is for lighter gage sheets and 3/16-inch plates, the latter being virtually impossible to obtain. Stocks of heavy steel, such as bars and structurals, are more ample. A leading distributor reports stocks about 75 per cent of normal. Individual orders average larger tonnages generally.

Chicago — Warehouse interests feel the tight mill situation in two ways, by larger orders for steel and by inability to replace stocks promptly. Several price increases have been announced as follows: Galvanized sheets from 4.60 to 4.85 cents; bands and hoops from 3.40 to 3.60 cents.

Boston—Warehouses continue to book substantial volume, tool steels, alloys and specialties, hot-rolled products, plates, shapes and bars moving actively. Limited inventories of some distributors are limiting sales on certain items. Jobbers are frequently more concerned in securing mill shipments than in soliciting sales.

Philadelphia — Steel sales are heavy but distributors could increase sales if they accepted all available business. To prevent rapid depletion of stocks some restriction is placed on orders. Prices are strong.

Buffalo—The sustained drain on warehouse supplies has depleted some stocks and customers are forced to wait for replenishment. Forward buying is becoming more widespread. February sales gained 10 to 15 per cent over January.

Cincinnati—Warehouse demand slackened in the latter part of February, then quickly recovered and is tending upward. Sales of building materials are active.

St. Louis—Sales of most warehouses during February exceeded January. Demands are unusually varied, both as to customers and

commodities. Reflecting recent heavy shipments, stocks of some items have dwindled. There has been a brisk call for wire and wire products, much traceable to defense projects.

Seattle—Jobbing houses report heavy volume of business with car lot orders numerous. Deliveries are unsatisfactory. Plates and galvanized sheets are in best demand, the latter stimulated by an increase in the local area from 5.00c to 5.25c March 1.

Nonferrous Metal Prices

Mar.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1	12.00	12.00	12.25	51.25	50.87½	5.65	5.50	7.25	17.00	14.00	35.00
3	12.00	12.00	12.25	51.25	50.87½	5.75	5.60	7.25	17.00	14.00	35.00
4	12.00	12.00	12.25	51.25	50.87½	5.75	5.60	7.25	17.00	14.00	35.00
5	12.00	12.00	12.25	51.25	50.87½	5.75	5.60	7.25	17.00	14.00	35.00
6	12.00	12.00	12.25	51.35	50.87½	5.75	5.60	7.25	17.00	14.00	35.00
7	12.00	12.00	12.25	51.50	51.25	5.75	5.60	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high) 19.48
Copper, hot rolled 20.87
Lead, cut to jobbers 9.00
Zinc, 100 lb. base 12.50

Tubes

High yellow brass 22.23
Seamless copper 21.37

Rods

High yellow brass 15.01
Copper, hot rolled 17.37

Anodes

Copper, untrimmed 18.12

Wire

Yellow brass (high) 19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York 8.00-8.25
Cleveland 9.25-9.50
Chicago 9.12½-9.37½
St. Louis 8.37½-8.50

Heavy Copper and Wire

New York, No. 1 ..... 9.62½-9.87½
Cleveland, No. 1 ..... 10.00-10.50
Chicago, No. 1 ..... 10.25-10.50
St. Louis 9.62½-9.75

Composition Brass Turnings

New York 7.62½-7.87½

Light Copper

New York 7.62½-7.87½
Cleveland 8.50-9.00
Chicago 9.00-9.25
St. Louis 8.00-8.25

Light Brass

Cleveland 5.00-5.50
Chicago 6.12½-6.37½
St. Louis 5.00-5.25

Lead

New York 4.75-4.90
Cleveland 4.50
Chicago 4.62½-4.87½
St. Louis 4.25-4.50

Zinc

New York 6.50
Cleveland 5.00-5.50
St. Louis 4.50-4.75

Aluminum

Mis., cast, Cleveland 14.00
Borings, Cleveland 8.50
Clips, soft, Cleveland 16.50
Misc. cast, St. Louis 13.25

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l 13.25
Standard No. 12 aluminum (nom.) .. 19.50

Nonferrous Metals

New York, March 7. — Demand for nonferrous metals remains well above current output. Reflecting this condition of demand in excess of supply, scrap zinc, aluminum and nickel continue to sell for more than new metal. Scrap lead and scrap tin are the only major metals to sell at their usual relationship below virgin metal prices. Nonferrous metal prices remained firm to strong, with advances noted in tin and lead during the past week.

Copper: Sellers continue to allocate tonnage at 12.00c, Valley. Smelters are getting 12.50c. January shipments of both foreign and domestic refined copper to consumers set a new record of 124,000 tons. The previous record was recorded in October, 1940. New copper production in January was only 93,500 tons. It is estimated that February shipments were well above January, which would indicate that producers' stocks of 116,500 Jan. 31, were cut drastically once more.

Lead: Practically all lead sellers have been forced to allocate available tonnage among customers. Sellers ended the week with heavier unfilled backlogs. Earlier in the week American Smelting & Refining Co. advanced the price of lead 10 points to 5.75c, New York, and 5.60c, East St. Louis. Domestic refineries are producing 15,500 tons per week, and imports of refined lead average an estimated 1500 tons per week. Actual consumption per week seems to be averaging 16,000 to 17,000 per week.

Zinc: Despite continued tightness in the domestic market, a moderate volume of business is transacted each day, with prime western holding firm at 7.25c, St. Louis. At the close of February, zinc stocks reached a new all time low point, according to the American Zinc Institute Inc., New York. Zinc production and shipments during February were below the January volume.

Tin: On Thursday and Friday of last week tin prices advanced, with futures also advancing on Friday. Both consumers and dealers participated in the improved buying. This revival in domestic buying, following W. A. Harriman's, Chief of the materials division, OPM, statement in which he condemned rising tin prices, has been gradual.

Stockholders of Copperweld Steel Co., Glassport, Pa., have been asked to vote on increasing the company's authorized indebtedness from $3,000,000 to $5,000,000. Vote will be taken at a special meeting of stockholders following the annual meeting, April 30, at Glassport.

Equipment

Seattle—All lines are active, demand for automotive road construction and maintenance items being particularly strong. United States engineer has shipped to Yakutat, Alaska, a stiff-leg derrick through Star Machinery Co., Seattle, for American Hoist & Derrick Co. Seattle has called bids March 14 for three 3000-kva transformers. Bonneville project, March 8, for six centrifugal pumps, and March 25 for 140 outdoor bus insulators. Denver will open bids March 21 for 2300-volt motor equipment for Shirley and Terry pumping plants, Buffalo Rapids project, Mont.

Steel in Europe

Foreign Steel Prices, Page 113

London—(*By Cable*)—Steel production, concentrated on war contracts, continues intense in Great Britain. This leaves a negligible ordinary commercial tonnage and restricted export tonnage. Works are well supplied with materials and are booked far into second quarter, with backlogs increasing. Tin plate trade is facing difficulties concerned with possible closing of smaller works.

Shipbuilding May Take Million Tons Steel

New York — Shipbuilding programs may require 1,000,000 tons of steel over the next year or more if pending work all materializes. Orders for about 550,000 tons of plates, shapes and bars are being distributed for 200 government cargo ships awarded earlier in the year. Contracts call for completion in 14 months, with initial specifications to be released this month. An option on 100 more of the same type is pending, requiring 275,000 tons of steel. An option for 60 additional ships for the British government, to be built in this country, is also pending, which would take 180,000 tons of rolled steel.

Ferroalloys

Ferroalloy Prices, Page 112

New York—While price announcement on the principal ferroalloys for second quarter has already been delayed, definite action is believed sure to take place before the middle of this month. The general expectation is that there will be no change in most major products. Meanwhile, ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

Coke Oven By-Products

Coke By-Product Prices, Page 111

New York—Coke oven by-product prices are unchanged and firm, strong demand absorbing most current heavy production. Supplies of toluol are short, the lacquer trade accounting for most shipments. Explosives are taking some, but plants now under construction are expected to get into production about the same time new powder plants are finished. Xylol and other distillates are less tight, but all production is being moved. Demand for phenol by the industrial trade is brisk and shipments for plastics are heavy and mounting. Jobber buying of naphthalene for household needs is at peak, and, with industrial requirements maintained, there is no surplus. Contract shipments of sulphate of ammonia to the fertilizer trade are steady with some spot buying.

"Maintain Advertising" Marketers Advised

(*Concluded from Page 25*)

get them all tomorrow. How about ten in June, five in July, and five in August? Will that turn the trick? If the salesman sits down

with the customer and studies production schedules, the result will often be a machine tool delivery schedule that meets the customer's needs and is at the same time within the limits of possibility as far as the machine tool builder is concerned.

"In fact, in these hectic days, the customer sometimes actually wants to buy more machine tools than he actually needs! An example of that occurred in our experience only a short time ago. A customer wanted 17 lathes, right away. Well, to ask for 17 lathes tomorrow is like asking for the moon in a basket. We said to our salesman, 'Go into that plant, study their production needs and schedules, and make an analysis of what they actually require, just as you would have made back in the old days when orders were hard to get.' Our salesman did so, and found that this company really needed not 17 machines, but ten. And on the basis of ten lathes, a satisfactory delivery schedule was arrived at. Here is a first-class example of what a salesman can do when a plant is sold out to beyond capacity.

"The machine tool industry has a rather broad conception of the function of the salesman. He does far more than simply sell machines. He comes pretty close to being a production engineer and a service man. He should be able to step into a customer's plant, size up a job to be done, figure out the best way of doing it, and if need be, put on a pair of overalls and give the boys in the shop a few first-class pointers in really fine machine tool operation.

"And certainly in these days, when we cannot deliver machines as fast as customers want them, the least we can do is to give them every help and consideration. This is a simple investment in goodwill and in human contacts which will inevitably be repaid a thousand times over."

Construction and Enterprise

Ohio

AKRON, O.—Flexlock Corp. is being organized to manufacture a pipe coupling device for use in construction work and industrial plants and plans construction of a manufacturing plant for its production. J. M. W. Chamberlain, an officer of U. S. Stoneware Co., Brimfield road, Akron, O., is one of the organizers.

AKRON, O.—Akron Bronze & Aluminum Co., H. A. Ehmann, president, plans erection of an addition for cleaning room and pattern storage.

CINCINNATI—National Marking Machine Co., 4026 Cherry street, will build a two-story office and factory building 80 x 100 feet, to cost about $48,000.

CLEVELAND—Ohio Forge & Machine Corp., 3010 Woodhill road, Sherman C. Dalby, president, is building a storage addition.

CLEVELAND — Timmerman Products Inc., 2038 Fulton road, is building a monitor addition 40 x 44 feet.

CLEVELAND — Wellman Bronze & Aluminum Co., 6017 Superior avenue, will build new machine shop addition 38 x 64 x 115 feet at 1265 East Sixtieth street to which machine shop equipment will be removed.

CLEVELAND—Cleveland Tractor Co., Euclid avenue and East 193rd street, will build addition costing about $12,000, to increase capacity for defense work.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 122 and Reinforcing Bars Pending on page 124 in this issue.

Sam W. Emerson Co., 1836 Euclid avenue, has general contract.

CLEVELAND—Champion Machine & Forging Co., 3695 East Seventy-eighth street, has engaged McGeorge-Hargett, engineers, 9400 Quincy avenue, to make survey of expansion requirements and plant addition probably will be built.

ELYRIA, O.—General Rivet & Machine Co., a division of Milford Rivet & Machine Co., Buckeye street, will lease building to be erected by Alex Altfeld, 324 Fourth street, one story 40 x 250 feet. Bids on building will be taken by Milo S. Holdstein, architect, Hickox building, Cleveland.

GALION, O.—Galion Metallic Vault Co. will let contract soon for a one-story 70 x 160-foot plant addition costing about $40,000. Althouse & Jones, Mansfield, O., are engineers.

HAMILTON, O.—Estate Stove Co., L. L. Kahn, treasurer, South Ninth street, will build a one-story 70 x 350-foot warehouse to cost about $70,000.

MANSFIELD, O.—Dominion Electrical Mfg. Co. will take bids in 30 to 60 days for a plant addition costing about $40,000.

ORRVILLE, O.—Orrville Bronze & Aluminum Co., Central court, M. R. Sonnanstine, superintendent, is building an addition 40 x 85 feet for use as bronze foundry, releasing present bronze foundry for additional aluminum casting space.

Massachusetts

GARDNER, MASS.—Florence Stove Co., Gardner, has let general contract for design and erection to Austin Co., 19 Rector street, New York, for a one-story 150 x 200-foot manufacturing building to cost about $50,000.

PITTSFIELD, MASS.—General Electric Co., L. E. Underwood, manager, Morningside street, will let contract soon for a laboratory unit to cost about $40,000.

WORCESTER, MASS.—Rice, Barton & Fales, 65 Tainter street, is considering sketches for a foundry addition to cost about $50,000.

Vermont

SPRINGFIELD, VT.—Bryant Chucking Grinder Co., 257 Clinton street, will build a one-story 140 x 160-foot machine tool plant costing about $250,000. Austin Co., 19 Rector street, New York, is contractor. (Noted Jan. 20.)

New York

ELMIRA, N. Y. — Elmira Aviation Ground School, A. Kerlin, superintendent, is expanding its machine shop at cost of $60,000.

MECHANICSVILLE, N. Y.—Department of public works will take bids soon for a garbage and rubbish incinerator to cost about $25,000. Whitman, Requardt & Smith, 11 North Pearl street,

Albany, N. Y., are engineers.

NORTH TONAWANDA, N. Y.—Buffalo Bolt Co., East avenue, plans construction of a crane runway to cost about $100,000.

TONAWANDA, N. Y.—Linde Air Products Co., 1811 Broadway, Tonawanda, will build plant additions costing $500,000 to $1,000,000.

WELLSVILLE, N. Y.—Worthington Pump & Machinery Corp. is having plans prepared for plant additions costing about $100,000.

New Jersey

ROSELLE, N. J.—Watson Stillman Co., Aldene road, has let contract for two end additions to its hydraulic machinery manufacturing plant, each one story, 60 x 90 feet, to Wigton-Abbott Corp., 1225 South avenue, Plainfield, N. J.

Pennsylvania

MARTINSBURG, PA.—REA has allotted funds to Valley rural electric cooperative, John Denton, manager, for 732 miles of rural transmission lines to serve 2674 customers in three counties.

Michigan

BENTON HARBOR, MICH.—Benton Harbor Industries has let general contract to M. W. Stock Construction Co., St. Joseph, Mich., for an addition to its gray iron foundry. (Noted Jan. 20.)

DETROIT—Revere Copper & Brass Inc., West Jefferson avenue, has let general contract to Barton-Malow Co., Detroit, for $39,000 plant addition. Johnck & Ehmann, Chicago, are architects.

DETROIT—Salem Metallurgical Co., 1442 Majestic building, has been incorporated with 10,000 shares no par value, to deal in metals, by M. L. Printz, 615 East Greendale avenue.

DETROIT—Tripaloy Inc., 2164 Penobscot building, has been incorporated with $160,000 capital to deal in copper alloys, by P. R. Bierer, 5200 West Chicago boulevard.

DETROIT—S. & S. Tool & Mfg. Co., 1548 Porter street, has been incorporated with $40,000 capital to manufacture tools, dies and machinery, by A. R. Riese, 1043 Clark street, Birmingham, Mich.

DETROIT—Clifford Sheet Metal Supply Co., 7634 Oakland avenue, has been incorporated with $5000 capital to deal in fabricating materials, by Oscar Adelman, 928 Penobscot building.

DETROIT—Newman Equipment Co., 1548 Franklin avenue, has been incorporated with $10,000 capital to deal in electrical machinery, by Morton H. Newman, 622 Engelwood avenue.

HILLSDALE, MICH.—Allied Products Co., W. Smith, manager, plans erection of a one-story 100 x 150-foot building for manufacture of metal products, to cost about $150,000.

KALAMAZOO, MICH.—Hoover Tool & Machine Co. has given general contract to Miller-Davis Co. for new plant on Palmer avenue.

MONROE, MICH.—Monroe Tool Mfg. Co. has been incorporated with $15,000 capital to manufacture sheet metal stampings, by Erick W. Bergman, 2006 North Dixie highway, Route 4.

SAGINAW, MICH.—Wickes Bros. have plans by Frantz & Spence, Saginaw, for a one-story 79 x 190-foot machine shop addition costing about $75,000.

Illinois

CHICAGO—Gits Bros. Mfg. Co., 1846 South Kilbourn avenue, manufacturer of oil cups, oil seals and other lubricating devices, is considering plans for plant expansion.

CHICAGO—Peerless Tool & Engineering Co., 4431 West Division street, tool and die manufacturer, has bought site at Haddon street and Kilbourn avenue and will build plant and office building 122 x 150 feet, at total cost of $200,000. Factory will be windowless.

CHICAGO—Simpson Electric Co., 5216 West Kinzie street, is building two-story addition covering 8000 square feet, costing about $20,000. Company manufactures electrical indicating instruments and radio testing equipment.

CHICAGO—Elkay Mfg. Co., 4704 West Arthington street, manufacturer of sheet metal products, including stainless steel sinks is adding about 3000 square feet of manufacturing space, increasing facilities about 15 per cent.

LEWISTON, ILL.—Spoon river electric co-operative, L. C. Groat, superintendent, has given contract to Donovan Contracting Co., St. Paul, at $182,132 for 230 miles of rural transmission lines to serve 429 customers.

NEWTON, ILL.—REA has allotted $105,000 to Norris electric co-operative, Merle D. Yost, superintendent, for 910 miles of rural transmission line to serve 3380 customers in nine counties.

PETERSBURG, ILL.—Menard electric co-operative, A. E. Becker, superintendent, has given contract to White Electric Co., Chicago, at $185,306 for 226 miles of rural transmission lines, serving 485 customers. Stanley Engineering Co., Muscatine, Iowa, is engineer.

PRINCETON, ILL.—REA has allotted $70,000 to Illinois valley electric co-operative John H. Wolfe, superintendent, for 796 miles of rural transmission lines to serve 1936 customers in five counties.

ROCKFORD, ILL.—Gunite Foundries Corp., manufacturer of castings and brake drums, will build foundry on Peoples avenue, costing about $200,000, including equipment, to manufacture machine tool castings. (See March 3.)

Indiana

LOGANSPORT, IND.—Logansport Radiator Co., James Digan, president, has bought the plant of the Mutti Foundry Co. Inc., Bremen, Ind. Equipment will be removed to Logansport and used in production of brass, aluminum and other nonferrous castings.

TELL CITY, IND.—Southern Indiana rural electric co-operative has given contract to C. A. Hooper Co., Madison, Wis., at $189,857 for 412 miles of rural transmission lines to serve 1379 customers.

Alabama

BIRMINGHAM, ALA.—Southern Natural Gas Co., Watts building, has let contract to M. & M. Construction Co., Oklahoma City, Okla., for 135-mile pipe line to cost about $2,250,000.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids as follows: March 14, schedule 5614, 35 motor-driven medium-duty lathes for Sewalls Point, Va.; schedule 5615, four motor-driven oscillating vertical sanders for Boston and Philadelphia; schedule 5618, motor-driven rotary shear for Norfolk, Va.; schedule 5622, motor-driven beam straightening hydraulic press for Norfolk, Va.; March 18, schedule 5611, four brake lining grinding or burnishing machines; schedule 5652, hoisting and rotating airplane crane machinery and spare parts for Brooklyn, Philadelphia and Norfolk, Va.; schedule 5665, 16 steel propeller shafts for Portsmouth, N. H., and Mare Island, Calif.

Missouri

ST. LOUIS—McQuay-Norris Mfg. Co., ordnance division, 2320 Marconi avenue, has been given a contract by the war department for construction, equipment and management of a $4,461,186 plant to manufacture armor-piercing cores for small arms ammunition. Plant will adjoin that of Western Cartridge Co.

ST. LOUIS—Marlo Coil Co., 6135 Manchester avenue, has let a contract for plant addition to A. H. Haesler Building & Contracting Co., 2346 Palm street, one

story 40 x 140 feet. (Noted Feb. 24.)

Wisconsin

ARCADIA, WIS. — William Mason, highway commissioner, Trempealeau county, will take bids soon for one-story county highway maintenance shop and garage, 80 x 140 feet. Volkman & Gohn, Eau Claire, Wis., are architects.

BELOIT, WIS.—Charles H. Besley & Co., manufacturer of disc grinders, taps, abrasive discs, etc., is building a one-story plant addition. W. Fred Dolke, Merchandise Mart, Chicago, is architect.

KENOSHA, WIS.—American Brass Co. will build plant for manufacture of ammunition brass cups, to cost about $4,750,000, including equipment.

MARINETTE, WIS.—Marinette & Menominee Box Co. will build a one-story addition 40 x 100 feet. Hubert & Gjelsteen, Menominee, Mich., are architects.

MILWAUKEE — Stampings Inc. has been incorporated to manufacture pressed steel products by William C. Burkard, Valentine W. Danielson and C. T. Stelzl.

MILWAUKEE—Falk Corp., manufacturer of gears, speed reducers and other metal products, has given general contract to Klug & Smith, Milwaukee, for one and two-story machine shop addition 100 x 150 feet, addition to welding shop 30 x 55 feet and storage shed addition 120 x 180 feet.

MILWAUKEE — Cunningham-Goggin Co., 610 West Michigan street, has been organized to deal in industrial and construction machinery and equipment, by John D. Cunningham and James L. Goggin.

MILWAUKEE—Allen-Bradley Co., 1326 South Second street, manufacturer of electrical control devices, has given contract to Selzer-Ornst Construction Co. for addition 90 x 126 feet, to cost about $60,000.

MILWAUKEE — Milwaukee Foundry Equipment Co. has given general contract to Edward Steigerwald & Sons for construction of a one-story plant addition 30 x 129 feet. Carl Liebert, 720 North Jefferson street, is architect.

MILWAUKEE—Fleming Mfg. Co., has been incorporated to manufacture water drains, grease traps and similar products, by H. J. Bendinger, Bernard J. Hankin and John H. Schlosser.

MILWAUKEE—L. J. Mueller Furnace Co., manufacturer of heating equipment, has given general contract to H. Schmitt & Son for two one-story plant additions, 26 x 83 and 21 x 107 feet. Grassold & Johnson, 734 North Jefferson street, are architects.

WEST ALLIS, WIS.—Wehr Steel Co., manufacturer of castings, has given general contract to Klug & Smith for one-story pattern shop 25 x 90 feet.

WEST ALLIS, WIS.—Allis Automatic Screw Products Co. has been incorporated to manufacture metal specialties, by Val Melloning.

WEST MILWAUKEE, WIS.—Supreme Metal Treating Co. has given general contract to Ray Stadler Construction Co., Wauwatosa, Wis., for a one-story plant 50 x 90 feet. Milton C. Herrmann is architect.

Minnesota

HUTCHINSON, MINN.—City light and power commission, Fred W. Putney, secretary, will open bids March 12 for an addition to municipal light and power plant 68 x 73 feet to house additional equipment. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, is engineer.

Texas

TEXARKANA, TEX.—W. S. Dickey Clay Mfg. Co., New York Life building, Kansas City, Mo., will rebuild its burned plant here, at cost of about $250,000.

Kansas

WHITEWATER, KANS.—Plans have been prepared by Paulette & Wilson, engineers, 1006 Kansas avenue, Topeka, Kans., for a waterworks and distribution system costing about $140,000.

Iowa

DELHI, IOWA—Bond issue for municipal light and power plant has been approved. Roy H. Smith is town clerk. A. S. Harrington, Baum building, Omaha, Nebr., is engineer.

SUMNER, IOWA—City, W. Weeskirch, mayor, has given contract to Welden Bros. Construction Co., Iowa Falls, Iowa, for complete sewage disposal plant and appurtenances. E. E. Schenk, 214 Waterloo building, Waterloo, Iowa, is consulting engineer.

VINTON, IOWA—City Council, F. J. Lynch, city clerk, opens bids March 28 for improvements and equipment for municipal light and power plant. Stanley Engineering Co., Muscatine, Iowa, is engineer.

California

LOS ANGELES—Martin Tool & Die Works, 1302 East Slauson avenue, has been established by Philip B. Martin.

LOS ANGELES — California Metal Enameling Co., 2151 East Fifty-first street, will build a new plant structure at cost of about $5500.

LYNWOOD, CALIF.—Grayson Heat Control Co., 3000 Imperial highway, will build a plant addition 39 x 72 feet, costing about $8000.

SAN DIEGO, CALIF.—Building permit has been issued for construction of concrete pier and transit shed at the foot of E street for the United States navy, 200 x 1000 feet, costing about $1,530,000.

SAN DIEGO, CALIF.—Ryan Aeronautical Co., 2930 Pacific avenue, will build a paint shop 80 x 115 feet, costing about $24,000.

SANTA MONICA, CALIF.—Douglas Aircraft Co. Inc., 3000 Ocean Park boulevard, will build an assembly building costing about $60,000.

Washington

SEATTLE—Amick Sheet Metal Works, 501 Alaskan Way, will build an addition 77 x 180 feet, costing about $15,000. General contract to Lovell Construction Co.

WALLA WALLA, WASH.—Walla Walla Machine & Foundry Co., 217 Paulsen building, has been incorporated with $75,000 capital by Graham Boyd, W. B. Bartlett and James Stafford.

WAPATO, WASH.—Vacuum Seal Co., East Third street, has been incorporated with $50,000 capital to manufacture and deal in machinery, motors and similar products, by John Irven and associates.

Canada

NEW TORONTO, ONT.—Pilbrico Jointless Firebrick Ltd., Edward M. Wilson, manager, 868 Lake Shore road, is having plans prepared for a plant addition to cost about $50,000, with equipment.

OTTAWA, ONT.—F. C. Askwith, secretary, commission of works, will build workshop costing $100,000 to replace one destroyed by fire last month. New equipment will be bought.

TORONTO, ONT. — William & J. G. Greey Ltd., 56 Esplanade, is building a machine shop costing about $50,000, with equipment.

HALIFAX, N. S.—Department of defense, Ottawa, Ont., through national harbors board has given general contract to Dominion Bridge Co. Ltd., Lachine, Que., for floating dry dock here, to cost about $2,750,000.

AMOS, QUE. — Municipal council is having plans prepared by M. H. Dineen, consulting engineer, for a waterworks plant costing about $200,000.

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Carbon	.70-.85
Mn.	.60-.80
Sul.	.055 Max.
Phos.	.045 Max.
Sil.	.30 Max.

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Shears, Gull. 2" Sq. & 4" Sq. B.D.
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Shear, Plate, 90"x1" Morgan, 22" Gap.
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GEAR PLANERS, 54" Gleason, bevel, M.D. (2)
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ALSO

2 or 3 traveling cranes to fit in above buildings, 7½ to 15 tons capacity. D. C. motors, cage operation.

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1—Caterpillar tread crane, gasoline or diesel, 40 to 50 ft. boom. To handle 2 yard, 2 line grab bucket.

1—30 to 40 ton gasoline or diesel locomotive.

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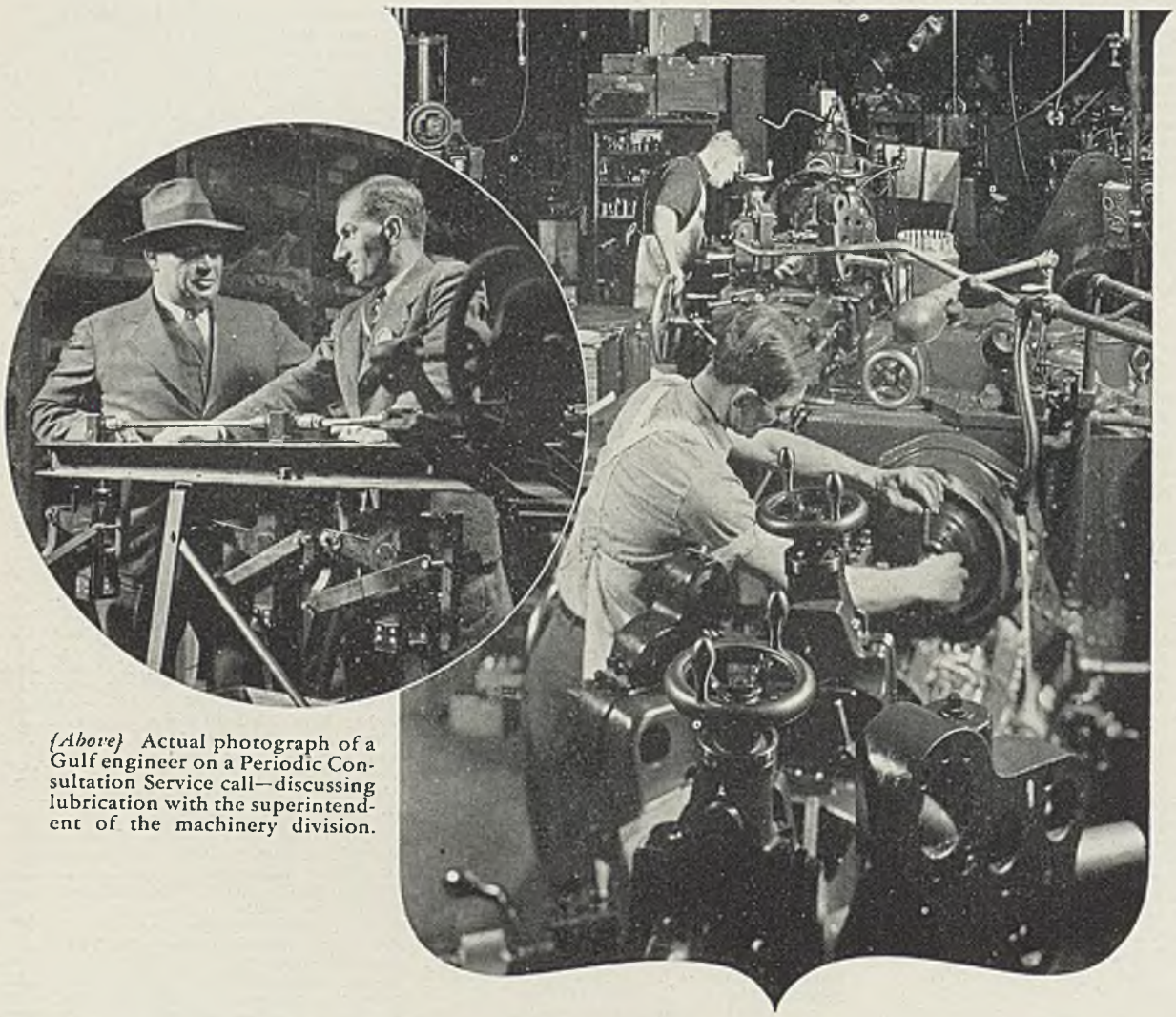

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