STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 7 **February 17, 1941**

PRODUCTION • PROCESSING • DISTRIBUTION • USE

MONEY-SAVING IDEAS

for EQUIPMENT BUILDERS

Two periodicals mailed FREE on request, cite actual cases

NICKEL STEEL TOPICS—This twelve page illustrated, miniature newspaper is published every second month and is devoted exclusively to Nickel alloy steels. Each issue is packed with illustrated technical and news articles dealing with the production, treatment and uses of these steels in rolled, forged and cast forms. Special features such as a question and answer page and pertinent editorials on technical subjects involving the uses of Nickel alloy steels are included in every issue.

NICKEL CAST IRON NEWS—This publication is a 12 page, illustrated newspaper-type periodical devoted to technical and news articles featuring the production of Nickel cast irons. Editorials and a question and answer section on these materials are special features in each issue. "Nickel Cast Iron News" alternates on a monthly basis with "Nickel Steel Topics".

NICKEL STEELS • CAST IRONS

AVAILABLE ON REQUEST—More Than 75 Publications Covering Various Industrial Fields, Applications and Production Procedures.

Permanently valuable for reference purposes are a large group of publications applying to various industrial applications and production procedures involving the uses of Nickel alloy steels, Nickel cast irons or Nickel containing non-ferrous materials. The titles of these publications with a brief description of their respective contents are set forth in a special catalogue, available on request. For your copy, simply return the coupon below.

The factual, informative material appearing in "Nickel Steel Topics" and "Nickel Cast Iron News" is of considerable practical value as evidenced by the fact that over 100,000 engineers, metallurgists and production men are now regularly reading these publications. You may read them too, at no cost or obligation. Simply mail the coupon at right.

I'D LIKE TO KEEP UP WITH THE NEWS

The International Nickel Company, Inc., 67 Wall St., New York, N. Y.

Gentlemen: Without cost or obligation, please send me the publications checked:

Nickel Steel Topics ☐ Nickel Cast Iron News ☐ List of Current Publications ☐

*Name*_____

S-2-17-41

*Address*_____

*City*_____ *State*_____

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

HIGHLIGHTING THIS ISSUE OF STEEL

■ RATIONING the supply of steel is a big job —but the steel industry continues to demonstrate the ability to do it. No instances are known where production lines have been shut down for lack of steel. Some companies have declared a temporary truce (p. 105) on orders from branch sales offices. In some cases members of branch sales staffs have been called to home offices to expedite the enormous task of entering orders. Informed opinion is that, for a variety of reasons, pressure to obtain steel should be somewhat less acute by the time spring starts to give way to summer. . . . Last week steel output (p. 25) dropped ½ point to 96½ per cent of ingot capacity. Reason: Labor trouble.

• • •

Manufacturers in industrial communities all over the country now are co-operating in an industrial census of the nation, to the end that the armament drive may be intensified by bringing primary contractors and potential subcontractors together. STEEL (p. 44) describes the methods by which an outstanding job along these lines has been approached at York, Pa. . . . Smoother army and navy procurement is expected to result from a new arrangement agreed upon in Washington (p. 24) last week. . . . OPM has ordered magnesium producers (p. 24) to allocate their product to defense industries. . . . New aluminum producing plants, using low-grade bauxite are to be located (p. 40) in Alabama and Arkansas.

Subcontractors At York, Pa.

• • •

Because technical and other manpower cannot be spared the International Acetylene association (p. 43) has called off its annual convention. . . Substitution of plastics for metals (p. 24) will be considered at a meeting Feb. 21; the automobile industry (p. 37) is planning to use substitute materials. . . Preformed steel siding is being used (p. 43) in army housing projects. . . Airplane speeds up to 1000 miles an hour (p. 42) now are believed possible. . . Direct reduction of low-grade ore to nodular iron is accomplished (p. 41) in a new type electric furnace. . . Freight car shortage is expected (p. 22) next autumn. . . For suggesting a better way to do the job General Electric Co. (p. 27) paid its men $77,477 during 1940.

Airplane Speeds, 1000 Miles

• • •

A patent issued to Charles H. Herty Jr. (p. 83) covers a new method of making steel by the open-hearth process; it is said to produce cleaner steel in faster time with less consumption of added materials. . . . Patents have been granted to Norman E. Goss (p. 80) on a new method for continuous casting of metals, both ferrous and nonferrous. . . . In this week's article in the series on the manufacture of high-explosive shells, Prof. Arthur F. Macconochie (p. 58) discusses shell forming by rolling. . . . A new system of rustproofing steel (p. 103) has been developed. . . . New type of armor plate (p. 88) is announced. . . . The new Buick axle plant (p. 65) has 35 separate conveyor systems.

New Type of Armor Plate

• • •

John P. Walstead (p. 76) describes a machinability test for cast iron; it eliminates variables which often make machinability test results inaccurate. . . . Hanford Eckman (p. 84) details an improved technique for welding chromium-molybdenum steel. . . . New plastic adhesives (p. 88) produce strong metal-to-metal bonds. . . . Duplicator control cuts time (p. 90) in milling screw-machine cams. . . . J. W. Halley (p. 92) discusses a 25 per cent strength increase in copper-bearing, high-tensile steels obtained by precipitation hardening. . . . J. P. Dovel (p. 89) tells how increased output of pig iron is obtained by revamping old blast furnaces with modern equipment, as replaceable inwall lining.

New Plastic Adhesives

More than 40 Years of Research —in Every Pound of Inland Steel

THE Inland Steel Company has always anticipated the exacting requirements of the metal working industry by producing finer, more uniform steel. For over 40 years, Inland research has been directed at this objective.

When Inland started its first mill, in 1893, every then known scientific method was applied to making its products. At first, research centered on making better harrow teeth, plow beams, merchant bars, etc. As the years have passed, Inland not only has added greatly to its physical plant, but also has greatly expanded research and metallurgical facilities.

Inland research has given industry such valuable steel mill products as: high-strength, low alloy Hi-Steel; lead-bearing, fast machining Ledloy; finer cold reduced tin plate; etc. Inland was among the first to offer the superior quality of sheets and strip made by continuous mills. Inland research has pioneered many steel processing methods and control devices by which steel of finer quality and greater uniformity are made.

Today, every pound of Inland Uniform Quality Steel has back of it over 40 years of intensive research.

SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATES · STRUCTURALS
PILING · RAILS · TRACK ACCESSORIES · REINFORCING BARS

INLAND STEEL CO.

"Industry Facing Severest Test"

In Labor Relations Under Defense Economy

How to hire, train and satisfy workers studied by American Management association . . . "Labor stealing" condemned as unpatriotic . . . Personnel managers warned expanding activity will bring labor disputes, demands for higher wages and other concessions . . . Aircraft and shipbuilding industries to require additional 500,000 skilled men

By E. F. ROSS

Chicago Editor, STEEL

CHICAGO

■ HOW to keep the wheels of industry running smoothly during the defense program, and how to put men to work, train them, and keep them at work, were among subjects discussed at the American Management association's annual personnel conference at the Palmer House, Chicago, Feb. 12-14. Some 1800 business leaders attended the meeting which was geared to the theme "Industrial Relations in a Defense Economy."

In keynoting conference sessions, Harold F. North, industrial relations manager, Swift & Co., Chicago, and vice president of the association's personnel division, declared that "American industry is facing the severest test it has yet been called upon to meet." Political, social and economic changes have greatly increased both the number and variety of pressures in employment situations.

A year ago, ten million people were unemployed. For those who wanted work and were unable to find it, expanded production schedules will provide employment, but for those who lost their urge and ambition to work, a means must be found to arouse their sense of personal pride and desire to accept normal responsibilities again, the speaker said. These, and those of younger ages who have never had employment, must be taught to work with others. "This means establishment of a far-reaching training program for development of technical and professional skills."

Labor stealing also was considered by Mr. North as a possible problem of the near future. Obviously, productive capacity of factories cannot be increased if employers enlarge their working forces by stealing labor away from each other. There is a great and dangerous shortage of skilled labor and this is a job to be done on an enormous scale.

Organizing intensive job instruction was a subject discussed by Michael J. Kane, training consultant, advisory commission to the council of national defense, Washington. Emphasizing the size of this job, he pointed out the aircraft industry will need 225,000 new workers by August and the shipbuilding industry will require 174,000 by the end of 1941 and a total of 261,500 by November, 1942.

"Both these industries face a tremendous problem in obtaining workers who can acquire the necessary skill," Mr. Kane said. "This problem must be met in part by 'upgrading and by adaptation of existing skills within the industry. However, the major part of the labor force will have to be recruited from the outside. In most cases, new workers will require careful selection and extensive training before they can be utilized effectively in shipbuilding."

Continuing, he stated that each plant should take stock of talent and experience of its employes and make internal adjustments before employing new men. Some sources from which to draw prospective workers will have to be uncovered. Some training will have to be provided outside the industry and some inside. Included in the latter is: (1) developing production workers through intensive instruction and job progression; (2) apprentice training; and (3) developing supervisors.

R. B. Hersey, assistant professor of industry, University of Pennsylvania, Philadelphia, described a good procedure in selecting and training supervisors, the key to which is to stress the goal—improvement of every individual supervisor by individual analysis and atten-

tion. The co-ordinated methods of individualized training include mental and physical examination, careful merit rating, formal training and the prognostic interview.

Analyzing labor trends, Leo Wolman, professor of economics, faculty of political science, Columbia university, New York, said that the forces which will determine these trends in the next several years are: (1) expanding industrial activity, (2) government labor policy, and (3) the objectives and strategy of organized labor. These factors, he declared, may be expected to multiply the occasions for labor disputes, push standards of wages and working conditions to much higher levels than at present, and vastly increase the power and influence of the trade union movement.

Government Won't Interfere

In the path of this movement, the government is not likely to interpose formidable obstacles, Dr. Wolman said. "Ever since it took office in 1933, the present administration has looked with kindly eye on large public spending, high wage rates and strong organization of labor. For seven years these measures failed to increase employment, reduce unemployment, and raise the nation's income in anything like the amounts hoped for. Now that the program of defense production seems to be doing just what the administration wanted to have done ever since 1933, it is not to be expected that the government will seriously try to interfere with any of the labor trends now gathering force in this country.

"These advances which organized labor is now demanding cannot be won without friction and possibility of strikes," Dr. Wolman concluded. "As the area of organizing activity and union demands widens, which it may be expected to do from now on, the occasions for differences of opinion, intransigent attitudes, and, hence, stoppages are bound to multiply. Some of these stoppages may well be converted into more or less prolonged strikes. This can be avoided in only two ways—first, by the work of a special public agency capable of settling most disputes through the force of public opinion, or, second, by giving the unions the concessions they expect to get."

Leaves Steel Cocoon

■ **Hull of a 20-ton navy patrol bomber is lifted from its steel fixture at the Glenn L. Martin Co. plant, Baltimore. It will receive its beaching gear, and roll toward successive steps of completion toward an enormous door at the rear of the assembly room. When wings finally are attached the bomber will be trundled down a concrete ramp to Middle river and from there flown to the Norfolk, Va., base. Martin is delivering these bombers at a rate of more than one a week**

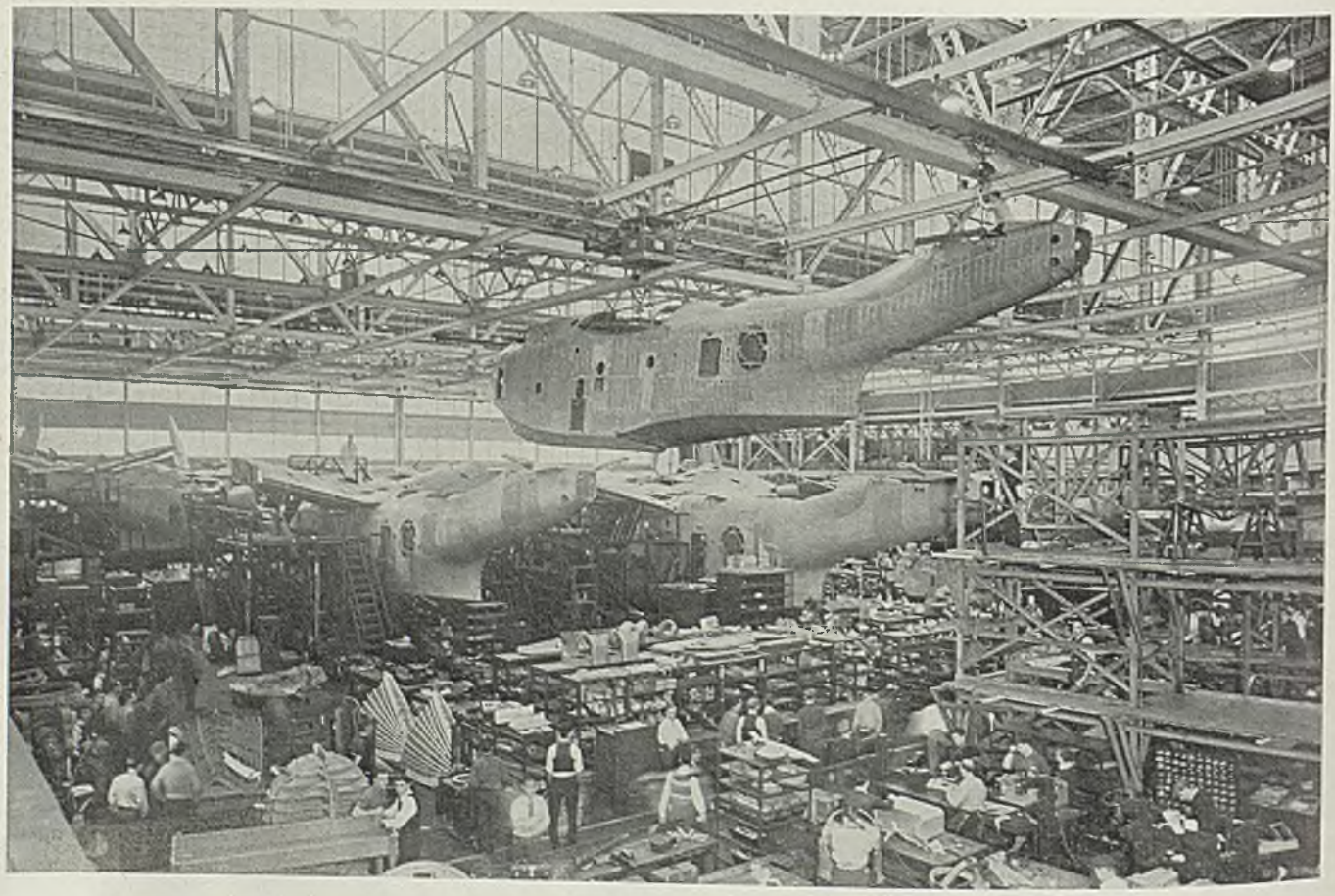
"Tight Situation" in Freight Cars Foreseen

■ Possibility that a tight situation in supplying railroad freight cars this coming autumn as well as the fall of 1942 was foreseen in Washinton last week. This assertion was expressed by W. Averill Harriman, chief of the materials branch, division of production, office of production management, in a speech prepared for delivery before the thirty-fifth annual dinner of the Traffic Club of Washington.

It was the first official admission by a rail official that a tight situation might develop. Discussing the adequacy of freight car equipment, Mr. Harriman declared that "I am sure the railroads cannot guarantee that there will not be a tight situation in the autumn of 1941 or the autumn of 1942."

Solution of the problem, according to Mr. Harriman, who is chairman of the board of the Union Pacific, is to seek co-operation of shippers, including government and the railroads in keeping the peak movement low by spreading shipments as much as possible throughout the year or during less active periods.

Business men as far as practicable, he continued, should make shipments and build up inventories in such a way as not to overtax transportation during the peak period, namely mid-September to mid-November.



U. S. Steel Orders Eight Cargo Ships Under Maritime Commission's Program

■ UNITED STATES Steel Corp. has placed orders for eight new cargo vessels to cost approximately $2,800,000 each, or a total of about $22,400,000.

Isthmian Steamship Co., a subsidiary, has entered into a contract with the United States maritime commission for purchasing, under the construction differential subsidy provisions of the merchant marine act of 1936, eight C-3 type, steam-driven turbine ships. They will have a sustained speed of 16½ knots and vessels are scheduled for delivery during first six months of 1942.

Four are now being fabricated in the yards of the Seattle-Tacoma Shipbuilding Corp., Seattle, and four in yards of the Western Pipe & Steel Co., San Francisco.

The C-3 ships, largest and fastest cargo vessels built under the maritime commission's program, are about 9300 gross tons, with a cargo capacity of approximately 10,000 tons. Plans for construction have been approved by the navy department as being suitable for national defense purposes.

The Isthmian company plans an important role in national defense, carrying cargoes of strategic materials from the Far East to American ports. These include tin, crude rubber, tungsten ore, manganese ore, antimony and quinine.

The company operates 65 ships, the largest fleet of seagoing vessels under the American flag. Eventually it will place the eight new boats in its regular round-the-world service.

The speed of the new vessels will make possible the maintenance of a fortnightly schedule of round-the-world sailings. The present vessels of the company require about 150 days for the normal round-the-world voyage, allowing time for loading and discharge cargo. The new ships are expected to reduce this to a maximum of 112 days.

The war has made it necessary to rearrange for the present the regular round-the-world lane and service is currently via the Panama canal to the Philippine islands and from there to Hong Kong, Shanghai, Haiphong, Saigon, Java, Straits Settlements, Sumatra and then back via the Panama canal.

The Isthmian company also operates service to India, a service to the intercoastal trade and another service from Pacific coast ports to the United Kingdom which have been temporarily suspended in compliance with the neutrality act.

Pittsburgh Steamship Co., U. S. Steel's lake transportation subsidiary, is building two new ore carriers this year, the first new Great Lakes freighters since 1937 when Pittsburgh Steamship launched four 600-foot vessels.

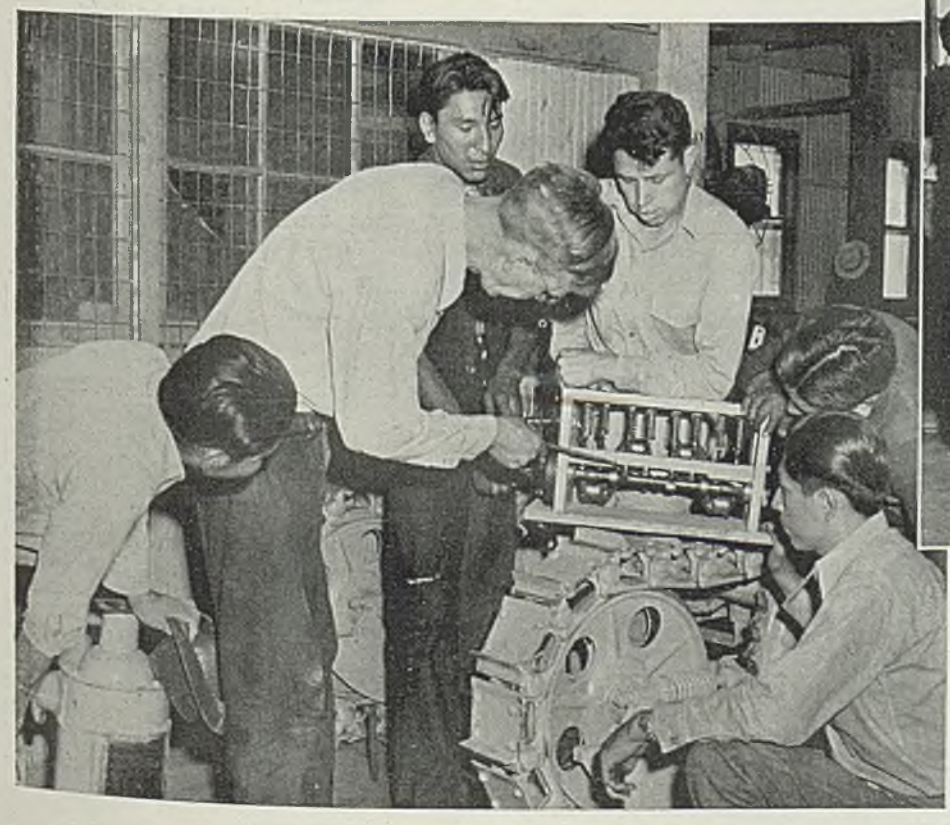
Army Increases Facilities At Shell Loading Plant

■ War department has awarded a contract for $1,934,000 for additional plant and equipment facilities, and for $4,471,060 for increased operations of the ammunition loading plant near Ravenna, O., to be constructed and operated by the Atlas Powder Co., Wilmington, Del.

Additions bring to $16,789,000 the total cost of construction and to $30,891,060 the total for operating costs.

■ Atchison, Topeka & Santa Fe railroad directors last week presented an operating miniature railroad exhibit, costing more than $100,000, to the Museum of Science and Industry, Chicago.

Arizona Indians Study Machinery Operations



■ Specialized training in theory and operation of mechanized equipment offered students at the Phoenix Indian school, Phoenix, Ariz., has been enthusiastically received. Students are shown studying a diesel tractor demonstrated by an instructor, left; and at work on a diesel motor, right. U. S. Indian Service photo

Priorities Division Acts To Conserve Aluminum, Magnesium for Defense

WASHINGTON

■ THREE steps designed to conserve aluminum and magnesium for defense industries have been inaugurated by the priorities division, office of production management. All three will involve some diminution in the supply of these metals for nondefense purposes. They are:

1. The priorities division has urgently requested producers of magnesium to allocate all their stocks to defense industries for the present. Defense needs for magnesium have been given complete preferential status over nondefense orders for the next 90 days.

2. Airplane companies have been asked to co-operate by saving scrap aluminum for return to the original source of supply.

3. Industrial users of aluminum in the nondefense field are being urged to give immediate attention to the use of substitutes, including plastics, because of the impact of a defense program which may make it impossible for them to furnish the general public with the usual supply of aluminum implements.

A plastics industry committee will meet here Feb. 21 with military officials to discuss the promotion of plastics as a substitute for metals in aircraft, refrigerators, washing machines and similar equipment.

In a letter to magnesium producers ordering complete preferential treatment of defense need, E. R. Stettinius Jr., priorities director, said:

"In view of the unprecedented demand for magnesium required by the cumulative defense needs for utilization of this metal, it is the opinion of the priorities division, based on recommendation of the aluminum and magnesium priority committee, that the supply for the immediate future at least should be exclusively allocated to defense needs.

Effective for 90 Days

"In consideration of the circumstances of the case, I hereby direct all manufacturers and fabricators to supply manufacturers of defense articles and equipment for the next 90 days, exclusive of all other demands, excepting those articles now in process, suspension of the manufacture of which would result in needless loss if not carried to completion.

"This direction for preferential consideration of defense projects should be considered as becoming operative immediately upon receipt of this communication. In case of special difficulties imposed by this ruling, where these involve minimum amounts of magnesium, reference of the decision involved may be made to Dr. E. M. Hopkins, minerals and metals priority executive."

Reach Agreement on Defense Purchasing Procedure

Donald Nelson, purchasing director, office of production management, and army and navy officials last week agreed on a defense materials purchasing procedure which is expected to end disputes over responsibility and authority.

The army and navy officials will continue to execute contracts as in the past and will fix specifications and delivery dates.

Mr. Nelson will review procurement procedures, specifications, and policies, and on highly technical items will make recommendations to facilitate efficient procurement.

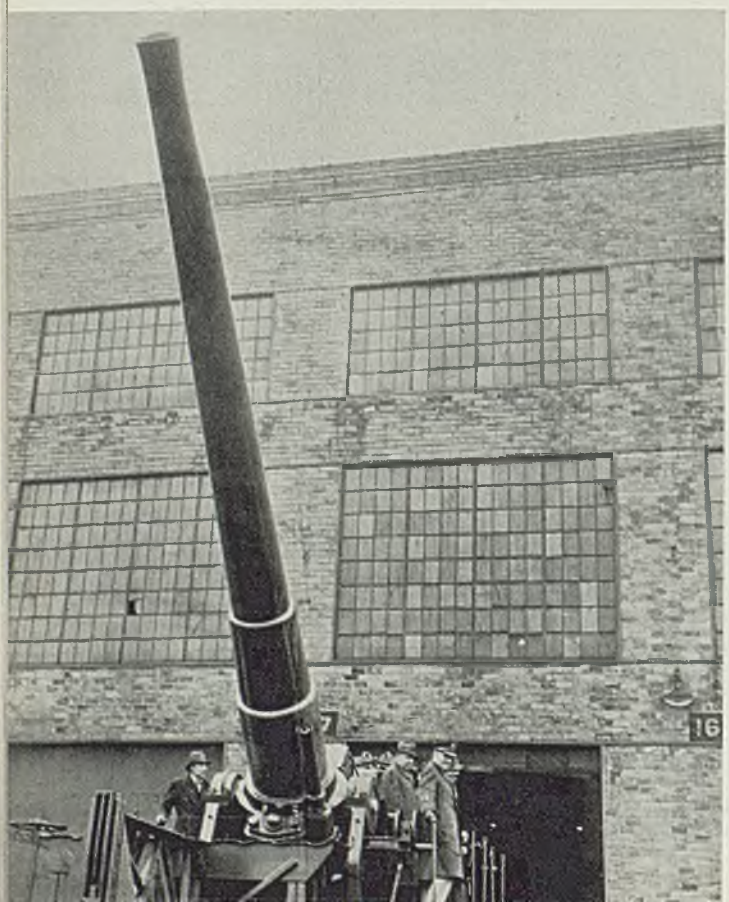
Contracts for $500,000 or more will be submitted to Mr. Nelson for clearance before the awards are made. Mr. Nelson will have authority to review procurement proposals he considers likely to have substantial impact on the market.

Capacity Ample To Meet Past Simultaneous Peaks

■ If the peak annual domestic demand ever recorded for each of the 17 principal classes of steel products had been experienced in the same year, the steel industry could have taken care of this demand by using only four-fifths of its present capacity, according to the American Iron and Steel institute.

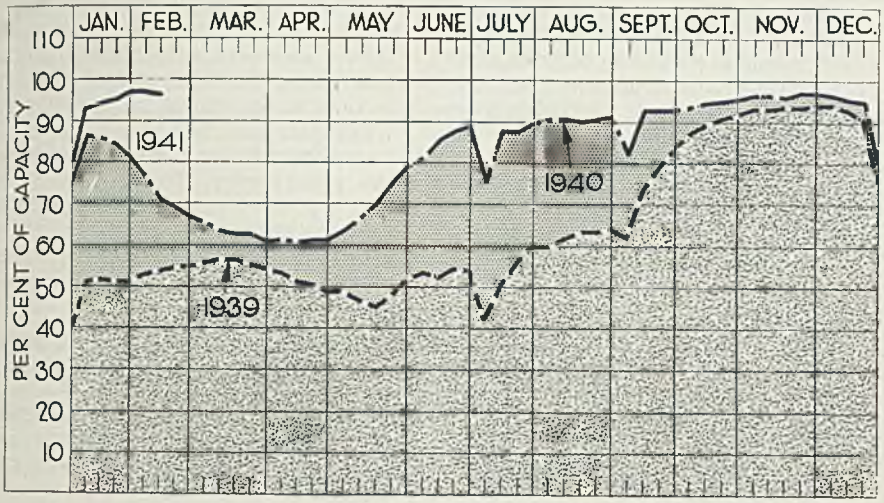
Actually, the records show, the 17 principal classes of steel products reached their individual peaks in nine different years scattered between 1906 and 1940. Not more than three products met their peak demand in any one year, indicating that records for steel production have rarely been established in more than a few different products at the same time.

If the peak output of all 17 products had occurred in the same year, total hot-rolled steel production in such a year would have been 55,010,000 net tons. After eliminating 5,563,000 tons, representing the exports of each class of products in the peak year of production, the net amount accounted for by domestic demand would have been 49,447,000 tons. This quantity of hot-rolled steel would have been produced from 68,299,000 net tons of steel ingots, since the yield of hot-rolled products from ingots would have ranged between 56 and 84 per cent, depending upon the product. This compares with present capacity of approximately 84,000,000 net tons of steel ingots.



Army Gets New Railroad Gun

■ First 8-inch railroad gun built for the United States army since 1918 was delivered Feb. 7 by Baldwin Locomotive Works, Eddystone, Pa. The 225,000-pound weapon can hurl a 260-pound shell 18 miles. Overall length of gun and mount is 49 feet 6 inches, and width of carriage is 10 feet 2 inches. NEA photo



PRODUCTION . . . . Down Half-Point

■ STEELWORKS operations last week declined ½-point to 96½ per cent, mainly the result of labor difficulties at Youngstown, O. Two districts advanced, three declined and seven were unchanged. A year ago the rate was 69 per cent; two years ago it was 55 per cent.

Youngstown, O.—Operations dropped 5 points to 90 per cent as the result of a walkout of SWOC committee members at Youngstown Sheet & Tube Co.'s Brier Hill open-hearth plant, Wednesday, causing suspension of 11 open hearths. This leaves 64 open hearths and three bessemers active. More than 1000 in the open-hearth division of Youngstown Metal Products Co., a subsidiary, are out in dispute over grievances. Before the walkout 75 open hearths were in operation.

Detroit—Down 4 points to 92 per cent, with 24 of 26 open hearths in production. One idle furnace is scheduled to be active this week.

Chicago—Gained 1½ points to 99½ per cent, highest since Jan. 11 when it touched 100. Five of six plants are at capacity or better.

St. Louis—Unchanged at 93 per cent, with 25 open hearths active.

New England—Advanced 8 points to 100 per cent, all open hearths being in production.

Birmingham, Ala.—Held at 100 per cent for seventh consecutive week.

Pittsburgh—Despite various shifts the rate remained 96½ per cent for the third consecutive week.

Wheeling—One hundred per cent for the fifth week.

Central eastern seaboard—Sustained at 96 per cent. Pencoyd plant of Carnegie-Illinois Steel Corp. started three open hearths.

Buffalo—While production continued at 90½ per cent, a furnace under repair will be lighted this week, which may give a higher rate.

Cincinnati—Continued at 95 per cent.

Cleveland—Slight changes in active equipment caused a loss of ½-point to 84 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 15	Change	Same week 1940	Same week 1939
Pittsburgh	96.5	None	66	47
Chicago	99.5	+ 1.5	68.5	52.5
Eastern Pa. ...	96	None	68	37
Youngstown ...	90	— 5	43	45
Wheeling	100	None	86	66
Cleveland	84	— 0.5	66.5	56.5
Buffalo	90.5	None	70	35
Birmingham ..	100	None	90	83
New England..	100	+ 8	63	70
Cincinnati	95	None	61	55
St. Louis	93	None	68	55
Detroit	92	— 4	92	89
Average	96.5	— 0.5	69	55

Steel Ingot Statistics

	Estimated Production—All Companies								Calculated weekly production, all companies Net tons	Number of weeks in month
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity		
Based on Reports by Companies which in 1939 made 98.26% of the Open Hearth, 100% of the Bessemer and 34.39% of the Electric Ingot and Steel for Castings.										
1941										
Jan. ...	6,282,713	99.2	451,637	76.0	208,734	95.0	6,943,084	97.1	1,567,288	4.43
Based on Reports by Companies which in 1939 made 98.06% of the Open Hearth, 100% of the Bessemer and 78.15% of the Electric Ingot and Steel for Castings.										
1940										
Jan. ...	5,371,390	86.0	285,714	56.1	111,625	70.0	5,768,729	83.4	1,302,196	4.43
Feb. ...	4,219,991	72.3	205,527	43.2	101,623	68.2	4,527,141	70.0	1,093,512	4.14
Mar. ..	4,090,224	65.5	191,559	37.6	108,307	67.9	4,390,090	63.5	990,991	4.43
1st Quar.	13,681,605	74.6	682,800	45.7	321,555	68.7	14,685,960	72.4	1,129,689	13.00
April ..	3,818,656	63.1	176,335	35.8	105,731	68.4	4,100,722	61.2	955,879	4.29
May ...	4,596,561	73.6	258,709	50.8	111,763	70.1	4,967,033	71.8	1,121,226	4.43
June ..	5,236,691	86.6	305,115	61.9	117,919	76.3	5,659,725	84.5	1,319,283	4.29
2nd Quar.	13,651,908	74.4	740,159	49.5	335,413	71.6	14,727,480	72.5	1,132,012	13.01
1st half	27,333,513	74.5	1,422,959	47.6	656,968	70.1	29,413,440	72.4	1,130,851	26.01
July ...	5,284,406	84.8	322,567	63.5	120,512	75.7	5,727,485	83.0	1,295,811	4.42
Aug. ...	5,686,755	91.0	369,770	72.6	130,761	82.0	6,187,286	89.5	1,396,679	4.43
Sept. ...	5,550,642	92.0	365,289	74.2	141,010	91.5	6,056,941	90.7	1,415,173	4.28
3rd Quar.	16,521,803	89.2	1,057,626	70.1	392,283	83.0	17,971,712	87.7	1,368,752	13.13
9 mos...	43,855,316	79.5	2,480,585	55.1	1,049,251	74.4	47,385,152	77.6	1,210,658	39.14
Oct. ...	6,076,701	97.3	408,317	80.2	158,957	99.6	6,643,975	96.1	1,499,769	4.43
Nov. ...	5,888,547	97.3	420,448	85.3	161,248	104.4	6,470,243	96.6	1,508,215	4.29
Dec. ...	5,924,325	95.1	399,434	78.6	170,090	106.9	6,493,849	94.1	1,469,197	4.42
4th Quar.	17,889,573	96.5	1,228,199	81.3	490,295	103.6	19,608,067	95.6	1,492,243	13.14
Total ..	61,744,889	83.8	3,708,784	61.7	1,539,546	81.8	66,993,219	82.1	1,281,431	52.28

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity for 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons. Bessemer 6,996,520 net tons, electric 2,586,320 net tons.

January Ingot Output At New All-Time Record

■ January steel production established a new high record at 6,943,084 net tons of open-hearth, bessemer and electric steel ingots and castings, the American Iron and Steel institute reports. The January report is the first monthly statement of the institute to include steel produced in electric furnaces and steel for castings produced by any process. Monthly reports since January, 1927, covered only open-hearth and bessemer steel ingot production but monthly data have been revised to correspond with reports now being issued. Revised figures for previous years will be found on page 35.

January production was 7 per cent greater than the comparable December output of 6,493,849 net tons and 20 per cent above output in January, 1940, which was 5,768,729 tons. October, 1940, was the previous peak month, when 6,643,975 tons was produced.

FINANCIAL

Republic Steel Files $90,000,000 Refinancing Program Securities

■ REPUBLIC Steel Corp., Cleveland, last week filed with the securities and exchange commission a registration statement covering $90,000,000 of new securities to enable the company to carry through a broad refinancing program. New securities registered consist of $65,000,000 in 20-year first mortgage sinking fund bonds and $25,000,000 in 15-year convertible sinking fund debentures. Coupons, redemption prices and offering prices will be reported later.

Proceeds of the new securities, together with proceeds derived from a $16,500,000 one to seven year serial loan arranged with Republic's banks, are to be used primarily to retire all the corporation's funded debt. This comprises $62,510,000 in 4½ per cent general mortgage bonds series B and C; $13,868,000 in 5½ per cent first mortgage bonds; $6,258,000 Gulf States Steel 4½ per cent first mortgage bonds; and $15,000,000 in 1¾ per cent serial notes. Total required to retire these securities, exclusive of accrued interest, is about $100,000,000.

Refinancing will reduce Republic's mortgage debt from approximately $82,500,000 to $65,000,000. New mortgage debt will be about 25 per cent of the present gross carrying value less depreciation and depletion of the property, plant and equipment of the corporation and its consolidated subsidiaries.

Annual sinking funds beginning in 1941 for both bonds and debentures are provided. About 40 per cent of each issue will be retired by maturity.

Contingent sinking fund, beginning in 1942 and annually thereafter, is also provided. It is based on earnings and computed as follows: 5 per cent of the first $5,000,000 of net earnings of the preceding year; 10 per cent of the next $5,000,000 of net earnings; and 15 per cent of all net earnings in excess of $10,000,000.

T. M. Girdler, chairman, declared the new financing would greatly simplify the corporation's debt structure.

Allegheny Ludlum's 1940 Net Profit $3,722,107, Taxes $2,773,429

Allegheny Ludlum Steel Corp., Brackenridge, Pa., in a preliminary statement reported net profit in 1940 was $3,722,107 after provision for depreciation, depletion, federal and state income taxes and the excess profits tax. This was equal, after dividend requirements on the corporation's 7 per cent preferred stock, to $2.78 per share on common. Net profit in 1939 was $2,093,518 or $1.48 per share on the common after preferred dividend requirements.

Fourth quarter net profit last year aggregated $1,591,954 after all charges and federal income taxes but before the excess profits tax. This compared with net income of $1,411,423 in last quarter of 1939.

Federal and state income taxes in 1940 totaled $1,673,682, the corporation reported. Excess profits tax provision was $1,099,747, for a total of $2,773,429 paid in taxes last year against $616,386 in 1939.

$1,425,214 Net Profit Earned by Woodward Iron Co. in 1940

Woodward Iron Co., Woodward, Ala., reports net profit earned in 1940 totaled $1,425,214 after charges and federal income and excess profits taxes. This was equal to $4.27 per share on the company's outstanding capital stock. Net income in 1939 was $631,177 or $2.25 per capital share.

Crucible Fourth Quarter Profit Larger Than in Entire Year 1939

Crucible Steel Co. of America, New York, earned $6,230,180 net income after depreciation, federal income taxes, provision for excess profits taxes and other charges in 1940. Equal to $10.24 per common share after annual dividend requirements on the company's 5 per cent cumulative convertible preferred stock, last year's profit compared with net income of $2,803,596 in 1939. Latter was equal to $2.54 per share on common after dividend requirements on the 7 per cent preferred.

Net profit in fourth quarter, 1940, was $2,859,682 after charges and federal income taxes but before excess profits taxes.

M. A. Hanna Nets $3,022,132 from Ore, Coal, Shipping Operations

M. A. Hanna Co., Cleveland, iron ore, shipping and coal operator, reports net income in 1940 was $3,022,132 after all charges and provision for federal taxes. It was equal, after dividend requirements on the company's $5 preferred stock, to $2.33 per share on common. In 1939 net income was $1,904,316 or $1.23 per share on common.

Preferred dividends paid last year aggregated $646,843. Dividends of $1.50 a share paid on common totaled $1,484,548; balance of $890,741 was added to surplus.

Alan Wood's 1940 Net Almost Double Profit in Previous Year

Alan Wood Steel Co., Conshohocken, Pa., earned $1,210,202 net profit last year. This was almost double net income of $678,921 earned in

27 Consumers' 1940 Earnings Up 75 Per Cent

■ AGGREGATE net income earned by 27 iron and steel consumers in 1940 was $65,398,983. This was an increase of nearly 75 per cent over $37,412,166 earned by the same companies in 1939. None reported a loss last year; in 1939, four companies incurred deficits. The same companies' aggregate net earnings in fourth quarter, 1940, was $17,307,850, an increase of 19 per cent over $14,531,949 in the corresponding period in 1939. None incurred a deficit in the quarter, against three who reported a loss in the period in 1939. All figures in the tabulation are net earnings, except where asterisk denotes loss:

	Fourth Quarter 1940	Fourth Quarter 1939	1940	1939
American Brake Shoe & Foundry Co., New York	$1,112,008	$794,285	$2,968,497	$2,121,173
American Steel Foundries, Chicago	863,088§	1,178,981§	2,943,534	1,368,514
Aviation Corp., New York‡	411,433	914,002*	484,288	2,238,049*
Bendix Aviation Corp., South Bend, Ind.†	2,835,321	1,398,889	9,310,074	4,485,972
Black & Decker Mfg. Co., Towson, Md.†	277,415	180,677	1,065,095	595,851
Bliss & Laughlin Inc., Harvey, Ill.	198,089§	281,046§	712,030	672,422
Byers, A. M., Co., Pittsburgh	239,278	241,757	652,689	824,605
Caterpillar Tractor Co., Peoria, Ill.	2,352,481	2,103,735	7,839,117	6,004,890
Chapman Valve Mfg. Co., Indian Orchard, Mass.	116,949§	182,876	579,229	414,341
Chicago Railway Equipment Co., Chicago	128,580§	201,461	302,969	243,680
Food Machinery Corp., San Jose, Calif.†	141,475	214,411	1,597,769§	1,223,030
General Railway Signal Co., Rochester, N. Y.	182,287	153,059	526,761	247,593
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.	112,005§	90,642§	450,000	395,725
Hoe, R., & Co. Inc., New York†	108,191	41,283*	200,087	145,278*
Monarch Machine Tool Co., Sidney, O.	382,125§	151,747§	1,183,102	529,577
Mullins Mfg. Corp., Salem, O.	34,628§	33,621§	290,023	149,213
Nash-Kelvinator Corp., Kenosha, Wis.†	87,130	22,998	1,395,008§	1,307,936*§
Noblitt-Sparks Industries Inc., Columbus, Ind.	452,259	491,736	1,105,855	1,003,744
Simonds Saw & Steel Co., Fitchburg, Mass.	451,280§	563,476	1,553,866	1,167,047
Smith, L. C., & Corona Typewriters Inc., Syracuse, N. Y.	373,925	77,530	739,630§	226,087§
Transue & Williams Steel Forging Corp., Alliance, O.	57,558§	32,567§	102,225	32,940
U. S. Hoffman Machinery Corp., New York	94,875§	11,977§	352,581	47,331
Victor Equipment Co., Cleveland	57,090§	152,200*§	173,723	128,213*
Warner & Swasey Co., Cleveland	565,507§	854,788§	3,371,283	1,864,553
Wayne Pump Co., Ft. Wayne, Ind.†	193,457	269,207	922,514	993,357
Westinghouse Air Brake Co., Wilmerding, Pa.	1,082,319	1,275,439	5,591,606	2,765,629
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.	4,402,097	4,784,555	18,985,428	13,854,365

*Loss; †fiscal year ended Sept. 30; ‡year ended Nov. 30; §indicated.

1939 and also exceeded the $1,057,639 net profit of 1937.

Preferred stockholders were paid dividends on account of accumulations totaling $7.50 per share in the year. Aggregate paid was $538,681.

Net sales in 1940 totaled $23,625,563, against $14,742,070 in the previous year. Estimated provision for state and federal income taxes and excess profits taxes was $790,000 last year, against $155,100 in 1939.

Copperweld's 1940 Profit Shows Moderate Increase at $1,140,082

Copperweld Steel Co., Glassport, Pa., reports 1940 net income was $1,140,082. Equal to $1.99 per share on common after preferred dividend requirements, this compared with net profit of $934,348 or $2.05 per common share in 1939. Common stock outstanding at the end of 1940 totaled 514,864 shares, against 431,714 Dec. 31, 1939.

Fourth quarter net profit, as computed from quarterly reports, was $341,345; it compared with computed net income of $323,799 in the period in 1939 and $277,423 in third quarter, 1940.

Continental Steel Corp.'s Net Profit $778,738 in 1940

Continental Steel Corp., Kokomo, Ind., reports net income in 1940 was $778,738 after all charges and provisions. This was equal, after preferred dividend requirements, to $3.23 per share on common, and was 35 per cent less than net profit of $1,208,200 or $5.28 per common share in the preceding year.

Net income in fourth quarter last year, after year-end adjustments, was $286,631 or $1.27 per share on common. In fourth quarter, 1939, net profit after deduction of reserves for future inventory price decline was $477,754 or $2.22 per common share.

Dividends paid in the year aggregated $7 per share on preferred and $1.50 per share on common. Taxes in 1940 were $807,000, equal to $4.02 per common share, against $791,000 or $3.94 per common share in the previous year.

$1,555,794 Net Profit Earned by Pittsburgh Steel Co. in 1940

Pittsburgh Steel Co., Pittsburgh, reports consolidated net profit after all charges and federal taxes in 1940 was $1,555,794. It was equal, after annual dividend requirements on the company's 5½ per cent prior preferred, the 5 per cent class A preferred and the 7 per cent class B preferred stocks, to $1.35 per share on common. Net income in 1939 was $564,870, and was equal to $4.18 per share on the 5 per cent class A preferred after dividend requirements on the company's 5½ per cent prior preferred.

Dividend arrearages on Pittsburgh's preferred stocks as of Dec. 31, 1940, totaled $19.25 per share on the 5½ per cent prior preferred; $17.50 per share on the 5 per cent class A preferred; and $66.50 a share on the 7 per cent class B preferred.

Interprets Company's Report by Radio

■ B. C. Heacock, right, president, Caterpillar Tractor Co., Peoria, Ill., recently employed a local radio station to interpret the company's annual report for 12,000 company employes and families. Mr. Heacock, who inaugurated this unique plan a year ago, introduced also some of his own observations on the company's progress. A copy of the report had been mailed to each employe and stockholder previously, to follow through as Mr. Heacock discussed items

Steel Corp. Shipments Near All-Time Record

■ Finished steel shipments by the United States Steel Corp. in January totaled 1,682,454 net tons, second highest for any month in the history of the Corporation, within 1 per cent of the peak month, May, 1929, when 1,701,874 tons was shipped, and the best January on record.

January shipments were 137,831 tons greater than in December, 1940, an increase of 8.8 per cent. Compared with 1,145,592 tons shipped in January, 1940, the increase is 536,862 tons, 46 per cent.

(Inter-company shipments not included)

Net Tons

	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	.....	1,009,256	747,427	522,395
March	.....	931,905	845,108	627,047
April	.....	907,904	771,752	550,551
May	.....	1,084,057	795,689	509,811
June	.....	1,209,684	807,562	524,994
July	.....	1,296,887	745,364	484,611
Aug.	.....	1,455,604	885,636	615,521
Sept.	.....	1,392,838	1,086,683	635,645
Oct.	.....	1,572,408	1,345,855	730,312
Nov.	.....	1,425,352	1,406,205	749,328
Dec.	.....	1,544,623	1,443,969	765,868
Total, by Mos.	.....	14,976,110	11,752,116	7,286,347
Adjustment	.....	.....	*44,865	†29,159
Total	.....	.....	11,707,251	7,315,506

†Increase. *Decrease.

Survey Discloses 300,000 Tons of Marooned Scrap

■ Approximately 300,000 tons of light bulky scrap, principally autobody and fender scrap, is lying dormant and rusting away in dealers' yards in 19 western states, where freight rates and minimum carload weights make shipment to consuming centers unprofitable, according to a recent survey.

The survey was made by Herman E. Krulewitch, secretary, Simon Krulewitch Inc., 1137 South Washtenaw avenue, Chicago, at the suggestion of Everett B. Michaels, treasurer, Institute of Scrap Iron and Steel Inc., and a member of its traffic control committee. The report will form a basis of a traffic report to be submitted to the national defense commission.

Questionnaires were sent to 891 dealers and automobile wreckers and 360 replies were received. These reported possession of more than 150,000 tons of light bulky scrap on hand. From this it is estimated the total available would be double that tonnage. The report itemizes the supplies, freight rates now in force and rates that would move the scrap into consumption.

■ For suggesting a better way to do the job, 11,510 General Electric employes were paid $77,477 during 1940. Suggestions were offered by 33,409 employes, an increase of 23 per cent over 1939. Of this number 11,510 were accepted.

MEN of INDUSTRY

James M. Mead

■ **JAMES M. MEAD,** formerly assistant manager, Philadelphia plant, Joseph T. Ryerson & Son Inc., Chicago, has been promoted to manager of that plant. He has been associated with Ryerson 22 years.

♦

H. W. North has resigned as consultant with Patterson Foundry & Machine Co., East Liverpool, O.

♦

Edward M. Bell, treasurer, Cleveland Tractor Co., Cleveland, has been elected a vice president. **Herbert P. Mee** also has been elected a vice president.

♦

Carl W. Coslow, formerly mechanical superintendent, Hamilton Watch Co., Lancaster, Pa., has joined Lockheed Aircraft Corp., Burbank, Calif., in an executive capacity.

♦

David C. Prince, manager, commercial engineering department, General Electric Co., Schenectady, N. Y., has been nominated for the presidency of American Institute of Electrical Engineers, New York .

♦

Dr. Vsevolod N. Krivobok has resigned as associate professor of metallurgy, Carnegie Institute of Technology, Pittsburgh, to become director of research, Lockheed Aircraft Corp., Burbank, Calif.

♦

Kenneth Ode, personnel manager, Falk Corp., Milwaukee, and associated with the corporation since 1934, has been appointed supervisor of plant maintenance. He succeeds **A. D. Rea.**

♦

James K. Fulks has been appointed factory manager of all plants of Ex-Cell-O Corp., Detroit, and **M. B. Montgomery** has been made factory superintendent, under Mr. Fulks.

♦

Robert L. deLoache has been appointed manager of the Philadelphia switchboard plant of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The past 14 years Mr. deLoache has been associated with the company's Atlanta, Ga., office.

♦

H. D. Wehrly has been named manager of the newly established marketing and organization department, Nash-Kelvinator Corp., Detroit, which will work with both the motor car and electric refrigeration divisions.

♦

S. C. Vessy, president, W. W. Sly Mfg. Co., Cleveland, recently was presented with a scroll signed individually by 40 of his closest associates, in recognition of his seventy-fifth birthday.

♦

Thomas S. Holden has been elected president, F. W. Dodge Corp., New York, succeeding the late Truman S. Morgan. Associated with the organization about 22 years, Mr. Holden has been editorial director of *Architectural Record* since 1937.

♦

F. F. Schwilk and **Earl Ginn** have been elected vice presidents, Continental Motors Corp., Detroit. Mr. Schwilk formerly was sales manager, and Mr. Ginn, assistant chief engineer in charge of the automobile engine division.

♦

Henry W. Colson has been placed in charge of the Chicago warehouse of Wolverine Tube Co., Detroit, succeeding **H. H. Chaplin,** resigned. Since his affiliation with the company about a year ago, Mr. Colson has been in charge of the office.

♦

Donald S. McKenzie has been named sales manager, plastics department, General Electric Co., with headquarters at Pittsfield, Mass. He succeeds W. H. Milton Jr., recently made assistant manager of the department. He formerly was affiliated with the Nela Park plant of General Electric at Cleveland.

♦

Walter Erman, Erman-Howell & Co. Inc., Chicago, has been appointed chairman of the committee on public relations and research, Institute of Scrap Iron and Steel Inc., Washington. Charles Dreifus Jr., Dreifus Iron & Steel Corp., New York, has been named vice chairman.

♦

Dan A. Lyons, associated with the Consolidated Steel Corp., Los Angeles, 17 years, has been elected vice president, Colby Steel & Engineering Co., Seattle, and will actively supervise production of heavy cranes and other material handling equipment.

♦

M. W. Rogers, formerly general factory manager in charge of production, Caterpillar Tractor Co., Peoria, Ill., has been elected president, Universal Unit Power Shovel Corp., Milwaukee; Potts Machine Co., Jackson, Mich., and Davies & Thompson Co., Milwaukee.

♦

Tom Towle has been placed in charge of the aeronautical engineering section, aircraft division, Hudson Motor Car Co., Detroit. A graduate of Yale, Sheffield School of Science, Mr. Towle has been identified with major producers in the aircraft industry the past 20 years, as well as operating his own company.

♦

George Sherman, formerly with the mechanical rubber goods division of U. S. Rubber Co., Detroit, has been appointed sales engineer for Wolverine Fabricating & Mfg. Co. Inc., Detroit. **Paul Curran,** formerly sales engineer, now heads the development laboratory and product control.

♦

James H. Deaderick, since 1939 assistant sales manager, western sales division, Caterpillar Tractor Co., San Leandro, Calif., has been transferred to headquarters of the company at Peoria, Ill., as assistant general parts manager. **W. B. Gordon** has been named parts manager in charge of physical inventory

Kenneth C. Plasterer

W. J. Long

Richard A. Geuder

Dr. Paul Dyer Merica

and its control; and **A. H. Yingst,** parts manager in charge of orders, invoicing, distributor contract, etc.

♦

Kenneth C. Plasterer has been appointed manager of General Motors Corp.'s forge plant, Lansing, Mich, succeeding **George Motherwell,** resigned. He formerly was chief inspector, which position he held until last July when he was assigned to special engineering work in connection with the national defense program.

♦

W. J. Long, for many years manager of sales at the Worcester, Mass., office of Universal-Cyclops Steel Corp., Bridgeville, Pa., has been named assistant general sales manager, and will make his headquarters at the Universal division, Bridgeville. He will also be in contact with activities at the Cyclops division, Titusville, Pa.

W. P. Knecht succeeds Mr. Long as manager of the Worcester branch.

Hugh E. Replogle has joined the organization in a general tool steel sales capacity, with headquarters at the Cyclops division.

♦

Harry J. Kiener, Hickman, Williams & Co. Inc., St. Louis, has been appointed chairman, chapter welfare committee, Institute of Scrap Iron and Steel Inc., Washington. Morton Cohen, General Iron & Metal Co., Minneapolis, has been named vice chairman.

♦

H. M. Wilson has been named vice president, Shenango Furnace Corp., Pittsburgh. Mr. Wilson, associated with Shenango since its organization, is also vice president and a director, Shenango-Penn Mold Co., and a director of Snyder Mining Co.

♦

Ashland Henderson, chemical engineer, and formerly metallurgist with the Frigidaire division of General Motors Corp., has been named to the technical staff of Battelle Memorial institute, Columbus, O. He has been assigned to a research investigation for development of metal surfaces resistant to wear, corrosion and chemical attack for specialized industrial uses.

♦

Richard A. Geuder has been made manager of metal industry applications, Reliance Electric & Engineering Co., Cleveland. He joined Reliance following graduation from Pennsylvania State college in 1929, and has been engaged in application engineering work since that time.

♦

Edward Coates, formerly superintendent, electrical department, Buffalo works of Republic Steel Corp., and later occupying the same position with Stewarts & Lloyds Ltd., Corby, England, has been appointed superintendent, electrical and mechanical department, Barium Stainless Steel Corp., Canton, O.

♦

L. G. Parker, president and treasurer, Cleveland Frog & Crossing Co., Cleveland, who celebrated his seventy-fifth birthday last October, relinquished his official duties at the company's annual meeting Feb. 10, but will remain a director. He had been associated with the organization 32 years.

L. E. Connelly was elected president and **F. P. Norman,** treasurer, succeeding Mr. Parker. **G. A. Peabody** was elected vice president, and **L. C. Spieth,** secretary.

♦

T. J. Naughton, heretofore identified with the Chicago office of Manning, Maxwell & Moore Inc., Bridgeport, Conn., has been transferred to Minneapolis, and will cover Minnesota, North Dakota and portions of South Dakota, Iowa and Wisconsin.

E. C. Robinet has been transferred from the company's Los Angeles office to Seattle; **J. E. Day** has been appointed representative in the Charlotte, N. C., district; **W. F. Williams** has joined the Chicago office; and **Charles Stepan,** the past several years associated with the Chicago office, has been promoted to the newly created position for handling of sales of Consolidated house heater boiler pop safety valves, house heater boiler gages, and Ashcroft hevi-duti and streamlined gages. **Joseph A. O'Connor** will assist Mr. Stepan.

♦

Dr. Paul Dyer Merica, assistant to the president, International Nickel Co., New York, last week received a platinum medal from the Council of the Institute of Metals in Great Britain in recognition of "distinguished services to nonferrous metallurgy." Dr. Merica, the third to receive the award, originated the "precipitation theory" of hardening, developed in research on aluminum alloys.

♦

H. M. Hooker was elected president, Hooker Electrochemical Co., Niagara Falls, N. Y., at a recent meeting of the board of directors. Other officers elected are: Executive vice presdent, **E. R. Bartlett;** vice president in charge of development, **R. L. Murray;** vice president and sales manager, **R. W. Hooker;** secretary and assistant treasurer, **L. A. Ward;** treasurer and assistant secretary, **J. F. Bartlett;** assistant treasurers, **W. A. Perrin** and **D. A. Riordan.**

B. Klaussen was appointed works manager, Niagara plant; **A. H. Hooker Jr.,** western sales manager, Tacoma, Wash., plant; **J. A. Flynn,** works manager, Tacoma plant; **Dunbar Meek,** purchasing agent; **H. W. Hooker Jr.,** assistant purchasing agent; **G. F. Rugar,** in charge of sales promotion, and **T. L. B. Lyster** continues as chief engineer.

DIED:

■ **EDWARD P. CONNELL,** 56, secretary-treasurer and general manager, Falk Corp., Milwaukee, Feb. 8, in that city. Mr. Connell, who joined the company in 1913, was made purchasing agent in 1917, controller in 1924, and treasurer in 1939. He was active in numerous committees of the American Gear Manufacturers association.

♦

Howard Gentine, 50, assistant superintendent, Wyckoff Drawn Steel Co., Chicago, in Chicago, Feb. 11. He had been affiliated with the company since 1928.

♦

Harry J. Copeland, 52, president and general manager, Copeland-Gibson Products Corp., Detroit, in Detroit, Feb. 11. Associated with the automobile business 27 years, he was at one time active in the Federal Motor Truck Co., and later was purchasing agent for Hudson Motor Car Co.

♦

Bert Ross Hartwell, 51, assistant secretary and treasurer, Teleweld Inc., Chicago, arc welding contractor and manufacturer of a portable brinell hardness tester, Feb. 4 in Evanston, Ill.

♦

Harry W. Frost, president and founder, Frost Railway Supply Co., Detroit, Feb. 8, in Santa Barbara, Calif.

♦

William Trefor Morgan, 45, chief metallurgist, Taylor Instrument Companies, Rochester, N. Y., in that city, recently. He was a member, American Institute of Mining and Metallurgical Engineers, Iron and Steel Institute (Great Britain), American Welding society, and was a past chairman, Rochester chapter, American Society for Metals.

♦

Ralph S. Richards, 60, for many years purchasing agent, Atlas Car & Mfg. Co., Cleveland, Feb. 6, in that city. In recent years he had been Cleveland district manager for a New York textile belting manufacturer.

♦

Philip C. De Bruyne, 56, superintendent, Moline Malleable Iron Co., St. Charles, Ill., Feb. 8, in Geneva, Ill.

♦

James M. Sampson, 63, the past 11 years engineer in charge of foundry processes and developments, General Electric Co., Schenectady, N. Y., recently at Niagara Falls, N. Y.

♦

Walter S. Railsback, president, New England Road Machinery Co., Boston, at his home in Newton, Mass., Feb. 7. A native of Indiana and attending Indiana university, he was a salesman for J. D. Adams Co., Indianapolis, before going to Boston 35 years ago to establish his own business.

♦

Edgar M. Cole, 55, traffic manager, American Cast Iron Pipe Co., Birmingham, Ala., Feb. 5, in that city. He was employed by the pipe company 23 years.

MEETINGS

Supersensitive Machine To Be Described for Engineers

■ A NEW MACHINE so sensitive as to determine the leakage of a single cubic foot of gas per square mile per year from a deep buried oil or gas field, will be described at the one hundred fifty-fourth meeting of the American Institute of Mining and Metallurgical Engineers, Engineers Society building, New York, Feb. 17-20.

More than 60 technical sessions will be held at which 300 papers will be presented. An all-institute luncheon meeting is scheduled at Hotel Commodore, Feb. 17.

Medals and awards to be presented Feb. 19 include the C. F. Rand gold medal to R. C. Stanley, chairman of the board and president, International Nickel Co. of Canada, Ltd.; the A. F. Lucas gold medal to C. and M. Schlumberger; the W. L. Saunders gold medal to H. C. Bellinger, vice president, Chile Exploration Co.; the R. W. Hunt award to A. B. Greninger and A. R. Troiana, as well as G. E. Steudel, division superintendent of blast furnace operation, South works, Carnegie-Illinois Steel Corp., Chicago. The J. E. Johnson Jr. cash prize will be awarded C. F. Hoffman, superintendent of blast furnaces, Bethlehem Steel Co., Sparrows Point, Md.

Foundrymen To Meet in Milwaukee, Feb. 20-21

Fourth annual regional foundry conference of the Wisconsin chapter, American Foundrymen's association, in co-operation with the college of engineering, University of Wisconsin, Madison, Wis., will be at the Schroeder hotel, Milwaukee, Feb. 20-21. Theme will be national defense.

Industrial Advertisers To Hold Eastern Conference

National Industrial Advertisers association is arranging an eastern regional conference in Newark, N. J., March 15, under guidance of the association's Newark chapter, the Industrial Marketers of New Jersey. Boston, New York, Philadelphia and Gettysburg chapters are expected to participate.

Advertising from the point of view of men to whom advertising is directed will be discussed by a sales manager, a comptroller, a purchasing agent, a chief engineer, a plant engineer, a distributor, a service manager and a salesman. C. S. Ching, director of industrial and public relations, United States Rubber Co., will address an afternoon session, and Merle Thorpe, publisher, *Nation's Business,* the evening meeting.

♦

Convention Calendar

Feb. 17-20—American Institute of Mining and Metallurgical Engineers. 154th meeting, Engineers building, New York. A. B. Parsons, 29 W. 39th street, New York, is secretary.

Feb. 20-21—Foundry Conference. Fourth regional meeting of Wisconsin chapter of the American Foundrymen's association and the University of Wisconsin, college of engineering, at Schroeder hotel, Milwaukee.

Feb. 27-28—American Hot Dip Galvanizing Association Inc. Annual meeting, William Penn hotel, Pittsburgh. S. J. Swensson, 903 American Bank building, Pittsburgh, is secretary.

March 3-7—American Society for Testing Materials. Committee week and regional meeting, Hotel Mayflower, Washington. C. L. Warwick, 260 S. Broad street, Philadelphia, is secretary.

March 13-14—Society of Automotive Engineers. National aeronautic meeting, Washington hotel, Washington. R. Buckley, 29 W. 39th street, New York, is secretary.

March 17-22—Oil Burner Institute. Annual meeting, Benjamin Franklin hotel, Philadelphia. G. Harvey Porter, 30 Rockefeller Plaza, New York, is managing director.

March 24-29—American Society of Tool Engineers. Fourth annual convention and machine and tool progress exposition, Convention hall, Detroit. Ford R. Lamb, room 428, Boulevard Temple building, Detroit, is executive secretary.

York Ice Machinery Plans Recapitalization

■ York Ice Machinery Corp., New Pa., last week issued a call for a special stockholders' meeting, March 25, to vote on a proposal to effect a recapitalization and change its name. Plan contemplates York Machinery merge with its subsidiary, York Corp., and adopt the latter name.

If the merger is approved, the surviving corporation will have 962,046 shares of common stock authorized and outstanding which will be issued on the basis of 15 shares for each existing share of preferred stock, and one share for each existing share of the corporation's common. This would result in distribution of 83.2 per cent of the new stock to the present preferred stockholders.

Meeting Demand for Faster Production, "Industry's Answer to Emergency"

■ "PLANT modernization offers an attractive opportunity to lighten the pressure on the labor market, to reduce costs and above all to maximize production per man-hour and man-year and make industry's contribution to defense one of the highest order" is the conclusion reached in a booklet, "Meeting the Demand for Faster Production," published by Farrel-Birmingham Co. Inc., machinery manufacturers, Ansonia, Conn.

According to the estimates of the authors, our wartime production needs, as measured in terms of man-hours of factory labor, must be revised upwards. The booklet points out that:

"Wartime production needs of even twelve billion man-hours yearly, superimposed upon domestic requirements ranging in peacetime at fifteen billion man-hours, represent a total of twenty-seven billion man-hours. The increased hours of effort represent continuous production of some five million additional men, even counting a man-year as 2400 hours. It is important to see the situation in that light; it is also useful to observe that probably not more than one-half such a number could be absorbed in manufacturing, considering both the limitations of factory floor space and the relative absence of a large supply of skilled and experienced labor. Approximate as such estimates must be, they nonetheless bring the problem into focus.

"The gradual decline in man-hours per unit of output between 1899 and 1919 and the sharp reduction between 1919 and 1931 came to an end in 1933. Since 1933 data from that source shows that no further gains have been made on the whole in reducing the labor time per unit of output; instead, the former trend has shown signs of reversing itself.

"Coincident with, if not the most important cause of that trend, is the sharp advance in the average age of production machinery. From six to eight machines out of each ten in important defense industries are over ten years of age and do not have the improvements developed in the last decade. That condition, if corrected, might provide an increased productivity per man-hour equivalent to adding not less than one billion and perhaps as much as three billion man-hours of effort to factory processes.

"The possibilities of machinery modernization are substantially enlarged, we think, when the program provides means of consciously comparing present equipment, however mechanically efficient, with new designs embodying improvements in any or all of the following respects:

"Increases in speed of operation without sacrifice of precision or other quality requirements; increases in the degree of skill transferred to mechanisms; improvements which simplify disassembly, adjustment, cleaning and resetting; improvements which diminish the hazards or arduousness of operations.

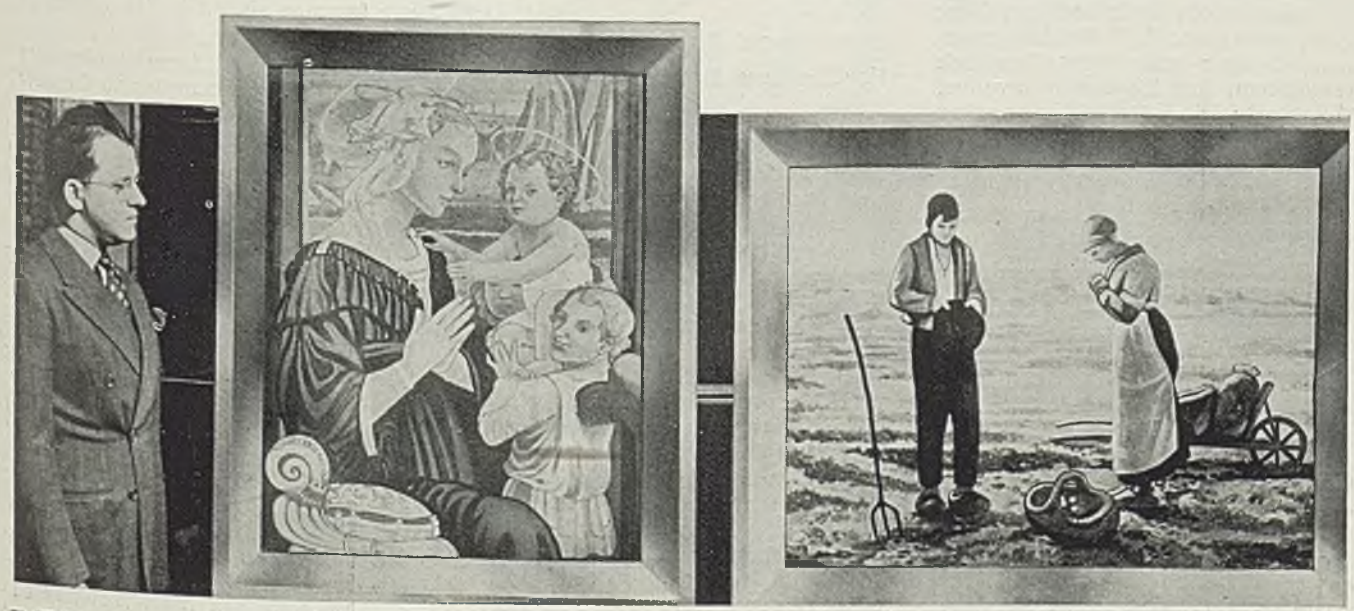
"The foregoing four broad approaches provide both a basis for a systematic program of checking and a comparison of existing equipment with the new design developed in recent years."

Tube Institute Plans Market Research Program

■ Seamless Steel Tube institute, 3510 Gulf building, Pittsburgh, will launch a program of market research and related activities March 1, under direction of W. A. Cather, now advertising manager, Babcock & Wilcox Co., New York.

Mr. Cather will operate from the institute's Pittsburgh office and from the office of the Michel-Cather organization, 2 Park avenue, New York.

Old Masters on Porcelain-Enameled Steel for Outdoor Memorial Gallery



■ Thirty-eight porcelain enamel paintings, reproductions of the finest classical and religious works of the old masters, soon will be hung in an outdoor art gallery in a 600-foot sunken garden at Sunset Memorial park, Cleveland. Pictures will be painted on steel panels in finely-ground glass colors—porcelain enamel — and fired at such high temperatures that the colors are welded into the metal's pores. Porcelain enamels for the paintings were supplied by Ferro Enamel Corp., Cleveland, and panels were fabricated and enameled by Beaver Enameling Co., Ellwood City, Pa. Artist is Daniel Boza, Cleveland, shown at left. Also depicted are two completed panels, Millet's "Angelus" and Fra Phillippo Lippi's "Madonna and Child." Two of the panels are 60 x 84 inches and 36 are 44 x 54 inches in size.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Metals Reserve Co. releasing copper and tungsten from stockpiles . . . China to send tin, antimony and tungsten to repay $50,000,000 loan . . . Steel producers and defense officials trying to expedite deliveries of structurals for defense projects . . . New appointment made to office of production management, which gradually is absorbing national defense advisory committee

WASHINGTON

■ JESSE JONES, federal loan administrator, announced last week the appointment of a committee to receive applications and make recommendations for the allocation of the Latin-American copper which the Metals Reserve Co. is making available to the market.

Committee will include: R. R. Eckert, secretary, United States Copper association, 50 Broadway, New York, chairman; T. E. Veltfort, manager, Copper and Brass Research association, 420 Lexington avenue, New York; W. J. Donald, managing director, National Electric Manufacturers association, 155 East 44th street, New York; Donald Wallace, of the advisory commission to the council of national defense; John Church, representing the office of production management.

Mr. Eckert has already mailed questionnaires to fabricators and other users of copper in order to obtain the necessary information for the committee's work.

China To Repay RFC Loan with Tin, Antimony and Tungsten

China will repay the new $50,000,000 Reconstruction Finance Corp. loan by sending this country $40,000,000 worth of tin and $10,000,000 each of antimony and tungsten, according to Federal Loan Administrator Jesse Jones.

Contracts have been signed fixing the purchase price for the metals at the 3-months average market quotation prior to deliveries, which are expected to cover several years.

Jones said an additional $10,000,000 loan will probably be made to cover the full value of the shipments, although payment may take some other form.

More than a year's supply of tin, 93,000 tons, has been purchased by RFC subsidiaries to date, Jones stated, and an equal amount is already in storage in this country.

Government To Sell Tungsten For Defense Production

Release of part of the government-held stockpile of tungsten will relieve a temporary stringency in spot supply of this metal and will assure adequate future deliveries to industry, it was announced by W. A. Harriman, chief of the materials branch, division of production, office of production management.

Authority to sell government stocks to industry was granted to the procurement division of the treasury department under executive order. Order authorizes the procurement division to sell or otherwise dispose of its tungsten stocks for defense production "to such buyers or users and in such amounts as may be requested from time to time by the office of production management."

Hillman Studies Strikes, Finds "Harmony Prevails"

Of the total working time for the entire year 1940, less than two hours per worker were lost because of strikes and this is less than one-quarter of the loss due to industrial accidents, Sidney Hillman, associate director general, office of production management, said last week in making public the results of a special study on the current status of industrial relations. The study had been made at his request by the bureau of labor statistics, department of labor.

"This figure shows beyond question that, generally, harmony prevails in employer-employe relations," Mr. Hillman declared.

Average Farm's Machinery Valued at $500 in 1940

Average dollar value of implements and machinery on the 6,096,789 farms of the United States, as shown by the 1940 census, was slightly over $500 per farm. This was a reduction of more than $20 per farm as shown by the census of 1930.

Total value of farm implements and machinery, according to the new census, was $3,059,266,327, contrasted with $3,301,654,481 ten years ago. In 1930, there were 6,288,648 farms.

In addition to topping the list of all the states in the total value of all farm property—lands and buildings—the agricultural state of Iowa also topped the list in the average value of implements and machinery per farm. It showed more than double the average for all of the 48 states.

Earlier Deliveries of Shapes For Defense Projects Sought

An effort to expedite the flow of structural steel shapes into defense construction has been inaugurated by representatives of the priorities division and major steel producers, it has been announced by E. R. Stettinius, Jr., director of priorities for the office of production management.

Representatives of the steel companies met in New York with

Samuel S. Stratton, general assistant director of the minerals and metals section of the priorities division.

The steel producers said they were already giving preferential treatment to defense orders and they agreed that an even greater effort would be made to fill defense orders first. This will be done on a voluntary and informal basis.

The major problem discussed involves the fact that a temporary tightness has developed in the delivery of structural steel shapes needed generally for defense construction, including the expansion of aircraft plants, automobile factories, military cantonments, and machine tool plants.

The situation has become particularly apparent during the past few weeks with statements from both defense and non-defense users of shapes that they are having some difficulty with deliveries.

At the New York conference, representatives of the mills, which are working at near capacity, said they expected that most defense orders for shapes would be on their books by early summer. This would indicate a tapering off of such orders after that time and an easing of the situation.

If the new effort to expedite defense deliveries is successful, officials of the priorities division believe that the imposition of formal priorities for such orders may be avoidable.

Hillman Names Eric Nicol as Administrative Assistant

Sidney Hillman, associate director general, office of production management, has announced appointment of Eric Nicol as his administrative assistant. Mr. Nicol was formerly administrative consultant to the division of administrative management in the bureau of the budget, and before serving in that position was for eight years an industrial relations and personnel adviser for various concerns in Philadelphia and elsewhere.

In his new post, Mr. Nicol is charged with the responsibility of co-ordinating activities of Mr. Hillman's office with those of others in OPM and with staff heads of various sections within the labor division of the national defense advisory commission.

Folsom Resigns as Head of Mining and Minerals Section

Resignation of Marion Folsom as head of the mining and mineral products section of the materials branch, division of production, office of production management, has been announced by W. A. Harriman, chief of the materials branch.

Mr. Folsom's place in the materials branch is being taken by G. M. Moffett, formerly director of the food products section.

Appalachian Manganese Ore Deposits To Be Explored

Two projects to explore Appalachian deposits of manganese ore, are under way by the bureau of mines.

Projects are part of the extensive exploratory program of the bureau in its efforts to determine sources of strategic minerals for the national defense.

Although the states of the Appalachian region have produced a substantial tonnage of manganese ore in the past and still contain many deposits capable of further production, the problem of exploring for additional tonnage in connection with the strategic minerals investigations has presented many difficulties. The quantity of high grade manganese usually obtainable from each individual deposit in the region after the ore has been washed or milled, is small. With rare exceptions, the production from single deposits has been only a few thousand tons. Consequently, most commercial operations have been unprofitable.

OPM Is Absorbing Defense Advisory Commission Personnel

National defense advisory commission is gradually fading out because practically all of its divisions have now been transferred to OPM.

The entire defense commission is now contained in OPM except the price stabilization division headed by Leon Henderson; consumers division, headed by Miss Harriet Elliott; and agricultural division, headed by Chester C. Davis. No one here seems to know at this time whether these divisions will eventually go over to OPM, but it is assumed that they will.

No Machine Tool Priorities For Educational Institutions

Because of the pressing need for machine tools in vital defense industries, including existing plants and factories under construction, the priorities division of the office of production management has decided that it cannot grant applications for priority certificates on such tools requested by schools and other educational institutions engaged in training workers. An effort is being made to divert such demand into secondhand or second-grade tools.

A letter sent out to boards of education and school administrators from whom there have been many requests for priority rating for the purchase of machine tools says that such requests cannot be granted.

Dredge Approach to Third Set of Panama Canal Locks

■ Suction dredge at work on the Atlantic approach to the third set of locks for the Panama canal, being constructed under direction of army engineers. Third set is designed to afford greater protection and safeguard transportation in case of war damage to portions of the canal. Capacity also will be greatly increased. NEA photo

Steel Institute Revises Ingot, Castings Statistics

■ Following its new policy of including electric steel ingots and steel castings in its production figures, the American Iron and Steel institute has revised its statistics for preceding years, for comparison. The figures below include open-hearth, bessemer and electric ingots and steel castings, the latter being tonnage produced in foundries operated by companies which also produce ingots. All figures are in net tons.

Year	Total	Weekly Av.	Year	Total	Weekly Av.	Year	Total	Weekly Av.	Year	Total	Weekly Av.
1917	49,649,215	952,229	1919	38,029,992	729,382	1921	21,630,744	414,859	1923	48,969,215	939,187
1918	48,882,299	937,520	1920	46,103,910	881,865	1922	38,914,072	746,338	1924	41,421,921	792,309

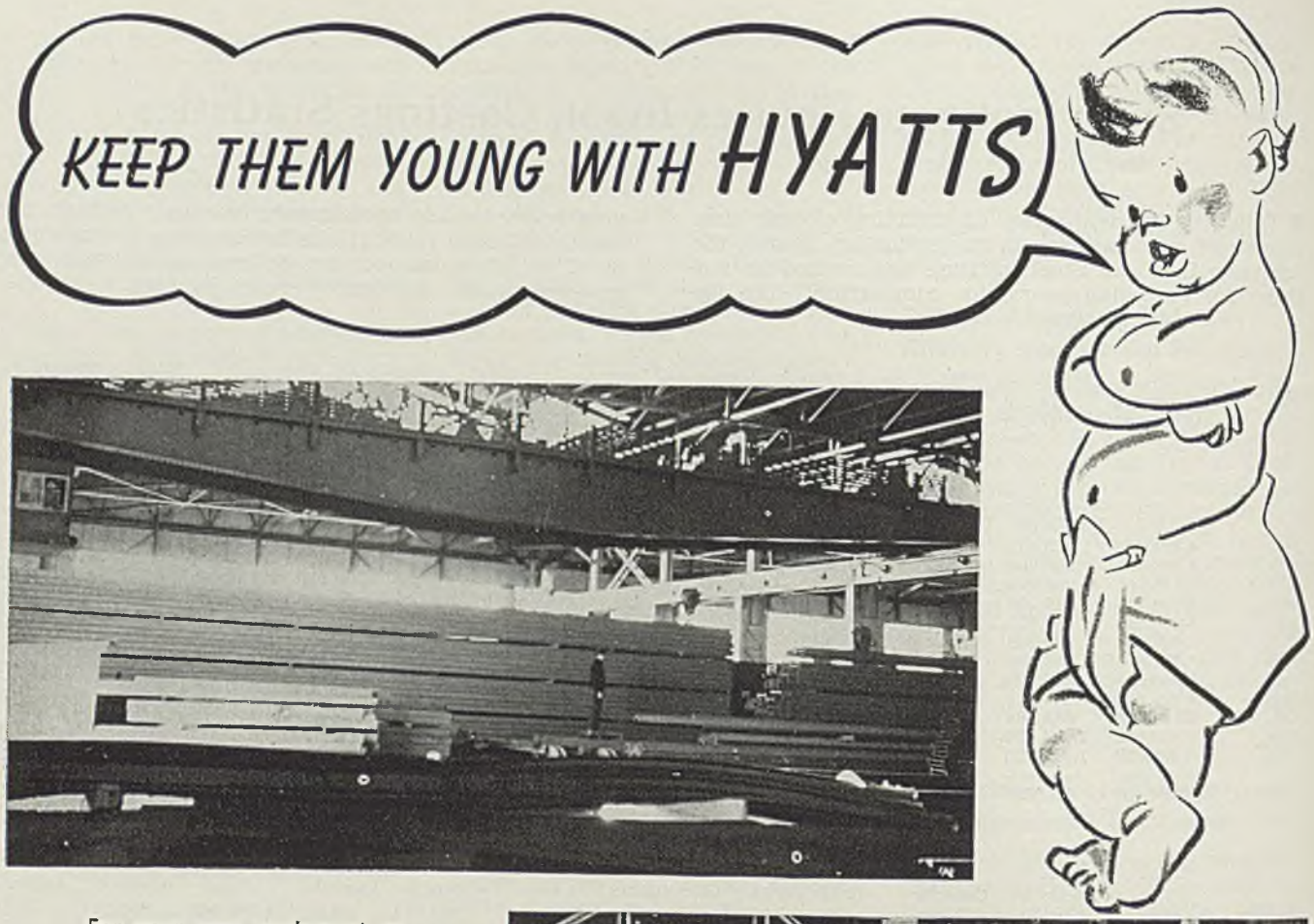
	1925		% of	1926		% of	1927		% of	1928		% of
	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity
Jan.	4,719,919	1,065,444	....	4,656,029	1,051,022	87.22	4,302,172	971,145	77.56	4,531,172	1,022,838	79.92
Feb.	4,223,613	1,055,903	. ..	4,264,863	1,066,216	88.48	4,327,341	1,081,835	86.40	4,590,842	1,108,899	86.65
March	4,721,111	1,065,714	. ..	5,035,081	1,136,587	94.32	5,148,330	1,162,151	92.82	5,117,384	1,155,166	90.26
April	4,033,752	940,269	....	4,626,271	1,078,385	89.49	4,685,249	1,092,133	87.23	4,888,226	1,139,447	89.03
May	3,888,883	877,852	. ..	4,425,910	999,077	82.90	4,594,340	1,037,097	82.83	4,776,766	1,078,277	84.26
June	3,606,900	840,769	. ..	4,207,512	980,772	81.39	3,968,129	924,972	73.88	4,250,736	990,848	77.42
July	3,471,854	785,487	....	4,095,783	926,648	76.89	3,637,255	822,908	65.72	4,320,783	977,553	76.38
Aug.	3,850,644	869,220	. ..	4,492,374	1,014,080	84.15	3,971,467	896,494	71.60	4,744,291	1,070,946	83.68
Sept.	3,927,822	917,715	....	4,409,463	1,030,248	85.49	3,710,754	866,999	69.25	4,709,416	1,100,331	85.98
Oct.	4,377,214	988,084	....	4,591,053	1,036,355	86.00	3,764,573	849,791	67.87	5,279,460	1,191,752	93.12
Nov.	4,393,068	1,024,025	....	4,175,502	973,310	80.77	3,549,711	827,438	66.09	4,844,460	1,129,245	88.24
Dec.	4,469,629	1,011,228	....	3,906,230	883,762	73.34	3,604,731	815,550	65.14	4,562,175	1,032,166	80.65
Total	49,684,409	952,904	....	52,886,071	1,014,309	84.17	49,264,052	944,842	75.46	56,615,711	1,082,932	84.62

	1929		% of	1930		% of	1931		% of	1932		% of
	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity
Jan.	5,115,195	1,154,672	86.56	4,288,212	967,994	71.08	2,852,540	643,914	44.59	1,685,665	380,511	25.88
Feb.	4,920,348	1,230,087	92.21	4,579,761	1,144,940	84.07	2,892,154	723,039	50.07	1,681,421	406,140	27.62
March	5,760,878	1,300,424	97.48	4,828,571	1,089,971	80.03	3,468,208	782,891	54.21	1,627,030	367,275	24.98
April	5,626,610	1,311,564	98.32	4,664,182	1,087,222	79.83	3,141,887	732,375	50.71	1,429,848	333,298	22.67
May	6,008,754	1,356,378	101.68	4,520,520	1,020,433	74.93	2,897,385	654,037	45.29	1,277,302	288,330	19;61
June	5,573,076	1,299,085	97.38	3,879,960	904,420	66.41	2,416,078	563,188	39.00	1,036,102	241,516	16.42
July	5,513,546	1,247,409	93.51	3,316,654	750,374	55.10	2,143,351	484,921	33.58	915,738	207,181	14.09
Aug.	5,614,144	1,267,301	95.00	3,473,898	784,176	57.58	1,949,462	440,059	30.47	961,153	216,965	14.76
Sept.	5,146,744	1,202,510	90.14	3,223,766	753,216	55.31	1,754,817	410,004	28.39	1,125,892	263,059	17.89
Oct.	5,154,063	1,163,445	87.22	3,055,972	689,836	50.65	1,805,653	407,597	28.22	1,233,957	278,546	18.94
Nov.	4,002,365	932,952	69.94	2,510,820	585,273	42.97	1,807,315	421,286	29.17	1,171,710	273,126	18.57
Dec.	3,299,786	746,558	55.96	2,246,742	508,313	37.32	1,477,529	334,283	23.15	977,389	221,129	15.04
Total	61,735,509	1,184,034	88.76	44,589,058	855,179	62.79	28,606,379	548,646	37.99	15,123,207	289,273	19.67

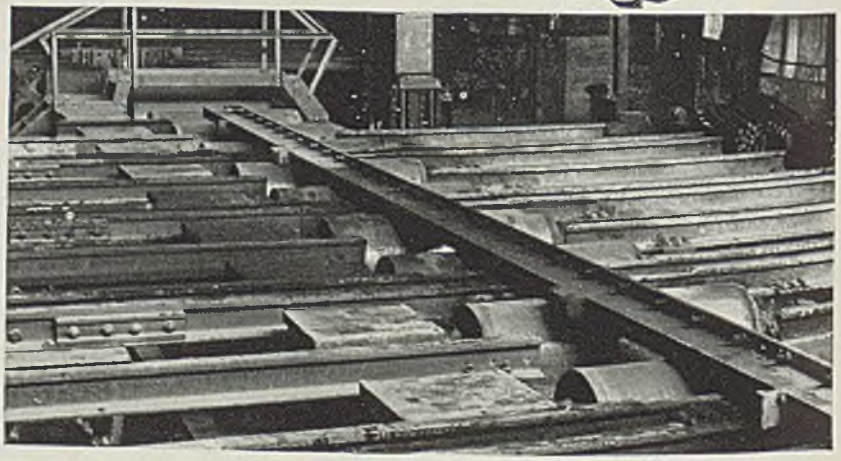
	1933		% of	1934		% of	1935		% of	1936		% of
	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity
Jan.	1,157,745	261,342	17.76	2,276,596	513,904	34.32	3,279,411	740,273	49.21	3,474,353	784,278	52.46
Feb.	1,221,664	305,416	20.75	2,521,472	630,368	42.10	3,169,849	792,462	52.68	3,379,587	816,325	54.61
March	1,022,675	230,852	15.68	3,190,040	720,099	48.09	3,273,848	739,018	49.12	3,810,436	860,144	57.54
April	1,531,813	357,066	24.26	3,346,922	780,168	52.10	3,017,120	703,291	46.75	4,494,782	1,047,735	70.09
May	2,250,236	507,954	34.51	3,875,202	874,763	58.42	3,009,189	679,275	45.15	4,614,529	1,041,654	69.68
June	2,919,687	680,580	46.24	3,487,612	812,963	54.29	2,580,723	601,567	39.99	4,543,888	1,059,181	70.85
July	3,607,288	816,129	55.45	1,697,879	384,136	25.65	2,591,191	586,242	38.97	4,473,940	1,012,204	67.71
Aug.	3,260,279	735,955	50.00	1,574,649	355,451	23.74	3,331,707	752,078	49.99	4,782,442	1,079,558	72.22
Sept.	2,599,370	607,329	41.26	1,446,551	337,979	22.57	3,227,815	754,162	50.13	4,744,841	1,108,608	74.16
Oct.	2,373,729	535,830	36.40	1,689,272	381,326	25.46	3,590,878	810,582	53.88	5,182,430	1,169,549	78.26
Nov.	1,731,930	403,713	27.43	1,836,008	427,974	28.58	3,599,619	839,072	55.77	4,941,014	1,151,752	77.05
Dec.	2,047,780	463,299	31.48	2,239,126	506,590	33.83	3,511,636	794,488	52.81	5,056,843	1,144,082	76.53
Total	25,724,196	493,368	33.52	29,181,329	559,673	37.37	38,182,986	732,317	48.68	53,499,085	1,023,318	68.45

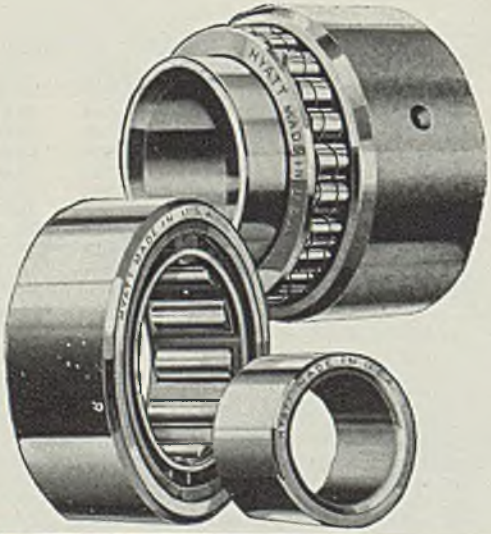
	Total	Weekly Av.	Capacity	1938		% of	1939		% of	1940		% of
	1937		% of	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity	Total	Weekly Av.	Capacity
Jan.	5,398,326	1,218,584	81.32	1,984,815	448,040	29.14	3,663,004	826,863	52.69	5,768,729	1,302,196	83.4
Feb.	5,050,824	1,262,706	84.26	1,942,795	485,699	31.59	3,448,120	862,030	54.93	4,527,141	1,093,512	70.0
March	5,970,247	1,347,686	89.93	2,293,884	517,807	33.67	3,929,387	886,995	56.52	4,390,090	990,991	63.5
April	5,801,540	1,352,340	90.24	2,196,413	511,984	33.30	3,431,600	799,907	50.97	4,100,722	955,879	61.2
May	5,894,260	1,330,533	88.79	2,061,169	465,275	30.26	3,372,636	761,317	48.51	4,967,033	1,121,226	71.8
June	4,787,710	1,116,016	74.47	1,868,848	435,629	28.33	3,606,729	840,729	53.57	5,659,725	1,319,283	84.5
July	5,212,832	1,179,374	78.37	2,259,677	511,239	33.25	3,648,639	825,484	52.60	5,727,485	1,295,811	83.0
Aug.	5,580,683	1,259,748	83.71	2,903,805	655,486	42.63	4,241,726	980,074	62.45	6,187,286	1,396,679	89.5
Sept.	4,907,592	1,146,634	76.19	3,029,736	707,882	46.03	4,881,601	1,140,561	72.68	6,056,941	1,415,173	90.7
Oct.	3,881,819	876,257	58.23	3,554,912	802,463	52.19	6,223,126	1,404,769	89.52	6,643,975	1,499,769	96.1
Nov.	2,464,793	574,544	38.18	4,072,676	949,342	61.74	6,292,322	1,466,742	93.46	6,470,243	1,508,215	96.6
Dec.	1,685,273	381,283	25.34	3,583,253	810,691	52.72	5,958,893	1,348,166	85.91	6,493,849	1,469,197	94.1
Total	56,635,899	1,086,227	72.33	31,751,983	608,976	39.60	52,797,783	1,012,616	64.53	66,993,219	1,281,431	82.1

KEEP THEM YOUNG WITH HYATTS



For your new equipment or changeovers let Hyatt Roller Bearings carry the load. Get in touch with us at any time for any application. We are ready to serve you.





Long ago the steel industry, knowing the tough service ahead of their equipment, learned to "keep them young with Hyatts." Therefore, tables, cranes, motors, and cars were built with Hyatt Roller Bearings; and down through the years many of these earlier units and thousands since have been on the go, with no time out for bearing care. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT *Roller* BEARINGS

Mirrors of *MOTORDOM*

By A. H. ALLEN
Detroit Editor, STEEL

New materials will appear in 1942 models as automakers conserve critical metals for national defense program. Substitutes will be as good or better than materials now in use . . . Production rate surpasses earlier estimates . . . Motor industry already producing parts for airplanes . . . Change in steel wheel contour lessens blowout danger . . . 1,000,000-square foot new plant planned at Rouge

DETROIT

■ SUBSTITUTIONS in materials for 1942 automobile models appear inevitable at this stage, but one thing certain is that such changes will not involve any *ersatz* materials; substitutes will have to be as good or better than the original.

Speaking for all car builders, Paul Hoffman of Studebaker declared officially the other day that the industry has been asked by the OPM "to survey the possibility of savings, notably in zinc, and to put these into effect as soon as model changes are made." It developed that the motor companies had anticipated this step and their studies were so far advanced that the release of large quantities of special metals is expected without delay.

Continuing, Hoffman says, "The production changes that will be required should, as a result of the industry's sustained long-range research into optional manufacturing methods and materials, be expected to occur without affecting performance, durability or appearance of the vehicles, unless in fact they yield improvements. Changes naturally will be decided upon with close regard to all other needs of the defense program. Nothing will be done, for instance, that would compel extensive new tooling."

It should not be inferred that any wholesale abandonment of zinc die castings is in prospect. Inquiries for numerous parts for 1942 models are being received regularly and give every indication of going through.

"The question as to why the auto industry should come out publicly with statements about substitutions being planned in new models is an interesting one. The average driver cannot tell the difference between a die casting and a plastic molding anyway, so why should he worry about substitutions? The answer is, of course, that the auto industry stands squarely behind the national defense program and is making every possible effort at co-operation.

It is important for the car-buying public to realize this position, important from a public relations standpoint and important from a product acceptance standpoint. Hence one can expect similar statements to be released from time to time which will show how the industry is co-operating on defense by changing its product or its manufacturing methods.

May Create New Choke Point

Elimination of one bottleneck may mean only the creation of another. Thus, when you change from die castings to steel stampings, you have to have more steel and you have to have new dies. Mills' order books are clogged already, and from steelmakers come reports about difficulty in obtaining such essential materials as nickel and aluminum. Shortages of the latter two metals, if in truth they do exist, appear only natural in the face of the unprecedented maintenance of capacity levels of steelmaking. There have been no breathing spells whatever in steel, no intervals when alloy suppliers would have a chance to catch up with the voracious appetites of open hearths.

On top of this situation is the natural tendency of buyers to build up inventories and to acquire material beyond immediate requirements. So far, the only corrective steps have been to appeal to the fairness of such buyers and to put artificial restraints on prices in the hope hoarding would be stopped.

The picture reminds one of the heavy eater who, after devouring five plates of soup, several steaks, salads and desserts, meanwhile filling his pockets with olives, radishes, rolls and other trimmings, roars out: "What, no more celery? Why, I won't have the strength to get up from the table if I don't get some celery!"

In line with efforts to promote substitutes which are as good or better than former parts, some companies are finding the present an ideal time to accent promotion of new products. For example, one of the bearing manufacturers has a line of steel-backed bronze bushings which can save about two-thirds of the bronze used in solid cast and rolled bushings. Backing is cold-rolled S.A.E. 1010 steel to which is applied electrically one of three types of bronze. One is 8 per cent lead, 83 copper, 3.5-4.5 tin and 4 zinc. A second is roughly 10 lead, 80 copper, 10 tin and 0.50 zinc; the third is 25 lead, 3.5 tin, 3 zinc and the balance copper. Rolled out in 4½-inch strips at a speed of about 15 feet per minute, the material is produced in thicknesses from 0.100 down to 1/16-inch. On the 0.100-inch strip the steel backing measures 0.071 and the bronze 0.029-inch. It is not strictly speaking a new product, but one which fits in nicely with the present need for conserving nonferrous metals.

Deliveries on metals and parts become progressively extended, and many salesmen have aban-

doned routine trips through their territory, realizing that cultivation of new accounts is useless, that their time might better be spent in their own plant trying in some way to expedite deliveries of material already ordered. For example, it is reported here that deliveries of 50-60 weeks are being quoted on aluminum rivets.

600,000 New Automobiles Estimated in Storage

Meanwhile automobile production continues to knock earlier predictions in the graveyard, roughly 535,000 cars and trucks having been rolled from assembly lines in January and better than 500,000 looked for this month. Not all these cars are being sold, of course, but retail sales are strong nonetheless. One estimate is that about 600,000 new cars are currently in storage, with every inch of available storage space under cover rapidly being used up here.

As long as retail sales hold to their present pace, cars in storage can be turned over without much delay, but if storage periods should have to be extended, particularly where cars are in outside lots, there is bound to be some deterioration.

In the new series of Buick cars described here several weeks ago is one body style which is brand new—the four-door sedan, patterning the family lines of the 1941 Chevrolet bodies but not built previously by Fisher Body. Now, this sedan body has been introduced on Olds and Pontiac, carrying a slightly lower price, and shortly will appear in the Chevrolet line at a slightly higher price. Thus the same body is used to supply "economy" cars for Buick, Olds and Pontiac as is used for the forthcoming "deluxe" Chevrolet model.

Hudson's Aircraft Division Already Producing Ailerons

Aircraft division of Hudson Motor Car Co., recently established, is now in operation, producing ailerons for the Glenn Martin planes. In charge of George Goin, the plant is capable of large-scale production of wings and ailerons, as well as certain other fuselage parts. Apparently the facilities will comprise one phase of subcontracting for Chrysler Corp., which is the primary contractor on parts and subassemblies for the Martin bomber.

Ford's Lake Fleet Moved 3,613,583 Tons in 1940

Figures show the Ford Motor Co. lake fleet, which operated in and out of the Rouge plant here two weeks longer than in any previous season, transported 3,613,583 tons of cargo during the 1940 season, a near-record tonnage. Half the cargo was coal, of which the company uses 6000 tons a day, brought up from docks in Toledo, O. Iron ore shipments from the Ford Blueberry mine in Upper Michigan and from the Menominee and Mesaba ranges totaled 701,916 tons. Other tonnages included foundry sand, 359,827 tons; limestone, 301,773 tons, crude rubber, 19,175,220 pounds, and lumber, 15,474,762 board feet. Cargo outbound from the Rouge included 50,000 tons of automobile parts for branch assembly plants in the East.

Although Ford's proposal to build a giant assembly plant for bomber construction in its entirety, involving among other things a mile-long assembly line, was turned down by army and defense commission officials, nevertheless plans are going forward for another new building at the Rouge plant with 1,000,000 square feet of floor space. It may be that Ford plans to concentrate manufacture of parts and subassemblies for the Consolidated bomber in this new plant, much as Chrysler is concentrating manufacture of similar parts for the Martin bomber in 500,000 square feet of space leased in the Graham plant.

Two of Mr. Ford's grandsons now are working in the aircraft division of the Ford plant.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,962	449,492
Feb.	202,597	317,520	422,225
March	238,447	389,499	440,232
April	237,929	354,266	452,433
May	210,174	313,248	412,492
June	189,402	324,253	362,566
July	150,450	218,600	246,171
Aug.	96,946	103,343	89,866
Sept.	89,623	192,679	284,583
Oct.	215,286	324,689	514,374
Nov.	390,405	368,541	510,973
Dec.	406,960	469,118	506,931
Year	2,655,171	*3,732,718	4,692,338

*Revised.

Estimated by Ward's Reports

Week ended:	1941	1940†
Jan. 18	124,025	108,545
Jan. 25	121,948	106,400
Feb. 1	124,400	101,240
Feb. 8	125,000	95,985
Feb. 15	127,500	95,050

†Comparable week.

Blowout Dangers Reduced by Change in Wheel Contour

By a simple change in the contour of the rolled steel wheel section, Plymouth engineers have greatly reduced danger from tire blowouts in 1941 models. A year of experimenting preceded introduction of the new wheel, during which time daring test drivers grimly held onto the steering wheel at speeds of 70-80 miles an hour while dynamite caps were exploded in tire sidewalls.

In one test, a flat tire was put on a new wheel and driven from a standing start up to 60 miles an hour under perfect control. In fact, centrifugal force of the spinning flat tire actually lifted the rim off the road as speed increased.

Studebaker Corp. Celebrates Eighty-Ninth Anniversary

Studebaker Corp. celebrated its 89th anniversary Sunday and looked back at a 38 per cent improvement in car sales for January over last year, at the same time looking ahead to the manufacture of airplane engines in three new plants going up near Fort Wayne, Ind.

Follansbee Completes Modernization Program

■ With two of three new mills on three-turn operation and the third shortly to receive its trial runs, Follansbee Steel Corp. has virtually completed its $1,270,000 modernization program at its Follansbee, W. Va., plant.

Two of the new four-high mills are for the cold reduction of hot-rolled strip to sheet and tin plate gages. The first of these cold mills is at peak production, currently exceeding its rated capacity of 3200 tons per month, the company reports. The four-high, 42-inch wide temper mill was placed on a three-turn basis early this month. The 38-inch Steckel cold mill, installed in 1933 and modernized in 1939, is also operating on a three-shift basis.

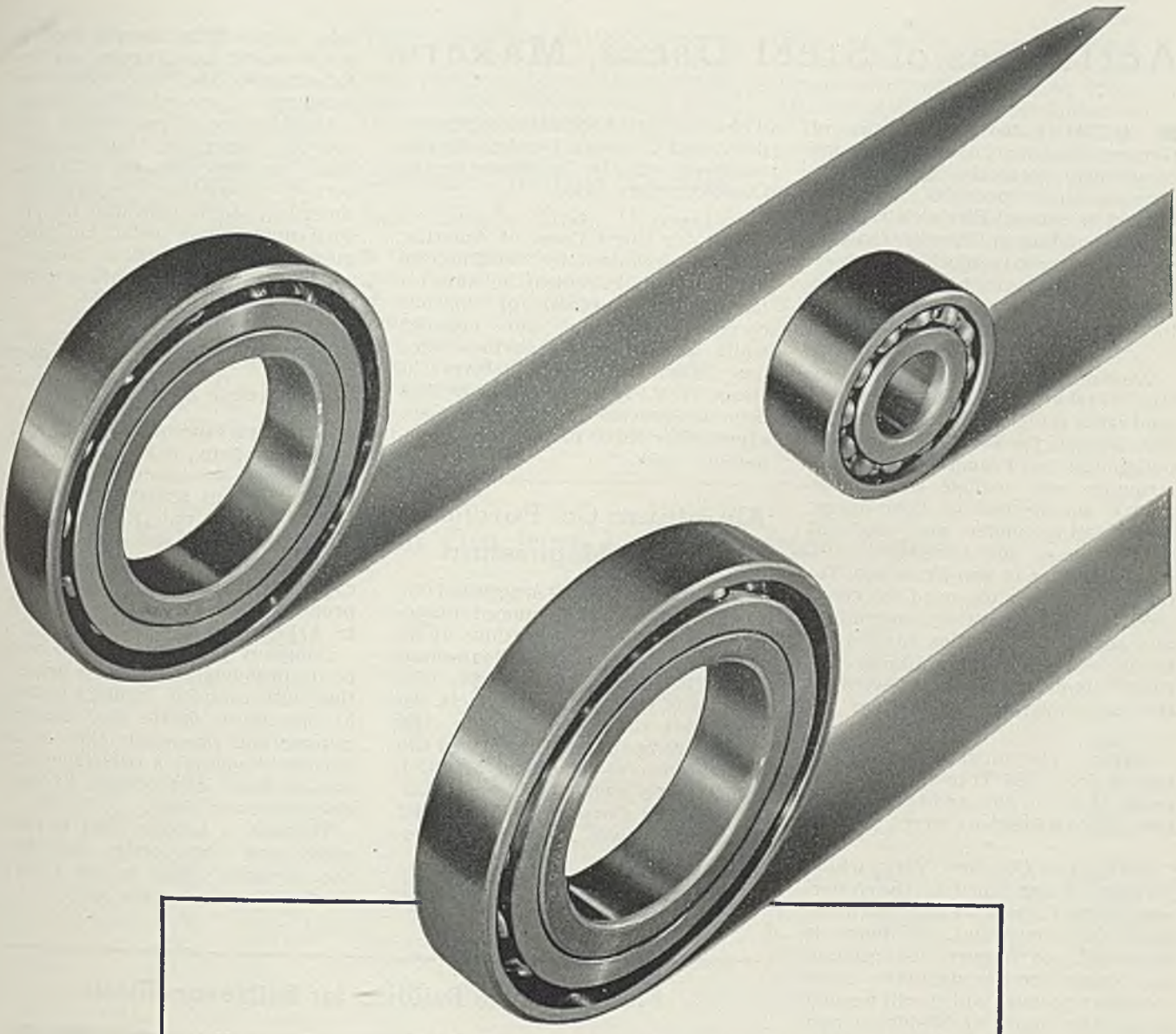
A pictorial presentation of the new Follansbee facilities will appear in an early issue of STEEL.

Steel Constructors To Aid Various Projects

■ American Institute of Steel Construction will sponsor various research projects in 1941 at the National bureau of standards, Lehigh university, Columbia university and New York university.

The institute is also collaborating with the Taylor model basin experimental laboratory, navy, in large-scale model tests of steel rigid frame knees of various shapes.

It also is represented in the welding research committee of the Engineering Foundation. The committee on preparation of structural steel surfaces for painting have carried out exposure tests on specimens subjected to no cleaning, wire brushing, weathering, sand-blasting and flame cleaning.



Built to *speed* Production

Forged from the finest of bearing steels—precision built at every step; New Departure ball bearings clear the way to the highest machine speeds. Production rates are improved, yet all important accuracy is retained throughout years of the hardest service.

Builders of machines that must conform to the most advanced performance requirements increasingly specify

NEW DEPARTURE

THE FORGED STEEL BEARING

2975

Activities of Steel Users, Makers

■ CHICAGO district activities of General Electric Co. and affiliated companies, formerly scattered in nine separate locations, are now housed in General Electric's new $1,500,000 building in Chicago. Occupying an entire city block, the structure is seven stories high, of modern design, and equipped with the latest in lighting and air conditioning.

♦

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has purchased land from the Dominican College of San Rafael, for erection of a new building in San Francisco. The new structure will include more than 100,000 square feet of floor space, consolidating under one roof all Westinghouse and subsidiary company activities in San Francisco. Total investment is expected to exceed $300,000. Manufacturing, assembling and servicing activities carried on by the company at its Emeryville, Calif., plant, will not be affected by the San Francisco consolidation.

♦

Sigma Instruments Inc. has moved from 388 Trapelo road, Belmont, Mass., to new and larger quarters at 76-78 Freeport street, Boston.

♦

Park Sales Co., New York, which introduced last April to the American market a new welding material made in Switzerland, has found it impossible to import this product any longer and has started to make a similar product which will be sold under the name of Weldoloy and will be distributed by Weldoloy Mfg. Co., a division of Park Sales.

♦

Swiss American Gear Mfg. Corp. has purchased from the Standard Oil Co. of New Jersey a part of its property on Hoboken avenue, near Ogden avenue, Jersey City, N. J., and will use it for demonstrating and warehousing gear cutting machines.

♦

Pal Blade Co., Plattsburg, N. Y., has purchased the entire cutlery division of Remington Arms Co. Inc., Bridgeport, Conn., including all machinery, dies, finished goods, goods in process and raw materials, and will operate it as a separate divison. A new location has been selected in Holyoke, Mass., to house equipment and materials, and production will continue without interruption.

♦

Roller-Smith Co., Bethlehem, Pa., has appointed John W. Clark Co., Chicago, representative in the Chicago territory. The change was necessitated by recent death of E. E. Van Cleef. M. B. Mathley, formerly associated with Mr. Van Cleef, will be affiliated with the Clark company, and C. Swain Lumley, district engineer, will also be located in the Clark company office.

♦

Van der Horst Corp. of America, recently organized by Hendrik Van der Horst to introduce in America his patented process of "porous chrome hardening" for cylinder walls, piston rings, bearings, etc., has established headquarters at Olean, N. Y., where a new plant has been constructed and is in full operation, after three months of experimental work.

Aluminum Co. Purchases American Magnesium

■ Aluminum Co. of America, New York, last week announced immediate expansion of operations of its subsidiary, American Magnesium Corp., to further increase the production of magnesium products. To carry out the expansion the Aluminum company has purchased the half interest of American Magnesium formerly owned by General Aniline & Film Corp., New York, and now wholly owns American Magnesium.

The purchase and the establishment of new plant facilities at Buffalo, augmenting present facilities at Cleveland, Los Angeles and New Kensington, Pa., will require expenditure of several million dollars.

Manufacture of magnesium products by American Magnesium already has been increased to 20 times normal peace-time requirements. American Magnesium does not produce magnesium metal, but fabricates magnesium articles, some of which are vitally important to national defense.

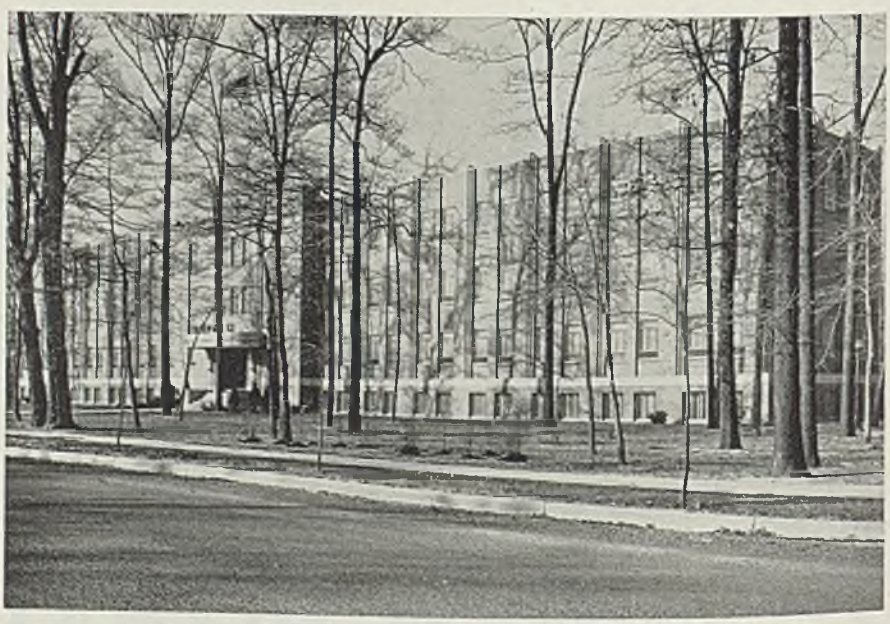
New Aluminum Company Organized in Chicago

■ Standard Aluminum & Alloy Co., a new company, is being organized in Chicago to produce aluminum metals. About $35,000,000 is being sought from the Reconstruction Finance Corp. to finance construction. Main offices will be in Chicago, but the company will operate properties near Decatur, Ala., and in Arkansas.

Company proposes to make most of its products at Arkansas properties, with complete facilities located at the source of the ore. Besides mining and processing the ore, it expects to operate a reduction plant and to build and operate its own electric power plant.

Through a process used in Germany and other foreign countries, the company plans to use a low-grade mine-run bauxite ore.

Modern Office Building for Bethlehem Steel



■ In this new 3-story steel-frame office building for Bethlehem Steel Co.'s Maryland plant, Sparrows Point, Md., the main lobby, elevator corridor, executives' offices, recreation and conference rooms are sheathed with flat steel, finished in facsimile walnut. Other offices are in gray-green enamel, with partitions removable steel panels, insulated against sound. Doors and jambs are steel, as are removable baseboard panels which carry both high and low tension electric lines for servicing office equipment

Iron Ore Forecasts Up to 75,000,000 Tons

■ Lake Superior iron ore mine operators forecast shipments this year at 70,000,000 to 75,000,000 gross tons, based on steel producers' preliminary estimates of requirements. The former record was 66,902,778 tons in 1916.

Shipments from American mines in the Lake Superior district in 1940 totaled 63,948,846 tons, compared with 45,547,974 tons in 1939, according to the Lake Superior Iron Ore association, Cleveland. The 1940 tonnage was the largest since 1929, with 66,157,359 tons. Shipments in 1939 amounted to 63,110,240 tons.

The Helen mine, Michipicoten range, property of the Algoma Steel Corp., shipped 361,394 tons in 1940, the only Canadian mine active.

Designs Furnace To Use Low-Grade Ores Directly

■ Direct reduction of low-grade ores to nodular iron is accomplished in a new type melting furnace designed by Norman T. Urquhart, New Philadelphia, O. Patents have been applied for on the development, which is a two-tube rotary unit working on the stage combustion principle. Iron produced runs from 0.04 to 0.5 per cent carbon.

Combustion Process Co. has been incorporated with capital of $100,000, and will establish headquarters at Dover, O. Mr. Urquhart will be president, and Fred Daniels, metallurgist, Mackintosh-Hemphill Co., Pittsburgh, will be board chairman.

Because the furnace is said to operate efficiently on low-grade ores, its backers are interested in reopening the "black band" ore fields in Tuscarawas county, Ohio. This deposit, which has not been worked for many years, is of the carbonate group, known commonly as siderite. Iron content runs from 30 to 56 per cent, 8 to 20 per cent silica, phosphorus to 0.9 and sulphur, 0.75.

Shipments of Iron Ore from Lake Superior Mines

MESABI RANGE

Mine	1939	1940	Mine	1939	1940	Mine	1939	1940	Mine	1939	1940
Adams Spruce Group	1,640,849	1,991,395	Godfrey (Glen)	430,415	219,339	Langdon	308,715	160,144	Sellers	1,904,313	5,784,048
Agnew	132,093	306,711	Grant	601,118	1,064,000	LaRue	51,247	104,351	Shenango	173,649	203,272
Albany	323,207	524,742	Greenway	.	34,072	Leonidas	545,825	572,083	Siphon (Spring)	948	. . .
Alexandria	46,670	.	Halobe	205,354	. . .	Mahoning	2,525,921	5,177,201	Sliver	34,250	52,874
Alice	122,313	54,225	Harold	38,324	. . . . .	Mesabi Chief	853,824	716,617	Smith	7,144	. . .
Alpena	. . . .	481	Mine	1939	1940	Minnewas	1,393,281	1,088,635	Snyder	65,810	42,201
Arcturus	404,017	803,149	Harrison	19,038	1,617	Minorca	3,247	. . . . .	South Agnew	139,862	60,750
Bennett	353,267	620,465	Harrison Annex	3,915	19,475	Missabe Mountain	2,739,250	4,330,739	South Uno G. N.	. . . . .	2,919
Biwabik	575,740	1,019,851	*Harrison and Patrick Concentration Plants	131,028	*384,185	Mississippi No. 2	. . . . .	21,327	South Uno N. P.	19,514	19,651
Bray	24,163	167,920	Hartley-Burt	809,505	729,414	Morris	1,325,985	1,660,684	Stein	. . . . .	150,064
Burt-Pool-Day	893,402	568,397	Hawkins	123,434	316,318	Morrison	569,378	799,606	Stephens (Pacific Tresp.)	. . . .	2,086
Canisteo	445,545	478,339	Hill Annex	2,166,603	2,991,068	Mine North Harrison	80,280	84,025	Susquehanna	618,639	606,628
Chataco	83,016	19,983	Hill Trumbull	987,918	1,087,064	North Harrison Annex	37,400	188,847	Union	145,912	144,288
Commodore	. . . . .	1,869	Hoadley	22,035	12,977	Pacific	50,484	107,063	Virginia	165,017	193,372
Coons	. . . . .	267,453	Holman-Cliffs	.	425,274	Patrick-Ann	163,769	177,742	Wacootah	317,978	306,015
Corsica	. . . . .	679,358	Hull Rust	2,591,464	3,901,971	Quinn	9,645	6,948	Webb	592,946	536,077
Dale	. . . . .	4,021	Judd	10,860	31,361	Reed	. . . . .	35,533	York	68,141	60,542
Danube	312,690	482,977	Julia	. . . .	15,207	Sargent	32,365	130,886	Total	30,314,857	45,667,677
Dunwoody	43,248	280,941	Kevin	108,377	81,047	Seranton	382,931	587,010			
Fayal	. . . .	16,025	Kinney	1,417	. . . . .						
Fraser	1,000,317	1,566,078									
Genoa-Sparta	. . . . .	49,330									
Godfrey (Burt)	319,826	330,347									

MENOMINEE

Mine	1939	1940	Mine	1939	1940	Mine	1939	1940	Mine	1939	1940
Baltic	8,224	2,738	Fogarty	15,348	43,607	James	167,630	210,360	Virgil	29,543	172,090
Bates	186,472	170,064	Forbes	107,030	. . .	Loretto	21,522	39,606	Wauseca	. . . . .	41,305
Bengal	300,691	280,945	Globe-Cornell	51,018	57,486	Matilda	3,474	1,583	Total	2,160,596	3,103,334
Berkshire	51,450	3,178	Hiawatha No. 1	251,464	279,095	Penn Mines	442,032	661,924			
Bradley	45,571	31,409	Hiawatha No. 2	187,007	274,232	Ravenna-Prickett	. . . . .	62,082			
Buck	58,935	224,507	Homer	142,288	218,448	Rogers	. . . . .	3,074			
Davidson Group	50,784	300,920				Tobin	40,113	24,681			

MARQUETTE

Mine	1939	1940	Mine	1939	1940	Mine	1939	1940	Mine	1939	1940
Athens	457,339	668,009	Gardner-Mackinaw	49,141	65,946	Maas	622,703	950,426	Richmond	136,432	178,760
Blueberry	402,473	334,651	Greenwood	61,870	103,638	Mary Charlotte	74,266	187,517	Stephenson	5,431	28,541
Cambria-Jackson	272,915	303,953	Lake Superior Holmes	253,684	301,398	Morris	390,244	427,259	Tilden	170,276	163,629
Cliffs Shaft	591,370	611,891	Lloyd	477,848	510,591	Negaunee	679,680	930,640	Volunteer	248,280	153,341
Francis	13,469	. . . . .				Princeton	202	273	Total	4,907,623	5,920,463

GOGEBIC

Mine	1939	1940	Mine	1939	1940	Mine	1939	1940	Mine	1939	1940
Anvil	271,195	277,575	Ironton	101,094	236,443	Penokee Group	537,042	600,559	West Davis	545,941	422,123
Cary	195,690	227,266	Keweenaw	296,998	383,628	Plymouth	480,906	706,658			
Eureka-Asteroid	395,417	508,265	Montreal	974,718	999,402	Puritan	286,175	222,746	Total	5,345,558	5,975,727
Geneva	13,909	. . . . .	Newport	607,404	605,983	Sunday Lake	400,160	572,306			
			Palms	. . . .	2,977	Wakefield	238,909	209,802			

CUYUNA

Mine	1939	1940	Mine	1939	1940
Alstead Group	145,647	170,930	Merritt	31,903	117,524
Armour No. 1	174,829	232,566	Pennington	. . .	8,891
Evergreen	141,312	118,574	Portsmouth	144,232	160,421
Hopkins	30,653	5,170	Sagamore	219,775	255,544
Louise	27,356	106,113	Wearne	125,188	118,439
Mahnomen	249,778	433,993			
Maroco	. . . . .	6,011	Total	1,290,673	1,734,176

VERMILION

Mine	1939	1940	Mine	1939	1940
Chandler	51,254	113,601	Zenith	463,833	450,808
Pioneer	566,171	560,467			
Sibley	161,246	227,564	Total	1,417,360	1,547,469
Soudan	174,856	195,029			

GRAND TOTAL 45,547,974 63,948,846

*Unallocated tonnage.

Del Monte Conference Appraises West Coast's Contributions to Defense

DEL MONTE, CALIF.

■ NATIONAL defense, its requirements from and effects on the Pacific coast metalworking industries were carefully appraised at the seventeenth annual conference of the Iron, Steel and Allied Industries of California held here Feb. 6-8. The conference, sponsored by the California state chamber of commerce at Hotel Del Monte, attracted about 100 more than had been anticipated and registrations totaled nearly 400.

General sessions were held on Thursday and Friday mornings, while Thursday afternoon was devoted to group meetings.

Major contributions by Pacific coast industries to the national defense program are aircraft and ships, both merchant and naval. These industries received considerable attention at the conference.

Airplanes with speeds of 1000 miles an hour are by no means impossible, John E. Canaday, Lockheed Aircraft Corp., Burbank, Calif., declared. He predicted that war demands would increase the speed and size of airplanes and that later these would be used increasingly to transport express and freight from coast to coast.

"A few years ago," he said, "engineers could not envisage speeds much in excess of 800 miles an hour, for at that speed the point was reached where wind would begin to pile up before the leading edge of the wings with the same effect as snow piles up before a plow.

"But now developments are in process to devise means of eliminating that resistance by disbursing the air in much the same fashion as snow is thrown aside by the rotary snow plow."

Most serious bottleneck in the aircraft industry, he pointed out, is that of skilled man-power. Major aircraft companies, however, are training production workers as rapidly as possible.

E. C. Mausshardt, Pacific coast district manager for the United States maritime commission, reminded the conferees that the placing of orders for 44 merchant ships with Pacific coast yards, most of which have been inactive since the World war, has meant a revival of shipbuilding in this district.

The maritime commission program, nationally, during 1940, built or had in the process of building 179 ocean-going vessels at a price of more than $450,000,000. Of this number, he said, 91 have been launched and 61 delivered. The navy has either acquired or soon will acquire 24.

Cargo Ships for Pacific Yards

Mr. Mausshardt pointed out that in addition to the maritime commission's original long-range building program, which provided for fast C-type vessels, it also has undertaken to effect the building program requested by the President on Jan. 3. This program calls for 200 cargo ships of simple design which can be built quickly and cheaply. It is contemplated that at least 62 of these will be awarded to Pacific coast yards.

Government spokesmen who have been advocating large expansion of the steel producing industry were sharply criticized by John H. Van Denventer, editor, *The Iron Age*.

Mr. Van Deventer reviewed the tremendous tonnages now being produced and estimated probable requirements of the defense program and the export market. Ten million tons, he thought, is a liberal estimate for exports. The American Iron and Steel institute has estimated 3,500,000 tons will be required for our own defense program this year. Even though the latter figure be doubled to allow for a sharply expanded program, said the editor, "we get a total of 17,000,000 tons for national defense requirements at home and aid to England and Canada, plus other exports.

"Thus our steel industry could fully discharge its obligations to Washington, London and Ottawa in respect to the abnormal demands for war and preparation for war with three months' production and still have nine months free for the normal requirements of peace-time production."

Arthur H. Young, lecturer on industrial relations, California Institute of Technology, Pasadena, Calif., declared America's position of leadership among industrial nations is not due solely to our national resources or to the genius of our management or to the skill of our workers, but to a combination of all these.

Mr. Young criticized the present administration for "deliberate fostering of class consciousness between labor and capital." He believed, however, that management must accept the fact of unionism and advised that employers' approach to the problem be based on "realism rather than wishful thinking."

A. J. Lundberg, president, California state chamber of commerce, urged enforcement of every reasonable economy in state government, "in order to facilitate the financing of national defense and to keep the tax structure in a healthy condition."

Pacific coast power facilities are geared to serve the needs of normal industrial and domestic consumption in addition to defense program work, declared George C. Tenney,

Del Monte, Calif., Conference Group

editor, *Electrical West,* San Francisco.

"The aggregate of just the 1941 increments plus available capacity shows 1,550,000 kilowatts of assured capacity, plus 310,000 kilowatts of reserves, to meet an anticipated 1941 peak of 1,400,000 kilowatts."

Lieut. Col. J. F. Stromme, industrial planning officer, western air corps procurement district, stated: "The United States, in the field of civil aviation, in the past decade has met the challenge of the greatest nations in the world and has won supremacy. If we Americans are now forced . . . to turn our aeronautical genius from the pursuits of peace to the art of war in the air that same American genius will be equal to the task of achieving supremacy of aerial defense."

Resolutions Adopted

The conference approved a resolution recommending the Wagner act be amended to provide for separation of the prosecuting and judicial functions of the labor board; that rules of evidence be followed and that findings be based on a preponderance of the evidence; that free speech be restored to employers; and that coercion from any source be outlawed.

Other resolutions recommended: Economy in state government; clarification of state regulations on sales and use taxes; co-operation in national defense training.

C. B. Tibbetts, Los Angeles Steel Casting Co., Los Angeles, was elected chairman of the organization, succeeding B. J. Osborne, Moore Drydock Co., Oakland, Calif. H. M. Tayler, Tayler & Spotswood Co., San Francisco, was elected vice chairman, and C. S. Knight, California chamber of commerce, was re-elected secretary.

The new executive committee:

Reinforcing steel: C. M. Gunn, Gunn, Carle & Co., San Francisco; and W. A. Godshall, Blue Diamond Corp., Los Angeles.

Steel plate fabricators: Duncan S. Neilsen, Berkeley Steel Construction Co., Berkeley; William G. Meagher, Independent Iron Works, Oakland; John W. Lucas, Southwest Welding & Mfg. Co., Alhambra; and R. A. Stumm, Southern Pipe & Casing Co., Azusa.

Structural steel: P. F. Gillespie, Judson-Pacific Corp., San Francisco; and Alfred Neuffer, Bethlehem Steel Co., Los Angeles.

Steel mills: W. A. Ross, Columbia Steel Co., San Francisco; and W. H. Stewart, Bethlehem Steel Co., San Francisco.

Merchant steel: Hugh Oliphant, Tay Holbrook Co., San Francisco; and O. E. Bean, Union Hardware & Metal Co., Los Angeles.

Foundries: Charles P. Hoehn, Enterprise Engine & Foundry Co., San Francisco; C. B. Tibbetts, Los Angeles Steel Casting Co., Los Angeles; Ivan Johnson, Pacific Steel Casting Co., Berkeley; and J. E. Eppley, Kinney Iron Works, Vernon.

Manufacturers and purchasing agents: W. Saunders, Air Reduction Sales Co., Emeryville; and E. F. Watkins, Southern California Edison Co. Ltd., Los Angeles.

Pacific Coast Steel Fabricators association elected the following:

President, D. G. Henderson, president, Consolidated Steel Corp., Los Angeles, succeeding P. F. Gillespie, Judson-Pacific Co., San Francisco; secretary and treasurer, B. J. Osborne, Moore Drydock Co., Oakland.

Directors: P. F. Gillespie, Judson-Pacific Co., San Francisco; B. J. Osborne, Moore Drydock Co., Oakland, Calif.; T. L. Hanning, Steel Tank & Pipe Co., Portland, Oreg., D. G. Henderson, Consolidated Steel Corp., Los Angeles; Charles McGonigle, Poole & McGonigle, Portland, Oreg.; Paul Pigott, Pacific Car & Foundry Co., Seattle; George H. Raitt, Steel Tank & Pipe Co., Berkeley, Calif.; A. B. Shafer, Garrett & Shafer Engineering Works, Seattle; R. A. Stumm, Southern Pipe & Casing Co., Azusa, Calif.; Charles W. Broyles, Herrick Iron Works, Oakland; C. W. Timmons, American Pipe & Steel Co., Alhambra, Calif.; T. A. L. Loretz, Los Angeles, manager.

Preformed Steel Siding Used in Army Housing

■ Preformed steel siding is being used in housing projects at four army camps, with "very good results," according to the war department. Siding is in the form of sheets two sheet wide and up to ten feet in length. Sheets are stamped to simulate ordinary siding at the suppliers plant, given a prime coat of paint and shipped to the camp ready for use.

In construction of the housing units, usual lumber framework of rafters and studs is used but the studs are placed 2 feet apart. The steel sheets are nailed to the studs from the bottom up and overlapping sheets are bolted together between the studs.

Insulating material is placed on the inner face of the studs to form an interior finish.

Construction of this type is being used at Camp Wheeler, Macon, Ga., for an original cantonment and a replacement center to care for 17,000 soldiers; at Camp Croft, South Carolina, for a replacement center for 18,400 men; at Camp Wolters, Texas, for a replacement center for 17,000; and at Fort Riley, Kansas, where about half its new housing for 17,000 men will be of the steel siding type.

Acetylene Convention Indefinitely Postponed

■ Forty-first annual convention of the International Acetylene association, originally scheduled to be held at the Hotel Netherland Plaza, Cincinnati, April 2, 3 and 4, has been postponed indefinitely. Increasing demands upon the time of engineering personnel and the belief that technical and other manpower, normally applied to convention activities, should be released for more urgent work, motivated the cancellation.

January Industrial Gear Sales Up 24.5 Per Cent

■ Industrial gear sales in January were 24.5 per cent above December, and 110.5 per cent above January, 1940, according to the American Gear Manufacturers association, Wilkinsburg, Pa. Association's index for January stood at 259, compared with 208 in December, and 123 in January, 1940.

Association's compilation includes only industrial gears and does not include automotive gears or gears used in high speed turbine drives.

William J. Fisher

Warren C. Bulette

Robert E. Gephart

William S. Shipley

Inter-Company Co-operation Speeds Defense Production

■ York, Pa., manufacturers are co-ordinating all human and mechanical facilities to obtain greatest possible efficiency and speed in manufacturing war materials. Plant facilities have been surveyed and every available machine tool listed. Community's reservoir of trained labor is being catalogued; training and retraining programs are under way. Parts of defense contracts are sublet to other manufacturers possessing suitable equipment. York's subcontracting plan suggests how manufacturers in other cities can fully utilize available capacity with a minimum of confusion and without overexpansion

YORK, PA.

■ PRODUCTIVE facilities of York county's 248 manufacturing plants are being pooled to execute national defense contracts more quickly and efficiently. A plan has been worked out by the York Manufacturers' association through its defense committee which makes available information as to what type of work each plant is equipped to do and which facilitates and encourages a system of subcontracting.

Essence of the plan is co-operation among the various manufacturers and co-ordination of all available equipment and skilled manpower. It is designed to enable primary contractors, through subcontracting, to handle larger defense orders than would be possible otherwise and at the same time to fully utilize all human and mechanical resources.

Each major plant, under the York plan, closes its own contracts with the government, then sublets parts of the order which it is unable to fill—due either to lack of the particular tools required or because the size of the order exceeds the capacity of the plant.

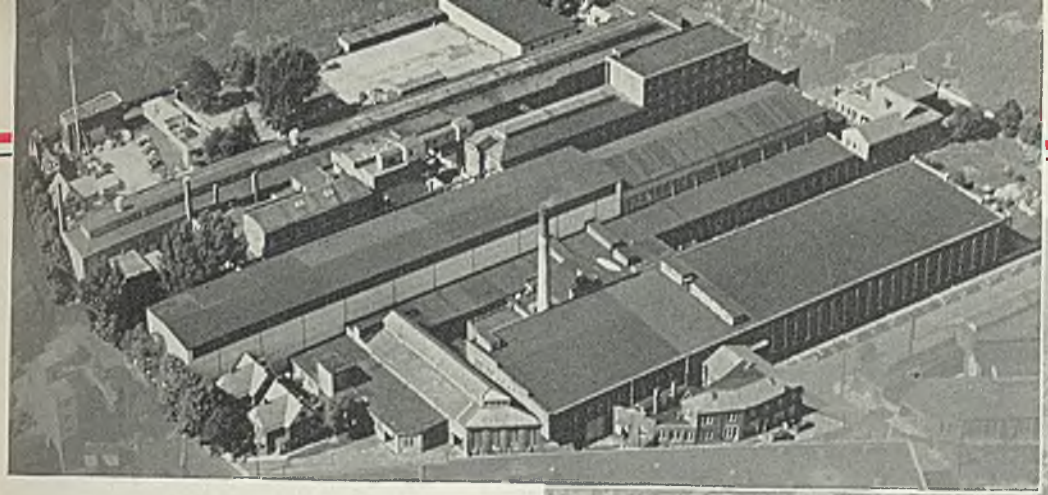
An example of how the plan actually is working: York Ice Machinery Corp. has a large horizontal boring machine, which, normally, is used only about 350 hours a year. Since York plants began co-operating in defense work, the boring machine has been in operation steadily and at present has enough work scheduled for full operation until May.

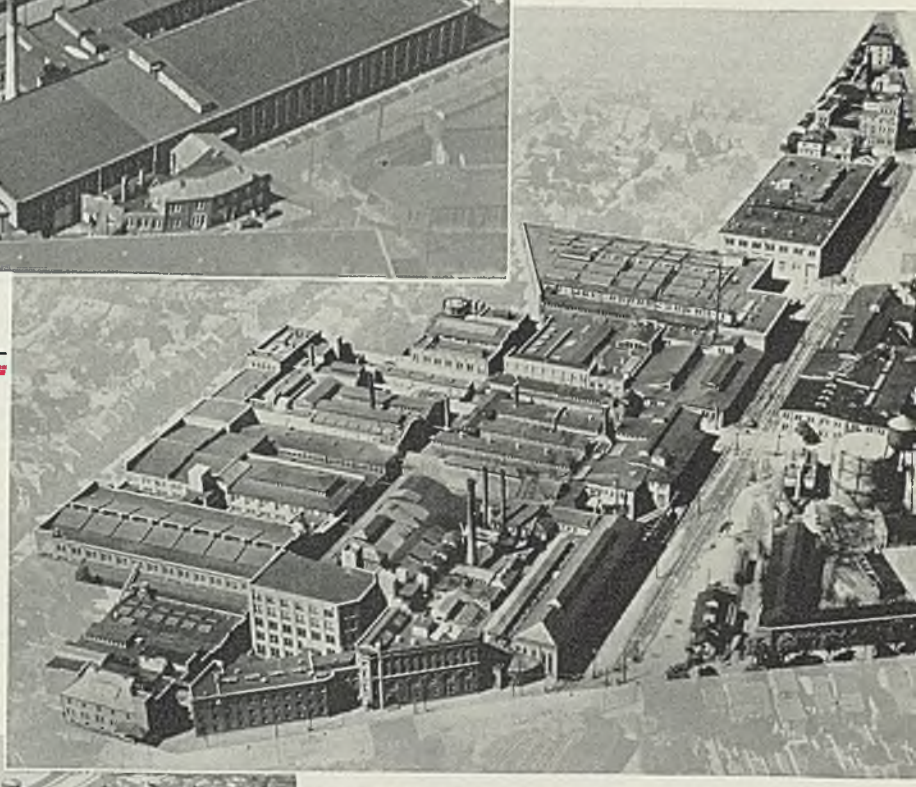
It now is working on powder press parts for which the A. B. Farquar Co. holds the primary contract. The Farquar company is not equipped with sufficient boring mill capacity, and if the company had to wait until the tools could be obtained, in the present machine tool market, delivery of the urgently needed powder presses would be delayed many months.

One of the first steps in launching the plan was a survey of available machine tools and other equipment by the defense committee. In 180 plants in York were discovered 10,0 machine tools, many of which were not known to exist except by their owners. The survey uncovered surprisingly great potentialities in non-metalworking plants; many of these had machine tools and skilled men. Hosiery plants, ribbon and silk mills, paper mills and the Edison Light & Power and Metropolitan Edison companies had tools suitable for defense work. Drill presses, lathes, grinding wheels and other tools were found in garages and even in a candy factory.

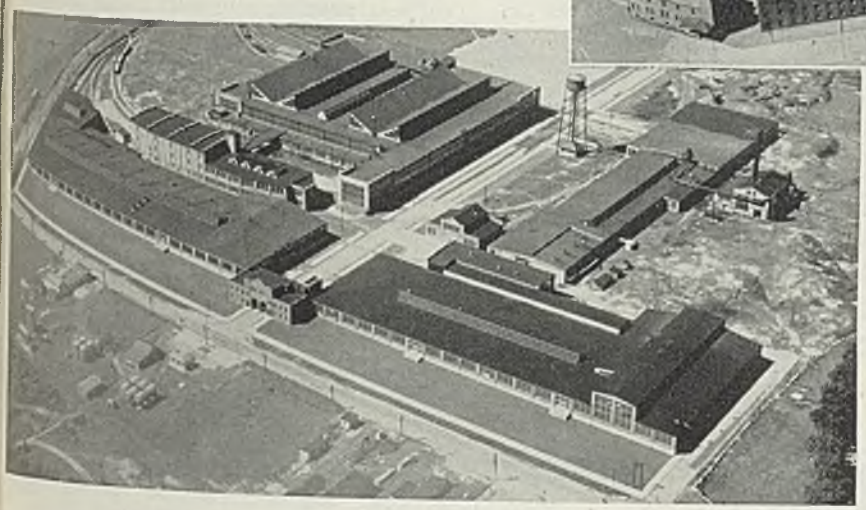
Results of the survey were filed in the offices of the York Manufacturers' association, where they are

Members of the defense committee, York Manufacturers' association, who founded the plan for pooling the community's manufacturing facilities to expedite the rearmament effort





York's larger industrial plants already are co-operating in the defense plan. Typical are those of S. Morgan Smith Co., above; West York plant of York Ice Machinery Corp., right; and Grantley plant of York Ice Machinery Corp., below



available to any company obtaining a defense contract and desiring to sublet part of it.

Workers are not being shifted from their regular plants nor are machines moved. Work is divided so that parts of the contract can be handled by the secondary plants.

Much of the program to date is in anticipation as the volume of defense work has not yet become so heavy as to require primary contractors calling on all the secondary plants available. York Safe & Lock Co., A. B. Farquar, and Read Machinery Co. are among the plants subletting work at the present. York Safe & Lock has given York Ice Machinery a subcontract for parts for gun mounts and the Red Lion Tool & Die Co. one for dies. Read Machinery and Farquar also have sublet parts of contracts to York Ice Machinery.

York Safe & Lock holds a major share of the more than $25,000,000 in defense orders held by York firms. Other primary plants already co-operating in the program are American Chain Co., S. Morgan Smith Co., B. M. Root Co., Brandt-Warner Mfg. Co. (subcontracting) and Steacy-Schmidt Co.

Members of the defense committee of the manufacturers' group directing the plan include: William S. Shipley, chairman of the board, York Ice Machinery Corp., chairman; William J. Fisher, vice president and general manager, A. B. Farquar Co.; Warren C. Bulette, president, Brandt-Warner Mfg. Co.; Robert P. Turner, vice president, New York Wire Cloth Co. Robert E. Gephart, of the manufacturers' association, is secretary.

Committee, after completing its survey of available equipment, decided to make another survey of skilled labor available, but not now employed in plants working on defense contracts. During the depression years many skilled York men drifted away from their trades and found employment elsewhere. Many now are working for utility companies, in the building trades, garages and other lines.

Committeemen believe these men could be put back on jobs to which they were once accustomed with a few weeks' retraining. Plan provides that return of such men to their old trades would be voluntary, both on the part of the men and their current employers. Workers would be assured they could return to their present jobs at the termination of the emergency.

Under such a voluntary arrangement, first line defense industries would have the opportunity of asking for trained men temporarily from other industries, less essential to the national defense, and to keep them until the emergency passes or until they could be replaced with men from any of the several training or retraining projects under way.

It was pointed out that a voluntary, inter-plant drafting program for skilled labor would serve to cut down labor migrations from the city and would cause all of the local supply to be absorbed before men from outside of the York industrial area would be given employment.

Survey is being undertaken by

individual branches of industry and trade, each for itself; garage owners will list their employes to determine which among them might be available for defense work service, retail trade will make its own survey, and other branches of business and industry will do likewise.

An extensive training and retraining program is being conducted through the York school system and is tied in with defense work. York is among the 41 towns and cities in Pennsylvania where special part-time technical courses have been started by the Pennsylvania State college, under the new federal defense training program.

Courses offered locally include engineering, drafting, elementary machine design, production control, cost control, elementary tool design, pre-foremanship for production supervision.

Local industries have indicated an immense need for workers trained in these subjects. York school board has purchased land for the erection of an annex to the school shop in order to facilitate retraining of larger groups of men than can be accommodated at present. School authorities have requested a federal appropriation of $80,000 for purchase of machinery to equip the annex.

A recent class of 42 graduates of a retraining course conducted at night by the high school found immediate employment.

Armco's New Texas Steel Plant To Have 200,000 Tons Ingot Capacity

■ AMERICAN Rolling Mill Co., Middletown, O., will construct a steel plant on the ship canal near Houston, Tex. Plant will have capacity of 200,000 tons of ingots a year, and will operate principally on scrap iron, manufacturing billets for shell forgings, structural steel, light plates for shipbuilding, wire, rods, oil field supplies, and other items necessary to the national defense.

Reconstruction Finance Corp. has authorized a $12,000,000 loan to finance construction. National defense officials have approved the plant and original announcement of its construction was made by William S. Knudsen of OPM.

Charles R. Hook, president, said a new Texas corporation will be organized to build the plant, which will be a wholly-owned American Rolling Mill Co. subsidiary. Operations will be managed by the Sheffield Steel Corp., another Armo subsidiary, which operates plants in St. Louis and Kansas City, Mo., Tulsa and Sand Springs, Okla. R. L. Gray, Sheffield Steel president, will become president of the Texas corporation. Mr. Hook will be chairman, and Calvin Verity, vice president and general manager, American Rolling Mill, will be vice chairman.

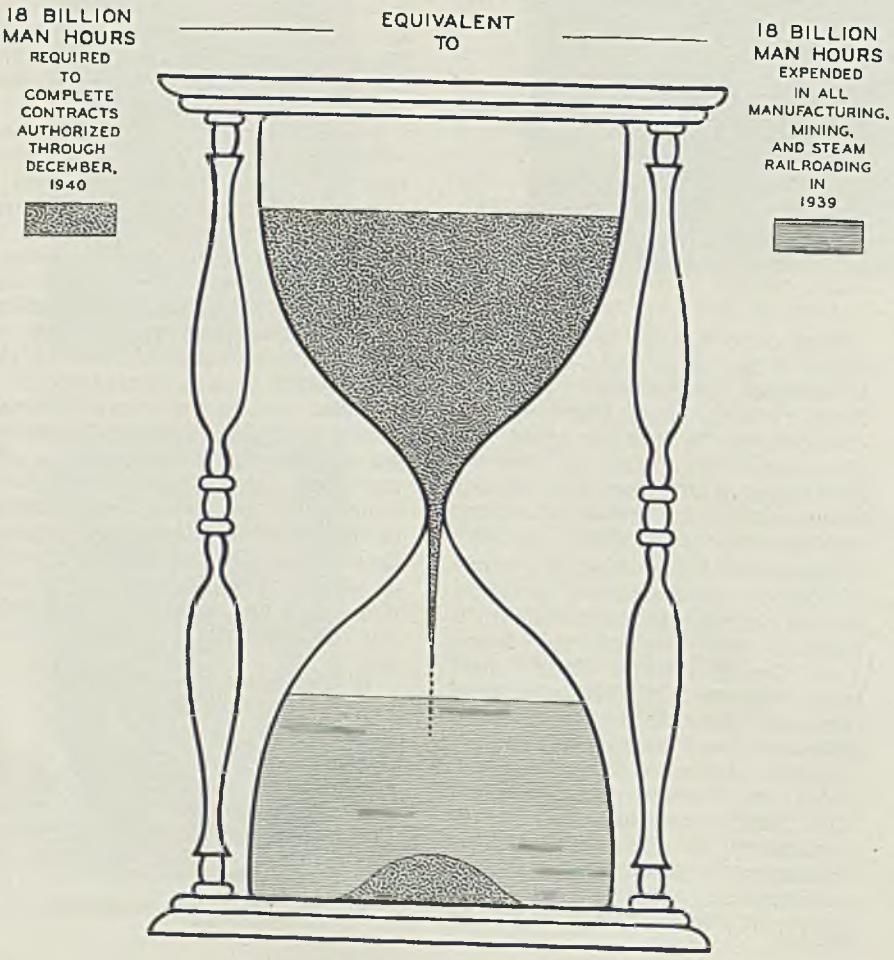
Plant will consist of three 100-ton open-hearth furnaces, a billet and structural mill, a rod mill, merchant bar mill, 84-inch plate mill, wire mill, and auxiliary equipment.

Option on a site of 600 acres on the ship canal is being closed and will permit loading of ocean-going vessels from company docks.

Construction will start "at the earliest possible moment."

Selection of the Houston location, said Mr. Hook, "is in line with the decentralization policy of heavy industries which has been in the minds of the administration in order that plants manufacturing defense products would be less vulnerable in case of attack."

Man-Hours Required by Defense Program



■ Eighteen billion man-hours will be required to complete defense materials ordered in 1940, the same number expended during 1939 on all manufacturing, mining, and steam railroading combined. Defense contracts as used here include those for national defense, plus British and other foreign orders. Chart data from National Industrial Conference board

New Company Formed To Build Electric Furnaces

■ Hydro-Arc Furnace Corp., 9 South Clinton street, Chicago, has been incorporated to design, build and sell a new line of electric arc melting furnaces. President and general manager is W. Harvey Payne, who has had many years of experience in the electric furnace field.

The Hydro-Arc furnace is hydraulically operated, as its name implies. An outstanding feature is the low-inertia counter-weighting and electrode prime mover equipment.

The new company is associated with Whiting Corp., Harvey, Ill., which will manufacture the new line of equipment.

Week's Defense Awards $98,759,469; Army Contracts 90 Per Cent of Total

■ MOST of the defense contracts last week reported awarded by the war and navy departments were small, many for items only indirectly required in defense. Aggregate of awards in the week, however, was more than two and a half times that of the previous week and totaled $98,759,469. War department's contracts comprised nearly 90 per cent of the total.

Navy department reported it has entered into a contract with the General Machinery Ordnance Corp. for rehabilitation and equipment of certain parts of the United States naval ordnance plant at South Charleston, W. Va. Ordnance equipment is to be machined at an estimated cost not to exceed $1,645,000. Contract specifies the work be done at actual cost, additional equipment to become property of the United States and the rehabilitated unit to be leased to the contractor.

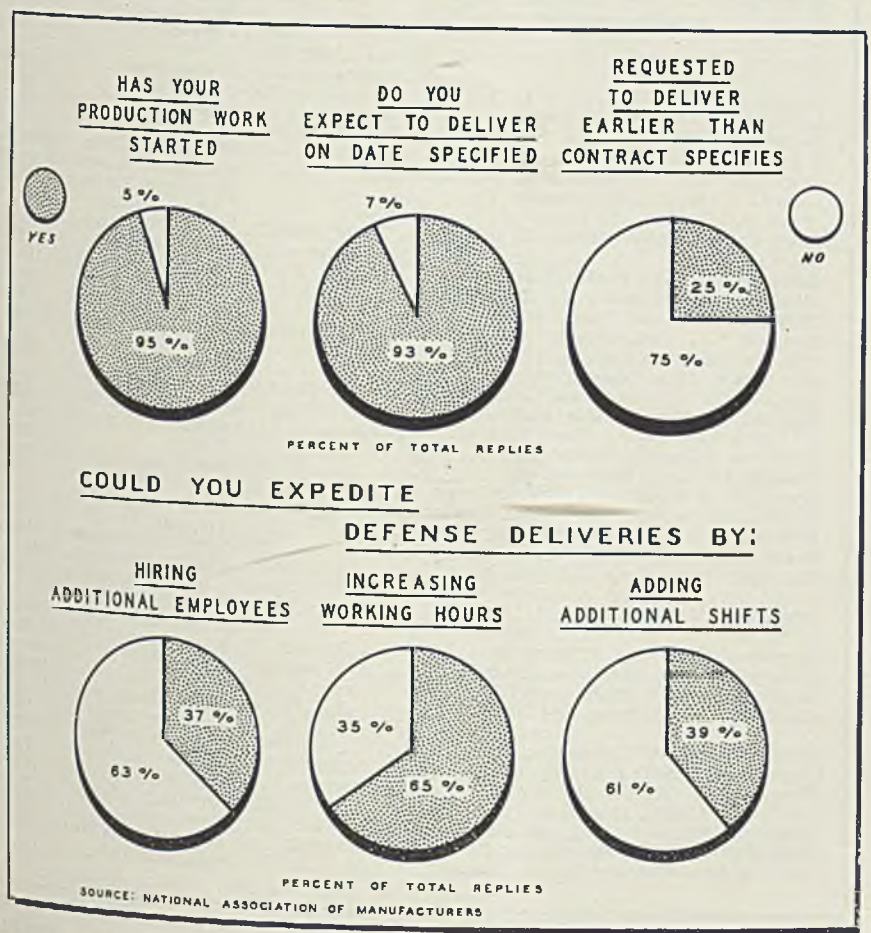
Bureau of yards and docks, navy department, awarded contract for construction of a dry dock at the destroyer base, San Diego, Calif., to Pacific Bridge Co., San Francisco, at $2,800,000 on a cost plus fixed fee basis.

War department last week reported the following:

Ordnance Department Awards

Acme Steel Co. Inc., Chicago, strappings, $2100.
Alden Supply Co., Philadelphia, emery cloth, $1050.
Aluminum Co. of America, Massena, N. Y., aluminum alloy, $2827.70.
American Brass Co., Waterbury, Conn., small arms ammunition components, brass, gilding metal, $739,006.40.
American Steel & Wire Co. of New Jersey, Philadelphia, nails, $1061.05.
Arrow Tool & Reamer Co., Detroit, cutters, $2560.
Automatic Die & Products Co., Cleveland, tools, $1098.
Baltimore Brass Co., Baltimore, metal strips, $6359.80.
Belknap Hardware Co., Louisville, Ky., hardware, $1067.47.
Belmont Smelting & Refining Works Inc., Brooklyn, N. Y., copper ingots, $6620.
Bliss Co., E. W., Brooklyn, N. Y., presses, $8485.
Bodine Corp., Bridgeport, Conn., drilling and tapping machines, $1250.
Boston & Lockport Block Co., East Boston, Mass., tackle blocks, $7283.30.
Braeburn Alloy Steel Corp., Braeburn, Pa., steel, $2195.12.
Bridgeport Rolling Mill Co., Stratford, Conn., brass, $64,450.45.
Bristol Brass Corp., Bristol, Conn., artillery ammunition components, $7840.98.
Brown & Sharpe Mfg. Co., Providence, R. I., steel parallels, gages, $6039.08.
Carboloy Co. Inc., Philadelphia, tools, $4051.08.
Chase Brass & Copper Co. Inc., Waterbury, Conn., small arms ammunition components, brass strip, $659,600.60.
Colonial Broach Co., Detroit, broach sections, $2102.35.
Crucible Steel Co. of America, New York, steel, $5398.64.
Davenport Machine Tool Co. Inc., Rochester, N. Y., machinery, $1889.50.
Detroit Broach Co. Inc., Detroit, broach sections, $56,802.19.
Exact Weight Scale Co., Columbus, O., scales, $25,290.
Federal Screw Works, Detroit, artillery ammunition components, $232,725.
Fox Munitions Co., Philadelphia, gages, $1342.
Globe Forge & Foundries Inc., Syracuse, N. Y., forgings, $2612.50.
Great Southern Box Co. Inc., New Orleans, wire boxes, $1075.
Greenfield Tap & Die Corp., Greenfield, Mass., gages, $3309.36.
Hanson-Whitney Machine Co., Hartford, Conn., gages, $38,586.42.
Hardinge Co. Inc., York, Pa., rotary dryers, $8774.
Hardware & Supply Corp., Kansas City, Mo., hardware, $2445.48.
Henry & Wright Mfg. Co., Hartford, Conn., machines, $5754.
Hobbs, Clinton E., Co., Everett, Mass., chain blocks, $25,268.95.
Jones & Lamson Machine Co., Springfield, Vt., lathes, grinding machines, $37,177.85.
Kennedy-Van Saun Mfg. & Engineering Corp., Danville, Pa., artillery materiel, $12,067.20.
Kent Machine Co., Grand Rapids, Mich., machines, $3260.15.
King Powder Co., Cincinnati, O., artillery

Primary Contractors Report on Defense Production Problems



■ Defense deliveries can best be expedited by increasing working hours, according to a survey of primary contractors conducted by the national defense committee, National Association of Manufacturers, New York. Sixty-five per cent of the contractors queried reported more working hours would solve the need for greater speed in deliveries.

Adding of shifts was regarded as a means of expediting deliveries by 39 per cent, while 37 per cent considered hiring additional employes a desirable method. Accompanying chart presents summary of views of defense manufacturers who reported to the association. Ninety-five per cent declared their defense production has started, 93 per cent expect to deliver on specified dates and 25 per cent have been requested to deliver products earlier than contracts specify.

NAM, conducting a self-census of productive facilities to expedite defense, reports an estimated 10,000 primary contractors are registered with the army and navy procurement offices in accordance with "mobilization day" plans and that most of them now have defense contracts. Current survey indicates there are more than 30,000 potential subcontractors to suupplement them.

ammunition components, $29,361.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $1752.56.
Lincoln Tool & Die Co. Inc., Detroit, milling fixtures, $1467.
Marshall & Huschart Machinery Co., Chicago, milling machines, $1031.
Metalwash Machinery Co. Inc., Newark, N. J., washing equipment, $5970.
Modern Tool & Die Co., Philadelphia, gages, $36,254.
Mueller Brass Co., Port Huron, Mich., artillery ammunition components, $113,660.28.
National Acme Co., Cleveland, screw machine, $9959.40.
National Cash Register Co., Dayton, O., artillery ammunition components, $10,490.75.
National Lock Washer Co., Newark, N. J., artillery ammunition components, $44,752.
National Tube Co., McKeesport, Pa., ammunition components, $91,000.
Nichols, George P., & Bros. Inc., Chicago, machinery, $14,710.
Niles-Bement-Pond Co., Pratt & Whitney division, Hartford, Conn., gages, taps, $19,615.63.
Ogden Iron Works Co., Ogden, Utah, melt units, $48,950.
Pangborn Corp., Hagerstown, Md., steel, $2190.
Parent Metal Products Inc., Philadelphia, stacking trays, steel shelving, $4810.50.
Peters Engineering Co., Philadelphia, machines, $4000.
Poor & Co., Canton Forge & Axle works, Canton, O., forgings, $11,230.25.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $8957.
Precision Mfg. Co., Philadelphia, gages, $9928.
Reed Prentice Corp., Worcester, Mass., routing machines, $22,352.
Reliable Tool Co., Irvington, N. J., tools, $1523.
Revere Brass & Copper Co., Baltimore, brass, $789,770.
Root, B. M., Co., York, Pa., machines, $1242.
Russell, J., & Co. Inc., Holyoke, Mass., handles for chests, $1575.
Rustless Iron & Steel Corp., Baltimore, steel, $2532.08.
Sall, George, Metals Co., Massena, N. Y., aluminum strips, $1535.
Scheinert Bros. Inc., New York, screws, $5208.34.
Schmidt, George T., Inc., Chicago, marking machines, $2890.
Shaw-Walker Co., Muskegon, Mich., office desks, $2303.29.
Sheffield Gage Corp., Dayton, O., gages, precision instruments, $4986.98.
Sieg Co., Davenport, Iowa, hardware and reamers, $5046.44.
Simonds Saw & Steel Co., Chicago, steel, $1280.88.
SKF Industries Inc., Philadelphia, ball bearings, $4927.10.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $5668.54.
Sterling Products Co., Chicago, hardware, $1319.78.
Sterling Products Co. Inc., Moline, Ill., lighting units, $2428.68.
Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $6081.19.
Talon Inc., Meadville, Pa., gages, $27,349.50.
Taylor-Wharton Iron & Steel Co., Easton, Pa., artillery materiel, $10,428.60.
Titeflex Metal Hose Co., Newark, N. J., conduit, $7790.
Triplex Machine Tool Corp., New York, presses, $2475.
Trojan Hardware Co., Troy, N. Y., gas burning equipment, $8578.
Trotter, Nathan, Inc., Philadelphia, tin, $4040.
Union Hardware Co., Torrington, Conn., wire cleaning brushes, $1300.
United States Motors Corp., Oshkosh, Wis., parts for generating units, $1214.
Vinco Corp., Detroit, gages, $11,136.35.
Webb, Jervis B., Co., Philadelphia, trolley type conveyor, $9197.
Weinstein, S., Supply Co., New York,

(*Please turn to Page* 49)

PURCHASES UNDE

(In Week Ended Feb. 1)

Iron and Steel Products	Commodity	Amou
American Car & Foundry Co., New York	Stretcher weights	$58,145
American Cast Iron Pipe Co., San Francisco	Cast iron pipe	14,600
American Chain & Cable Co. Inc., Bridgeport, Conn.	Chains, chain link fencing	29,727
American Hoist & Derrick Co., St. Paul	Shackles, clamps	10,109
American Rolling Mill Co., Middletown, O.	Sheet steel	54,890
American Shim Steel Co., New Kensington, Pa.	Steel	13,903
American Steel & Wire Co., Cleveland	Cable, wire netting	72,438
Apollo Steel Co., Apollo, Pa.	Sheet steel	37,032
Babcock & Wilcox Tube Co., Beaver Falls, Pa.	Tubing	12,401
Balfour Guthrie & Co. Ltd., San Francisco	Pig iron	19,949
Barrett Equipment Co., St. Louis	Brake reliners	25,584
Bethlehem Steel Co., Bethlehem, Pa.	Buoys, sheet steel, tool steel, rail bars	206,824
Bliss & Laughlin Inc., Harvey, Ill.	Steel	32,141
Campbell Foundry Co., Harrison, N. J.	Castings	15,592
Capitol Steel & Iron Co., Oklahoma City, Okla.	Structural steel	11,445
Carnegie-Illinois Steel Corp., Pittsburgh	Bar steel, sheet steel, plates	76,826
Carolina Steel & Iron Co., Greensboro, N. C.	Gates, bulkhead frames	47,961
Copperweld Steel Co., Glassport, Pa.	Reinforcing fabric	224,625
Crane Co., Chicago	Valves	66,735
Crucible Steel Co. of America, New York	Bar steel	56,361
Dayton Type Inc., Dayton, O.	Stand assemblies	47,034
Dzus Fastener Co. Inc., Babylon, N. Y.	Fasteners	27,784
Eastern Rolling Mill Co., Baltimore	Ammunition, sheet steel	1,975,260
Elite Specialty Metal Co. Inc., New York	Buckles	26,980
Empire Machinery & Supply Corp., Norfolk, Va.	Sockets	11,550
Fairmount Tool & Forging Co., Cleveland	Wrenches	14,677
Foran Foundry & Mfg. Co., Flemington, N. J.	Castings	15,519
General Fireproofing Co., San Francisco	Shelving	38,972
General Motors Corp., Hyatt Roller Bearings division, Harrison, N. J.	Bearings	21,445
Gifford-Wood Co., Hudson, N. Y.	Steel boxes	31,590
Globe Machine & Stamping Co., Cleveland	Trays	26,000
Greene-Wolf Co. Inc., Brooklyn, N. Y.	Valves	11,994
Greenville Steel Car Co., Greenville, Pa.	Buoys	425,085
Harrisburg Steel Corp., Harrisburg, Pa.	Cylinders	41,717
Herring Hall Marvin Safe Co., Hamilton, O.	Yokes, rings	52,945
Hindley Mfg. Co., Valley Falls, R. I.	Cotter pins	11,248
Hunter Pressed Steel Co., Lansdale, Pa	Clamps	10,685
Indestro Mfg. Corp., Chicago	Wrenches	11,914
Indianapolis Stove Co., Indianapolis	Stoves	18,907
Kennedy-Van Saun Mfg. & Engineering Corp., Danville, Pa.	Baseplates	12,067
Kilby Steel Co. Inc., Anniston, Ala.	Clamps	54,000
Kline Iron & Metal Co., Columbia, S. C.	Structural steel, hardware	24,125
Keppers Co., American Hammered Piston Ring division, Baltimore	Piston rings	16,361
Kurzon, Charles, Inc., New York	Locks	16,200
Lapham-Hickey Co., Chicago	Steel	28,830
Leathem Smith Coal & Shipbuilding Co., Sturgeon Bay, Wis.	Hull and fittings	600,000
Logan Electric Specialty Mfg. Co., Chicago	Clamps	60,000
Lukens Steel Co., Coatesville, Pa.	Housings, forgings, steel plates	110,841
Mack-International Motor Truck Corp., Long Island City, N. Y.	Dump chassis	15,780
Maine Steel Inc., South Portland, Me.	Shackles, clamps	174,883
Michigan Steel Casting Co., Detroit	Tube couplings	15,023
Midland Structural Steel Co., Cicero, Ill.	Structural steel	48,840
Midvale Co., Philadelphia	Nickel steel	35,136
Mill Factor Products Co., New York	Reamers	11,236
Moto-Scoot Mfg. Co., Chicago	Rods	122,500
Mueller Co., Chattanooga, Tenn.	Gates, stands	15,012
Nashville Bridge Co., Nashville, Tenn.	Structural steel	36,870
National Can Corp., New York	Cans	60,376
National Tube Co., Pittsburgh	Flasks	228,347
Noland Co. Inc., Washington	Wrenches	10,409
Nye Tool & Machine Works, Chicago	Dies	16,964
Pacific States Steel Corp., San Francisco	Steel rivets	26,716
Pittsburgh Steel Co., Pittsburgh	Tubing	100,282
Pressed Steel Tank Co., West Allis, Wis.	Steel containers	14,320
Republic Steel Corp., Cleveland	Blanks, steel, iron roofing, iron, billets	710,060
Roebling's, John A., Sons Co., Trenton, N. J.	Shackles, clamps, jackstays	223,224
Roessing Mfg. Co., Pittsburgh	Steel coils	61,973
Rotary Electric Steel Co., Detroit	Steel	30,107
Rustless Iron & Steel Corp., Baltimore	Steel	104,211
Ryerson, Joseph T., & Son Inc., Chicago	Steel, sheets, bars, plates, rods	33,660
Southern Pipe & Casing Co., Azusa, Calif.	Pressure pipe	22,180
Southwest Welding & Mfg. Co., Alhambra, Calif.	Buoys	12,440
Stacey Bros. Gas Construction Co. Inc., Cincinnati	Gas holders	111,300
Stafford, N., Co., Brooklyn, N. Y.	Stencils, shields	18,608
Standard Pressed Steel Co., Jenkintown, Pa.	Cores	179,599
Steel Conversion & Supply Co., Castle Shannon, Pa.	Chisel-blanks	11,900
Sterling Steel Casting Co., St. Louis	Steel castings	19,601

WALSH-HEALEY ACT—

	Commodity	Amount
Iron and Steel Products		
Summerill Tubing Co., Bridgeport, Pa.	Tubing	$62,524.38
U. S. Steel Export Co., New York	Structural steel	121,925.00
Union Boiler & Mfg. Co., Lebanon, Pa.	Buoys	18,600.00
Union Twist Drill Co., Athol, Mass.	Hobs	14,774.97
United Aircraft Products Inc., Dayton, O.	Rod ends	11,527.30
Vincennes Steel Corp., Vincennes, Ind.	Structural steel	12,024.00
Walton East Branch Foundry Corp., Walton, N. Y.	Castings	15,282.55
Walworth Co., New York	Valves	30,161.93
Western Pipe & Steel Co. of California, Los Angeles	Buoys	54,348.00
Wire Rope Corp. of America Inc., New Haven, Conn.	Wire rope	13,248.00
Wolverine Pressed Steel Co., Grand Haven, Mich.	Handles	17,094.00
Worden-Allen Co., Milwaukee	Gates, bulkhead frames	16,850.00
Yale & Towne Mfg. Co., Stamford, Conn.	Locks, keys	32,572.25
Youngstown Sheet & Tube Co., Youngstown, O.	Sheet steel	29,898.89
Nonferrous Metals and Alloys		
Adams & Westlake Co., Elkhart, Ind.	Lights, reflectors	$11,713.50
Aluminum Co. of America, Pittsburgh	Conductor, aluminum alloy, antifriction metal	780,533.96
American Brass Co., Waterbury, Conn.	Brass tubing, bronze, copper	73,761.15
American Metal Co. Ltd., New York	Copper	108,700.00
American Smelting & Refining Co., New York	Bronze, manganese, zinc, copper, lead	221,470.71
Bohn Aluminum & Brass Corp., Detroit	Aluminum alloy	91,757.10
Bridgeport Brass Co., Bridgeport, Conn.	Copper pipes	12,552.25
Calumet & Hecla Consolidated Copper Co., New York	Ingot copper	48,200.00
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Copper, seamless tubing, bands	58,459.40
Foster Wheeler Corp., New York	Brass, copper pipe	114,956.00
General Time Instruments Corp., Thomaston, Conn.	Clocks	131,175.00
International Nickel Co. Inc., New York	Nickel-copper alloy	278,204.78
Kelly, John P., Philadelphia	Bronze castings	10,500.00
Kidde, Walter, & Co. Inc., New York	Fire extinguishers	258,636.30
Lewin Mathes Co., East St. Louis, Ill.	Copper tubing	16,040.00
Revere Copper & Brass Inc., Baltimore	Welding rods, condenser tubes, cartridge cups	232,403.09
Machinery and Other Equipment		
Acme Machine Tool Co., Cincinnati	Lathes	$38,354.10
Aerial Machine & Tool Corp., New York	Assemblies	40,320.00
Air Reduction Sales Co., New York	Regulators	27,250.00
Allen, H. F., Co. Inc., New York	Grinding machines	11,920.00
American Hoist & Derrick Co., St. Paul	Cranes	418,000.00
American Locomotive Co., New York	Engine parts	10,779.20
American Transformer Co., Newark, N. J.	Filter unit	10,775.00
Atlas Car & Mfg. Co., Cleveland	Locomotive	22,975.00
Atwater Mfg. Co., Plantsville, Conn.	Fuse plugs	118,125.00
Automatic Temperature Control Co. Inc., Philadelphia	Valves	30,842.50
Barnard Aviation Equipment Co. Inc., Ashley, Pa.	Pulleys	11,792.64
Barnes, W. F. & John, Co., Rockford, Ill.	Drilling machines	23,591.00
Bay State Elevator Co. Inc., Springfield, Mass.	Elevators	44,950.00
Bogue Electric Co., Paterson, N. J.	Motor generators	159,000.00
Bucyrus-Erie Co., South Milwaukee, Wis.	Crane	60,275.00
Bucyrus-Monighan Co., Chicago	Excavator	44,040.00
Buda Co., Harvey, Ill.	Diesel engine parts, generator sets	542,960.76
Bullard Co., Bridgeport, Conn.	Mills	109,513.75
Bulotti, C. F., Machine Co., San Francisco	Lathes	10,473.50
Burns, Jabez, & Sons Inc., New York	Coffee roasting units	10,343.00
Carey Machine & Supply Co., Baltimore	Lathes	21,988.66
Caterpillar Tractor Co., Peoria, Ill.	Tractors	239,324.00
Chicago Pneumatic Tool Co., New York	Drills, borers, grinders, wrenches, air compressor	94,139.35
Cincinnati Bickford Tool Co., Cincinnati	Drills	14,118.50
Cincinnati Gilbert Machine Tool Co., Cincinnati	Boring machines	28,650.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	47,393.00
Cincinnati Shaper Co., Cincinnati	Power press brakes	12,366.00
Cleveland Automatic Machine Co., Cleveland	Screw machines	28,999.55
Cleveland Tractor Co., Cleveland	Tractors	32,654.44
Colson Corp., Elyria, O.	Hand trucks	10,026.51
Columbia Steel Co., San Francisco	Anchors	341,850.00
Consolidated Shipbuilding Corp., New York	Engine parts	14,341.33
C-O-Two Fire Equipment Co., Newark, N. J.	Transfer units	15,045.00
Cowles Tool Co., Cleveland	Cutters	17,436.00
Cuno Engineering Corp., New York	Oil filters	11,347.56
Davidson, M. T., Co., Brooklyn, N. Y.	Pumps	17,761.80
De Laval Steam Turbine Co., Trenton, N. J.	Pumps	19,104.00
Denison Engineering Co., Columbus, O.	Test stands	425,000.00
Dixie Mill Supply Co. Inc., Shreveport, La.	Lathes, grinders	18,712.50
Electric Arc Cutting & Welding Co., Newark, N. J.	Generators	24,320.00
Engineering Products Co., Los Angeles	Winches	20,280.00
Florence Pipe Foundry & Machine Co., Philadelphia	Bending machine	10,512.00
Franklin Sales Co. Inc., Ft. Myers, Fla.	Mowers	11,627.60
Gardner-Denver Co., Quincy, Ill.	Compressors, parts, tools	13,917.51
General Electric Co., Schenectady, N. Y.	Locomotives	19,879.00

(*Please turn to Page* 50)

Week's Government Defense Contracts

(*Concluded from Page* 48)

hardware, $1138.98.
Weidemann Machine Co., Philadelphia, gages, $2781.
Weldon Tool Co., Cleveland, cutters, $1132.50.
Wilson, Andrew, Co., Lawrence, Mass., steel shelving, $1129.50.
Worcester Taper Pin Co., Worcester, Mass., nuts and taper pins, $1092.64.
Wyoming Tool & Die Co., Philadelphia, gages, $29,380.
Youngstown Sheet & Tube Co., Youngstown, O., steel, $3134.23.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $1860.72.

Corps of Engineers Awards

American Blue Print Co., New York, drafting equipment, $30,989.75.
American Hoist & Derrick Co., St. Paul, locomotives, $418,000.
Ames Baldwin Wyoming Co., Parkersburg, W. Va., shovels, $36,170.88.
Buffalo-Springfield Roller Co., Springfield, O., rollers, $34,825.
Caterpillar Tractor Co., Peoria, Ill., tractors, $239,324.
County Supply Co., Plainfield, N. J., drills, $24,307.25.
Flour City Ornamental Iron Co., Minneapolis, tiring reels, $22,176.
Fruehauf Trailer Co., Kansas City, Mo., trailers, $4,465,040.
General Cable Corp., Buffalo, N. Y., copper wire, $41,650.
Graybar Electric Co. Inc., New York, lineman's climbers, $8850.
Greenville Steel Car Co., Greenville, Pa., box cars, $60,940.
Haffner-Thrall Car Co., Chicago Heights, Ill., railroad cars, $23,942.10.
LeTourneau, R. G., Inc., Peoria, Ill., construction equipment, $74,416.
Lord & Burnham Co., Irvington, N. Y., duckboards for footbridges, $1885.
Maclane Hardware Co., New York, tools, $84,115.50.
Mills-Morris Co., Washington, tools, clippers, cutters, $78,121.90.
Natural Asphalt Co. of Virginia, Richmond, Va., distributors, $28,980.
Ohio Locomotive Crane Co., Bucyrus, O., locomotive cranes, $20,420.
Puget Sound Bridge & Dredging Co., Seattle, dredging slip, Seattle port of embarkation, $61,512.
Triumph Mfg. Co., Chicago, galvanometers, $26,880.
Vulcan Iron Works, Wilkes-Barre, Pa., locomotives, $205,000.
Walker Mfg. Co. of Wisconsin, Racine, Wis., jacks, $30,327.
Weil, J. H., & Co., Philadelphia, computers, $27,645.
Woodings-Verona Tool Works, Verona, Pa., bars, $10,528.13.

Quartermaster Corps Awards

Alan-Lawrence Co. Inc., New York, temporary housing, Ft. Hancock, New Jersey, $97,350.
Diamond T. Motor Car Co., Chicago, 4-ton trucks, $737,154.
Fargo Motor Co., Detroit, ½-ton trucks, $13,354.
Ford Motor Co., Alexandria, Va., light cars, $312,600.
General Motors Corp., Chevrolet division, Detroit, trucks, $8,678,085.01.
Gramm Motor Truck Co., Delphos, O., semi-trailers, $56,934.90.
Hooper, C. A., Co., Madison, Wis., electric distribution and light system, Jeffersonville quartermaster's depot, Indiana, $234,432.
Lavine Gear Co., Milwaukee, 1-ton trailers, $703,500.
Mack Mfg. Corp., Long Island City, N. Y., 2½-ton water tank trucks, $3390.
Mion Construction Co., Atlanta, Ga., temporary buildings, Lawson field, Ft. Benning, Georgia, $237,000.
Rendle, Roy B., Co., Malden, Mass.,

wharves, Ft. Warren, (harbor defenses of Boston), $51,992.
Simonds, John H., Portland, Me., wharves at Ft. Levett, (harbor defenses of Portland, Me.) $51,986.
Watson Automotive Equipment Co., Washington, semi-trailers, $52,097.11
Winter-Weiss, Denver, semi-trailers, $71,460.

Air Corps Awards

Bendix Aviation Corp., Pioneer Instrument division, Bendix, N. J., assemblies, $308,000.
Boeing Aircraft Co., Seattle, armor plate protection, $77,805.
Denison Engineering Co., Columbus, O., stand assemblies, $425,000.
Electric Wheel Co., Quincy, Ill., trailers, $74,500.
Goodyear Tire & Rubber Co., Akron, O., wheel and brake assemblies, $923,504.
Kidde, Walter, & Co. Inc., New York, fire extinguishers, $258,636.30.
Lights Inc., Alhambra, Calif., sets, $85,507.20.
Lights Inc. and Fritz Ziebarth, Alhambra, Calif., field lighting sets, $613,605.
Pollak Mfg. Co., Arlington, N. J., assemblies, $33,250.
United Aircraft Corp., Hamilton Standard Propellers division, East Hartford, Conn., propeller assemblies, $77,064.
Wesson Co., Detroit, drills, $29,132.57.
Weston Electrical Instrument Corp., Newark, N. J., indicators, $148,534.
Wright Aeronautical Corp., Paterson, N. J., maintenance parts for Wright aeronautical engines, $241,537.29.

Medical Corps Awards

Acme Shear Co., Bridgeport, Conn., scissors, $7020.
American Cystoscope Makers Inc., New York, surgical instruments, $11,708.45.
Bramhall-Deane Co., New York, laboratory autoclaves, $5408.
Buck X-Ograph Co., St. Louis, intensifying screen, X-ray field unit, $22,325.
Chayes Dental Instrument Corp., New York, dental equipment, $11,104.50.
Colson Corp., Elyria, O., food carts, $24,220.
Crannell, Nugent & Kranzer Inc., New York, lamps, $7582.25.
Crescent Surgical Sales Co., New York, surgical instruments, $39,403.
Dittmar, F., & Co. Inc., Philadelphia, surgical instruments, $14,128.70.
Gamp Electric Co., St. Louis, light fixtures, $5696.75.
General Electric Supply Corp., Washington, refrigerators, $5267.
General Electric X-Ray Corp., New York, stereoscope, $15,000.
General Fireproofing Co., Youngstown, O., hospital furniture, $5080.80.
Harris Hub Bed Spring Co., Cicero, Ill., folding beds, $31,380.
Haslam, Fred, & Co. Inc., Brooklyn, N. Y., surgical instruments, $20,860.
Laboratory Furniture Co., New York, laboratory equipment, $6261.
Lalance & Grosjean Mfg. Co., New York, mess and hospital equipment, $6588.29.
Langbein, Wm., & Bros., New York, surgical instruments, $44,552.
Logan Co., Louisville, Ky., folding beds, $26,730.
Midco Mfg. & Distributing Co. Inc., Sheboygan, Wis., motor generator, $17,500.
Onan, D. W., & Sons, Minneapolis, motor generator, $15,170.
Penn Surgical Mfg. Co., Philadelphia, surgical equipment, $52,983.56.
Pilling, George P., & Son Co., Philadelphia, forceps, $16,848.75.
Royal Metal Mfg. Co., Chicago, hospital furniture, $12,130.50.
Royal Typewriter Co., New York, typewriters, $5250.
Simmons Co., New York, wheeled carriages, $6617.10.
Singer Sewing Machine Co., St. Louis, sewing machines, $5225.
Sklar, J., Mfg. Co., New York, surgical instruments, $44,941.95.
Spencer Lens Co., San Francisco, laboratory equipment, microscopes, $19,403.90.
Standard X-Ray Co., Chicago, X-ray equipment, $15,615.
Superior Sleeprite Corp., Chicago, hospital furniture, $9704.50.
Tiemann, George, & Co., New York, surgical instruments, $1700.
Vollrath Co., Sheboygan, Wis., mess equipment, $29,445.80.
Wallace, R., & Sons Mfg. Co., Wallingford, Conn., knives, $10,587.26.
Westinghouse Electric & Mfg. Co., East

WALSH-HEALEY PURCHASES

(*Concluded from Page 49*)

Machinery and Other Equipment	Commodity	Amount
General Elevator Co., Atlanta, Ga.	Elevator	$10,291.00
General Motors Corp., Cleveland Diesel Engine division, Cleveland	Diesel engine parts	17,998.48
General Steel Castings Corp., Eddystone, Pa.	Anchors	96,612.00
Gisholt Machine Co., Madison, Wis.	Balancing machine, lathes	46,567.90
Greenville Steel Car Co., Greenville, Pa.	Railroad car	60,940.00
Haffner-Thrall Car Co., Chicago	Railroad car	23,942.10
Hanssen's, Louis, Sons, Davenport, Iowa	Jacks	38,520.00
Hardinge Bros. Inc., Elmira, N. Y.	Milling machine	10,058.00
Industrial Brownhoist Corp., Bay City, Mich.	Cranes	508,960.00
Ingersoll-Rand Co., New York	Compressors, compressor parts, pneumatic hammers	240,525.75
Insinger Machine Co., Philadelphia	Dishwashing machines	35,609.25
International Harvester Co. Inc., Chicago	Tractors	29,841.83
Iron & Steel Products Inc., Chicago	Baggage cars	17,430.00
Kidde, Walter, & Co. Inc., New York	Cylinders	10,350.00
Lakeside Bridge & Steel Co., Milwaukee	Cranes	129,150.00
Leece-Neville Co., Cleveland	Diesel engine parts	18,369.50
Lees-Bradner Co., Cleveland	Milling machines	35,530.00
Leland-Gifford Co., Worcester, Mass.	Drilling machines	46,880.00
LeTourneau, R. G., Inc., Peoria, Ill.	Carryall, crane	74,416.00
Lidgerwood Mfg. Co., Elizabeth, N. J.	Windlasses	28,889.00
Little, Arthur D., Cambridge, Mass.	Distilling unit	22,000.00
Lloyd & Arms Inc., Philadelphia	Drills	23,218.00
Mahr Mfg. Co., Minneapolis	Furnaces	11,947.02
Maxson, W. L., Corp., New York	Fuse setters	14,000.00
Milton Equipment Co., Philadelphia	Metal working machinery	13,800.00
Monarch Machine Tool Co., Sidney, O.	Lathes	39,116.00
Moore Eastwood & Co., Dayton, O.	Generators	94,341.00
National Acme Co., Cleveland	Screw machines	1,971,330.00
National Twist Drill & Tool Co., Detroit	Drills	11,469.60
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Metal shapers, reproducing machines	84,501.00
Ohio Locomotive Crane Co., Bucyrus, O.	Crane	20,420.00
Pacific Car & Foundry Co., Seattle	Railroad cars	16,500.00
Pacific Marine Supply Co., Seattle	Pumps	32,632.50
Peck Stow & Wilcox Co., Southington, Conn.	Metal working machinery	23,837.70
Philadelphia Gear Works Inc., Philadelphia	Speed reducers	71,688.00
Philips & Davies Inc., Kenton, O.	Gate hoists, dogging devices	180,000.00
Pittsburgh Steel Foundry Corp., Glassport, Pa.	Anchors	431,298.00
Pneumatic Scale Corp. Ltd., Norfolk Down, Mass.	Labelers	15,120.00
Porter, H. K., Co. Inc., New York	Locomotives	82,750.00
Prentiss, Henry, & Co. Inc., New York	Lathes	60,048.00
Proctor & Schwartz Inc., Philadelphia	Machines	24,060.00
Reed-Prentice Corp., Worcester, Mass.	Lathes	25,630.00
Robbins & Myers Inc., Hoist & Crane division, Springfield, O.	Hoists	11,952.00
Rockford Machine Tool Co., Rockford, Ill.	Shapers, planer, slotter	59,230.00
St. Joe Machines Inc., St. Joseph, Mich.	Washing machines	14,270.00
Samuel Machinery Co., Philadelphia	Grinding machines	12,500.00
Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.	Winches	146,828.00
Scovill Mfg. Co., Waterbury, Conn.	Primer assemblies, fuse parts	4,319,144.00
Seneca Falls Machine Co., Seneca Falls, N. Y.	Lathes	35,930.00
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.	Hoist mechanisms	13,365.00
Shipley, W. E., Machinery Co., Philadelphia	Spindle machines	20,205.00
Smith, A. O., Corp., Milwaukee	Converter vessels	131,130.00
Standard Steel Works, North Kansas City, Mo.	Tank trailers, dollies	941,554.00
Sterling Engine Co., Buffalo	Generator	13,644.00
Tidewater Supply Co. Inc., Norfolk, Va.	Milling machine	10,655.50
Triumph Mfg. Co., Chicago	Galvanometers	26,880.00
Underwood, H. B., Corp., Philadelphia	Milling machines	15,775.00
United Engineering & Foundry Co., Pittsburgh	Forging presses	1,972,182.00
Vulcan Iron Works Co., Denver	Coining presses	19,415.00
Warner & Swasey Co., Cleveland	Lathes	39,245.00
Wayne Tool Co., Waynesboro, Pa.	Reamers	11,223.50
Worthington Pump & Machine Corp., Harrison, N. J.	Pumps	54,298.00
Yale & Towne Mfg. Co., Stamford, Conn.	Pumps	191,688.00
York Corrugating Co., York, Pa.	Metal working machinery	16,836.60
York Ice Machinery Corp., York, Pa.	Refrigerating plants, low temperature chamber	63,366.42
York Machinery & Supply Co., York, Pa.	Lathes	35,752.00

Pittsburgh, Pa., refrigerators, $15,520.
White, S. S., Dental Mfg. Co., New York, dental equipment, $128,593.

Chemical Warfare Service Award

United-Carr Fastener Corp., Cambridge, Mass., clips and dies, $3697.14.

♦

Navy department announced the following:

Bureau of Supplies and Accounts Awards

Allis-Chalmers Mfg. Co., Milwaukee, rough machined shafts, $23,052.
Alteneder, Theo., & Sons, Philadelphia, rolling rules, $5482.50.
Aluminum Goods Mfg. Co., Manitowoc, Wis., aluminum platters, $6120.
Aluminum Products Co., La Grange, Ill., aluminum tureens, $6040.
American Smelting & Refining Co., New York, pig lead, $11,000.
American Steel & Wire Co., Cleveland, electric cable, $262,074.70.
American Type Founders Sales Corp., Elizabeth, N. J., printing equipment, $5369.74.
Anaconda Wire & Cable Co., New York, multi-conductor cable, electric cable, $98,259.70.
Austin-Hastings Co. Inc., Cambridge, Mass., motor shapers, $125,850.72.
Bates Mfg. Co., New York, paper fasteners, $22,125.
Beall Pipe & Tank Corp., Portland, Oreg., gasoline tanks, $16,950.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., aircraft starters, $452,520.
Blanchard, N. J., Boat Co., Seattle, aircraft rescue boats, $142,233.84.
Blanchard Machine Co., Cambridge, Mass., surface grinder, $7889.
Bridgeport Brass Co., Bridgeport, Conn., brass discs, $51,040.
Calumet & Hecla Consolidated Copper Co., New York, ingot copper, $54,225.
Camden Forge Co., Camden, N. J., propeller shafts, $8940.
Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $8189.70.
Columbia Steel & Shafting Co., Pittsburgh, bar steel, $21,647.55.
Consolidated Supply Co., Portland, Oreg., iron and steel pipe, $61,340.75.
Cuyahoga Steel & Wire Co., Cleveland, bar steel, $12,117.79.
Driver-Harris Co., Harrison, N. J., nickel-copper alloy, $5227.50.
Erie Forge Co., Erie, Pa., rough machined shafts, $23,185.50.
Evans Lead Corp., Charleston, W. Va., dry red lead, $21,335.70.
Federal Motor Truck Co., Detroit, motor trucks, $20,885.
Frederick Iron & Steel Co., Frederick, Md., gasoline pumps, $7749.80.
Freeport Point Shipyards Inc., Freeport, Long Island, N. Y., aircraft boats, $225,296.50.
Fuller, E. C., Co., New York, printing equipment, $6680.
Gardner-Denver Co., Quincy, Ill., motor-driven air compressors, $193,512.
General Cable Corp., New York, electric cable, $799,961.90.
General Electric Co., Schenectady, N. Y., electric cable, $7084.15.
General Electric Supply Corp., Schenectady, N. Y., incandescent sockets, $26,842.50.
General Motors Corp., Detroit, fire and rescue trucks, $98,930.70.
Gingras Boat Works Inc., Cocoa, Fla., aircraft rescue boat, $46,203.96.
Gisholt Machine Co., Madison, Wis., turret lathes, $47,600.50.
Gould & Eberhardt, Newark, N. J., gear hobbing machine, $13,004.
Greenberg's, M., Sons, San Francisco, globe valves, $16,284.
Hager, C., & Sons Hinge Mfg. Co., St. Louis, marine butt and brass strap hinges, $66,171.39.
International Harvester Co. Inc., Chicago, motor trucks, $46,914.28.
International Nickel Co. Inc., New York, nickel-copper alloy, $30,666.25.
Kearney & Trecker Corp., Milwaukee, milling machines, $118,101.90.
Keuffel & Esser Co., Hoboken, N. J., drawing curves and scales, $7346.50.
Lietz, A., Co., San Francisco, bearing circles, $11,875.
Morse Chain Co., Ithaca, N. Y., chains and sprockets, $16,377.92.
Mystic Shipyard Inc., West Mystic, Conn., aircraft rescue boat, $48,078.70.
National Electric Products Corp., Pittsburgh, electric cable, $260,999.70.
National Lead Co., Pacific Coast branch, San Francisco, dry red lead, $31,145.
Niagara Machine & Tool Works, Buffalo, shearing machines, $17,748.
Norwalk Tank Co. Inc., South Norwalk, Conn., gasoline tanks, $25,678.30.
Okonite Co., Passaic, N. J., electric cable, $161,865.25.
Old Dominion Paper Co., Norfolk, Va., paper clips, office pins, $13,677.
Perine Machinery & Supply Co. Inc., Seattle, vertical boring mill, $34,002.50.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, Columbus, O., electric cable, $95,114.96.
Rockbestos Products Corp., New Haven, Conn., electric cable, $561,760.40.
Rockford Machine Tool Co., Rockford, Ill., hydraulic shapers, $46,504.40.
Shepard Niles Crane & Hoist Corp., Philadelphia, electric cranes, $21,006.25.
Snow Shipyards Inc., Rockland, Me., coastal mine sweepers, $604,000.
South Coast Co., Newport Beach, Calif., aircraft boats, $206,098.40.
Spencer Lens Co., Buffalo, N. Y., prismatic binoculars, $10,400.
Struthers Wells-Titusville Corp., Titusville Forge division, Titusville, Pa., steel forgings, $172,152.
Tagliabue, C. J., Mfg. Co., Brooklyn, N. Y., thermometers, $50,146.40.
United Aircraft Corp., Hamilton Standard Propellers division, East Hartford, Conn., propeller blades, $73,267.75.
Weinstein, S., Supply Co., New York, steel hinges, wrenches, $21,087.64.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., dynamometer equipment, electric fans, $148,954.
Wheeler Shipyard Inc., Brooklyn, N. Y., aircraft boat, $52,128.
Yates-American Machine Co., Beloit, Wis., woodwork shapers, $7313.72.

Canadian War Orders Aggregate $28,064,002

TORONTO, ONT.

■ Canada will enlarge its shipbuilding program immediately by launching a $6,000,000 program for the construction of fast motor torpedo boats, minesweepers and other small vessels, according to C. D. Howe, minister of munitions and supply. Dominion shipyards to date have launched 45 corvettes and 13 minesweepers; 18 additional minesweepers and 14 corvettes will be completed by May.

Dominion Bridge Co., Lachine, Que., has received contract for construction of a floating dry dock to cost between $2,500,000 and $3,000,000, and which will be built "somewhere in eastern Canada."

Orders placed during the week ended Jan. 31 aggregated 2392 and were valued at $28,064,002. United States companies received awards valued at $7,618,149. The orders:

Government plants: Dominion Bridge Co. Ltd., Lachine, Que., $150,000.

Capital expenditure: Cock & Leitch, Montreal, $23,850; Standard Chemical Co. Ltd., Montreal, $60,000; Fairchild Aircraft Ltd., Longueuil, Que., $121,880.

Ordnance: Small Arms Ltd., Toronto, $180,000.

Munitions: International Flare-Signal

(*Please turn to Page* 124)

Floating Steel and Concrete Forts Used by Britain

■ **Huge steel and concrete sea forts of this type, heavily armed and anchored off the coast of England, are described as the United Kingdom's first line of defense. Forts are manned jointly by army and navy personnel. At left is a supply ship approaching a unit of the southern command. Picture at right shows anti-aircraft gunners at alert by their 3-inch gun. NEA photo, passed by censor**

Success in Defense Is More Important Than Politics

■ SOME politicians seem to be unable to understand how a man who was positively anti-Roosevelt and anti-new deal in 1939 and 1940 can be in favor of granting the President increased powers under the aid-to-Britain bill in 1941.

Senator Nye heckled Secretary of the Navy Knox on this point a few weeks ago.

Last Tuesday Senator Hiram Johnson and others tried the same tactics on Wendell Willkie. They pointed out that in his election campaign he expressed the fear that Mr. Roosevelt would become a dictator. If Mr. Willkie felt that way about it in 1940, they reason, how can he now favor a bill that will grant even greater authority to the President?

♦ ♦ ♦

Willkie's answer was logical. He said, "I'm apprehensive of every new grant of power to the executive . . . but if there is not enough flexibility in this bill the Nazis may not be stopped."

The high-pitched rejoinder of the veteran Senator Carter Glass was even more to the point: "It's better to have a home-made dictator than Hitler, isn't it?"

♦ ♦ ♦

This issue should be of interest to industrialists because most of them are in exactly the same position as Frank Knox and Wendell Willkie.

Like Knox and Willkie, they have been greatly disturbed in recent years by the increasing authority vested in the office of the President. They really feared not only a dictatorship but also the gradual disintegration of private enterprise.

They still are gravely concerned about the danger of concentrated power in the government and in the executive. They are as apprehensive as ever—if not more so—concerning the fate of private enterprise.

However, under existing circumstances, they are compelled to choose between two evils.

On one hand is the choice of making sure that our defense is adequate and in so doing give the President additional authority. The alternative is to deny him extra powers and to run the risk of standing alone against the totalitarian might of the world.

Majority opinion in industry holds that the former is the lesser of two evils.

Moreover, industry is on trial before the jury of the American people. Industrialists dominate OPM from top to bottom. They are in a strategic position of opportunity and of responsibility to make or break the defense program.

♦ ♦ ♦

Industry is not going to sulk nor engage in petty argument about authority. It is going to do its utmost to assist its representatives in OPM to put over the defense program in a big way.

It will do this because of patriotic instincts and because it knows that if the industrialists now in OPM fail, anti-business new dealers will take over the job.

That would spell the doom of private initiative.

Industrialists, in submerging pre-emergency attitudes, are proving to be more realistic than some of the politicians who —once supported liberally by industrialists —now are chiding them for their co-operative spirit.

E. L. Shaner

EDITOR-IN-CHIEF

The BUSINESS TREND

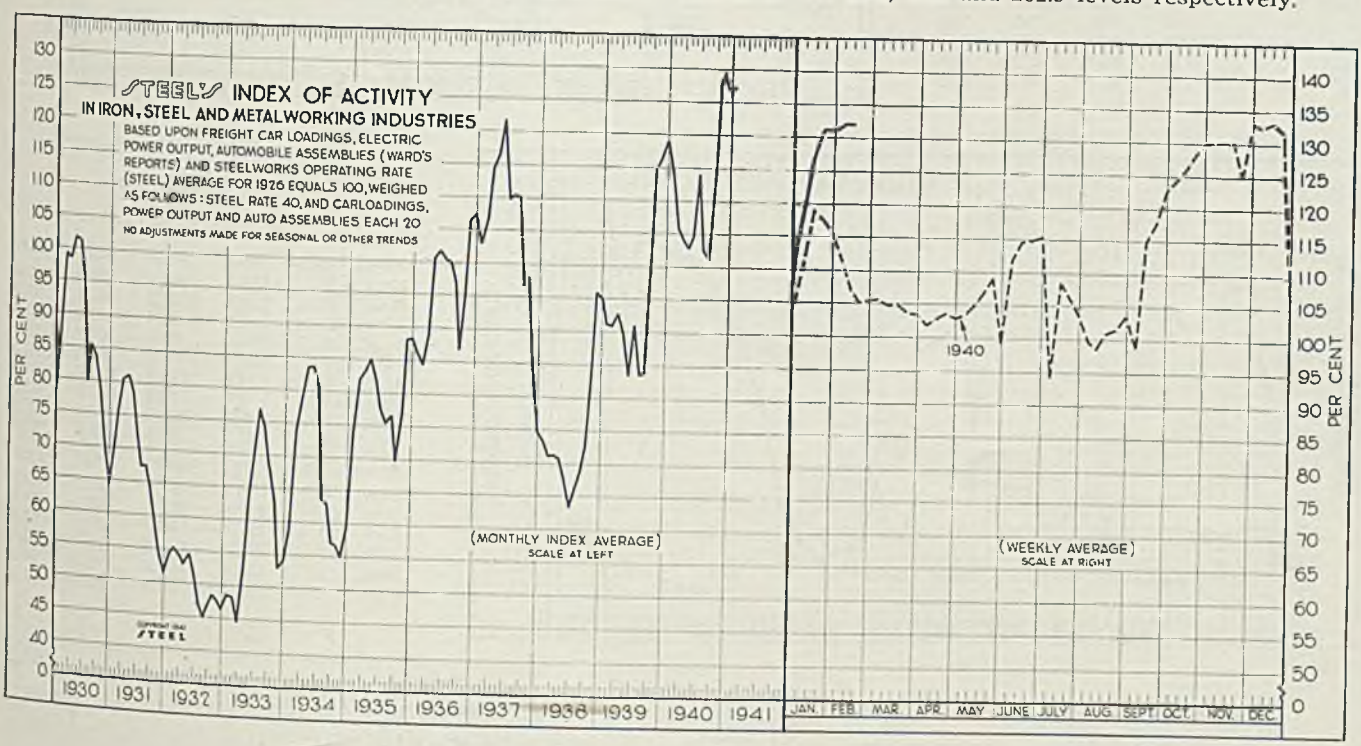
Industrial Indicators Record Little Change

■ PACE of industrial activity in the iron, steel and metalworking industries has recorded only minor fluctuations in recent weeks. New orders continue to exceed output in a number of instances and manufacturers are finding it difficult to improve on the record-breaking operating schedules. With the completion of the new production facilities now underway, the present level of industrial activity is expected to reach a new high plateau in the near future.

Reflecting the intensive forward buying movement throughout the latter part of last year, manufacturers' inventories in 1940 increased $1,200,000,000, according to the department of commerce. This expansion in stocks compared with a substantial rise of $775,000,000 in 1939. The department's inventory index in December rose three points to 119.3 per cent of the Dec. 31, 1938 average. At the end of 1939 the index was 107.3.

The extent purchasing agents are seeking protection on deliveries is indicated by the recent report of the Detroit Purchasing Agents' association which states 62 per cent of its members during January were buying from six months to a year ahead, against only 36 per cent the previous month and 12 per cent a year ago.

During the week ended Feb. 8, STEEL's index declined from the previous week to 131.9. At this time a year ago the index stood at 107.2, while in the corresponding week of 1939, 1938 and 1937 the index was at the 92.1, 71.2 and 101.9 levels respectively.

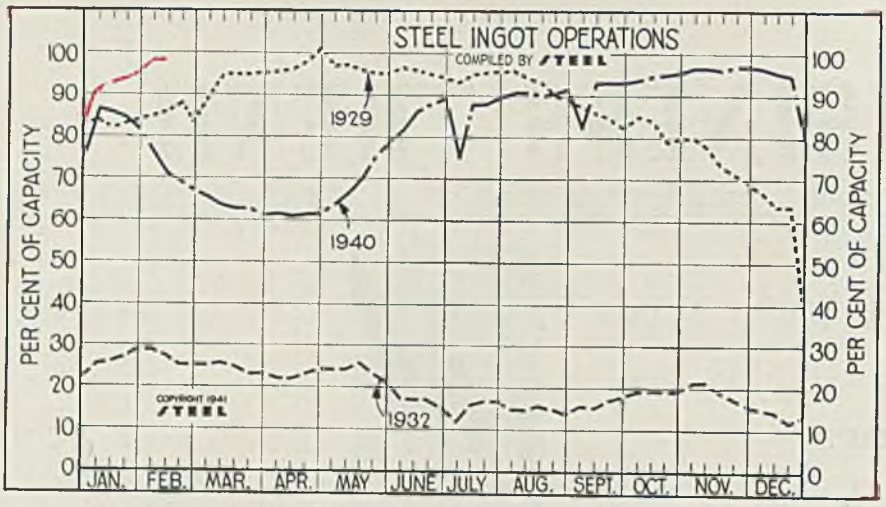


STEEL'S index of activity gained 0.1 point to 131.9 in the week ended Feb. 8:

Week Ended	1940	1939
Dec. 7	132.5	123.9
Dec. 14	132.6	124.2
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	131.9	107.2

†Preliminary.

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.	.....	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	69.7	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



Steel Ingot Operations

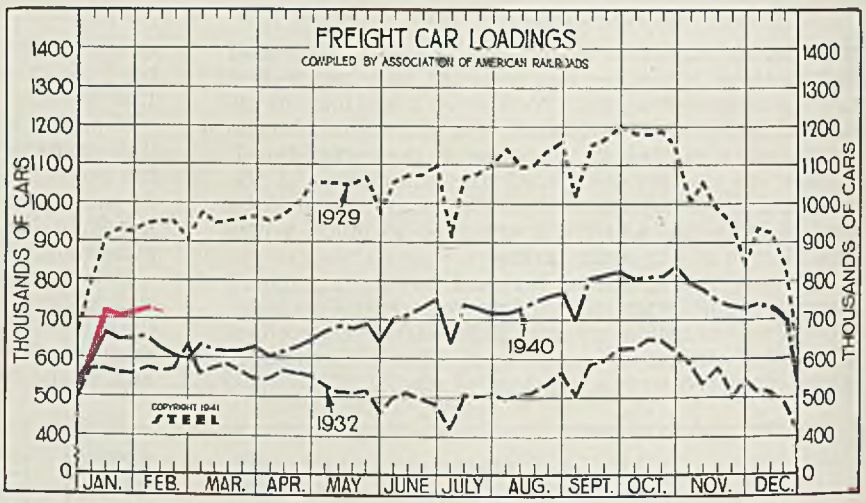
(Per Cent)

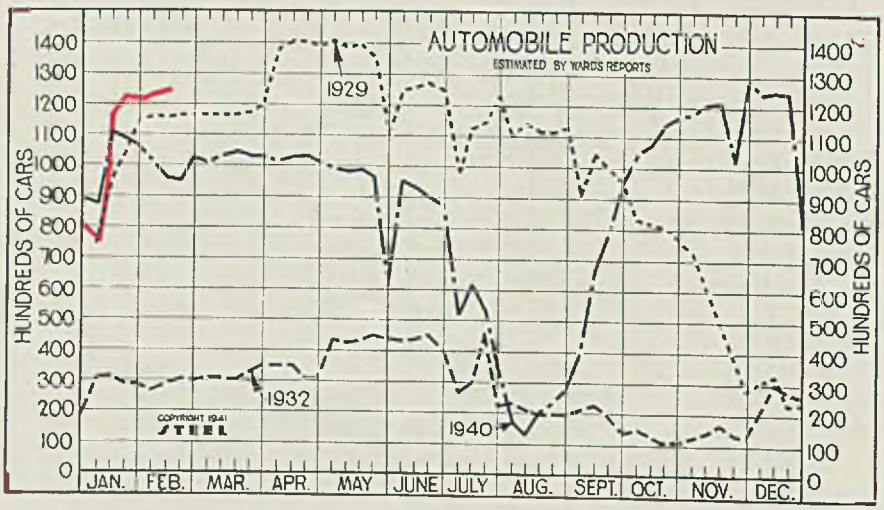
Week ended	1940	1939	1938	1937
Oct. 26....	95.5	92.0	54.5	51.0
Nov. 2....	96.5	93.0	57.5	47.0
Nov. 9....	96.5	93.0	61.5	39.0
Nov. 16....	96.0	93.5	63.0	35.0
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	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	21.0
Jan. 11....	93.0	86.0	52.0	26.0
Jan. 18....	94.5	84.5	51.5	29.0
Jan. 25....	95.5	81.5	51.5	30.5
Feb. 1....	97.0	76.5	53.0	33.0
Feb. 8....	97.0	71.0	54.0	31.0

Freight Car Loadings

(1000 Cars)

Week ended	1940	1939	1938	1937
Nov. 2.....	795	806	673	732
Nov. 9.....	778	786	637	690
Nov. 16.....	745	771	657	647
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	655	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	457
Jan. 11.....	712	668	587	552
Jan. 18.....	703	646	590	581
Jan. 25.....	711	649	594	570
Feb. 1.....	714	657	577	553
Feb. 8.....	710	627	580	565





Auto Production

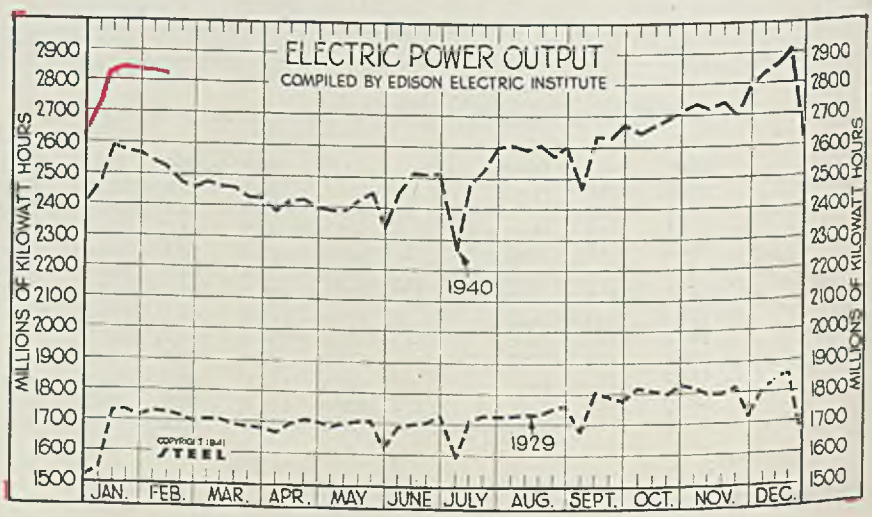
(1000 Units)

Week ended	1940	1939	1938	1937
Nov. 2....	118.1	82.7	80.0	89.8
Nov. 9....	120.9	86.2	86.3	85.3
Nov. 16....	121.9	86.7	96.7	85.8
Nov. 23....	102.3	72.5	84.9	59.0
Nov. 30....	128.8	93.6	97.8	86.2
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	49.6
Jan. 11....	115.9	111.3	86.9	54.1
Jan. 18....	124.0	108.5	90.2	65.7
Jan. 25....	121.9	106.4	89.2	65.4
Feb. 1....	124.4	101.2	79.4	59.4
Feb. 8....	125.0	96.0	84.5	51.4

Electric Power Output

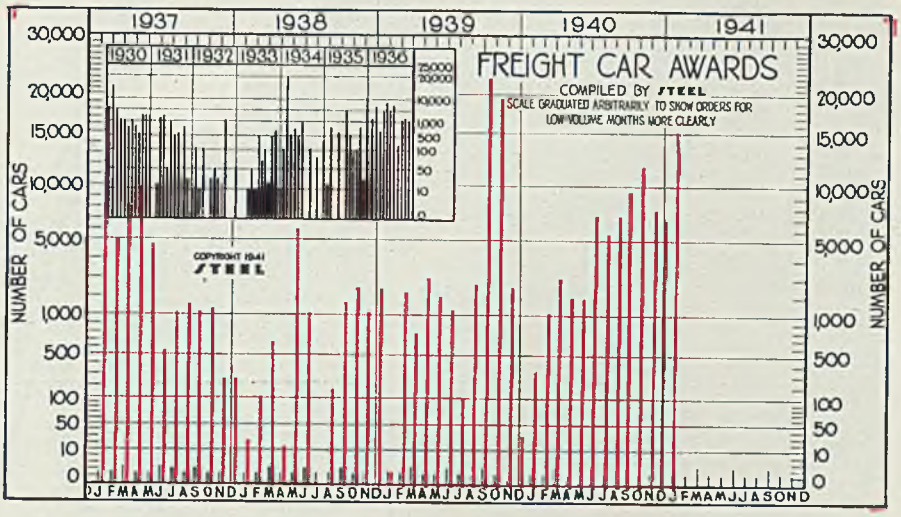
(Million KWH)

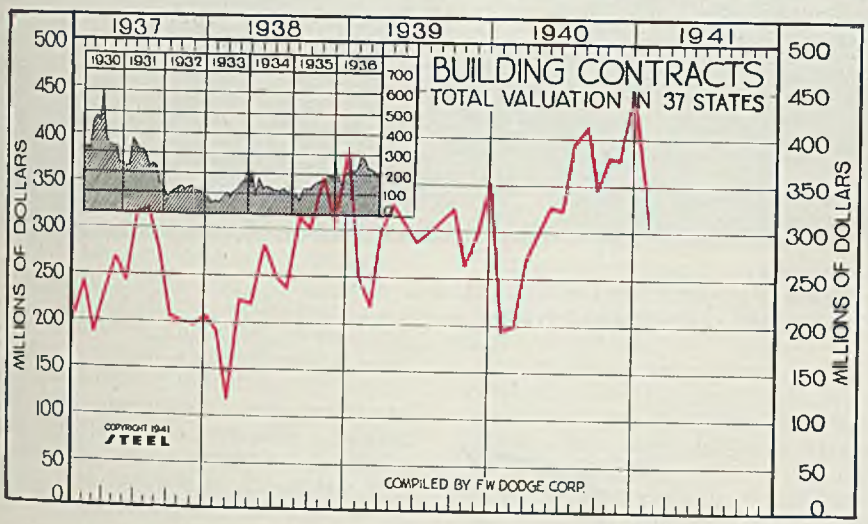
Week ended	1940	1939	1938	1937
Nov. 2...	2,734	2,537	2,207	2,202
Nov. 9...	2,720	2,514	2,209	2,176
Nov. 16...	2,752	2,514	2,270	2,224
Nov. 23...	2,695	2,482	2,184	2,065
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	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	1,998
Jan. 11...	2,835	2,593	2,270	2,140
Jan. 18...	2,844	2,572	2,290	2,115
Jan. 25...	2,830	2,566	2,293	2,109
Feb. 1...	2,830	2,541	2,287	2,099
Feb. 8...	2,824	2,523	2,268	2,082



Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	.....	1,147	2,259	109
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





Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1941	1940	1939	1938	1937
Jan.	$305.2	$196.2	$251.7	$192.2	$242.7
Feb.	.....	200.6	220.2	118.9	188.3
Mar.	.....	272.2	300.7	226.6	231.2
April	.....	300.5	330.0	222.0	269.5
May	.....	328.9	308.5	283.2	243.7
June	.....	324.7	288.3	251.0	317.7
July	.....	398.7	299.9	239.8	321.6
Aug.	.....	414.9	312.3	313.1	281.2
Sept.	.....	347.7	323.2	300.9	207.1
Oct.	.....	383.1	261.8	357.7	202.1
Nov.	.....	380.3	299.8	301.7	198.4
Dec.	.....	456.2	354.1	389.4	209.5
Ave.	.....	$333.7	$295.9	$266.4	$242.8

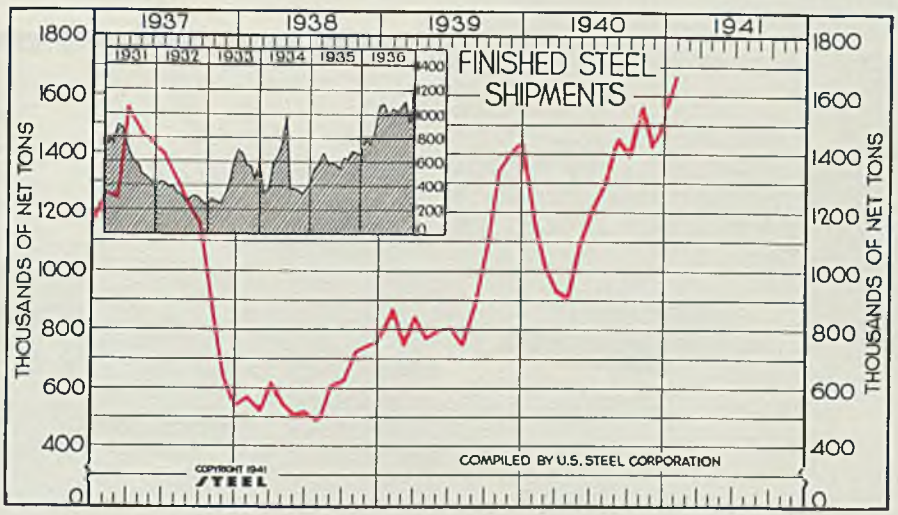
Finished Steel Shipments

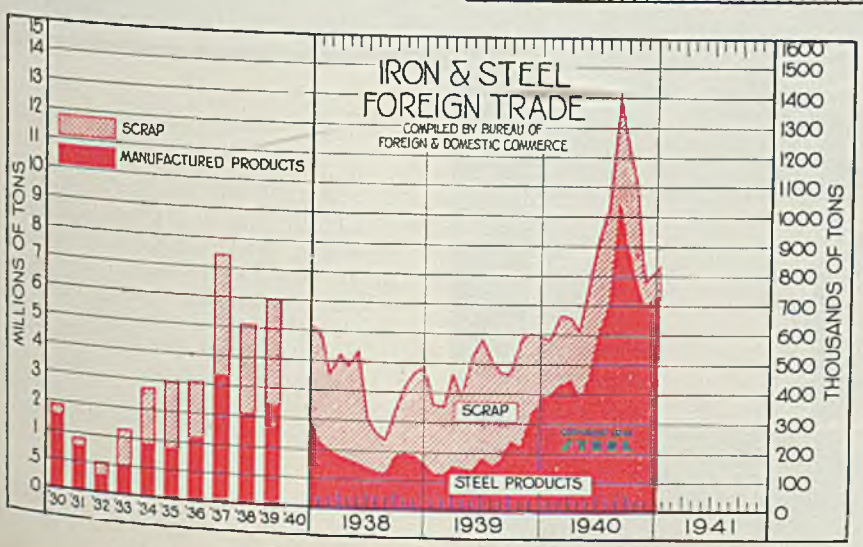
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1941	1940	1939	1938	1937
Jan.	1682.5	1145.6	870.9	570.3	1268.4
Feb.	.....	1009.3	747.4	522.4	1252.8
Mar.	.....	931.9	845.1	627.0	1563.1
Apr.	.....	907.9	771.8	550.5	1485.2
May	.....	1084.1	795.7	509.8	1443.5
June	.....	1209.7	807.6	525.0	1405.1
July	.....	1296.9	745.4	484.6	1315.3
Aug.	.....	1455.6	885.6	615.5	1225.9
Sept.	.....	1392.8	1086.7	635.6	1161.1
Oct.	.....	1572.4	1345.9	730.3	876.0
Nov.	.....	1425.4	1406.2	749.3	648.7
Dec.	.....	1544.6	1444.0	765.9	539.5
Tot.†	.....	14976.1	11707.3	7315.5	14097.7

†After year-end adjustments.



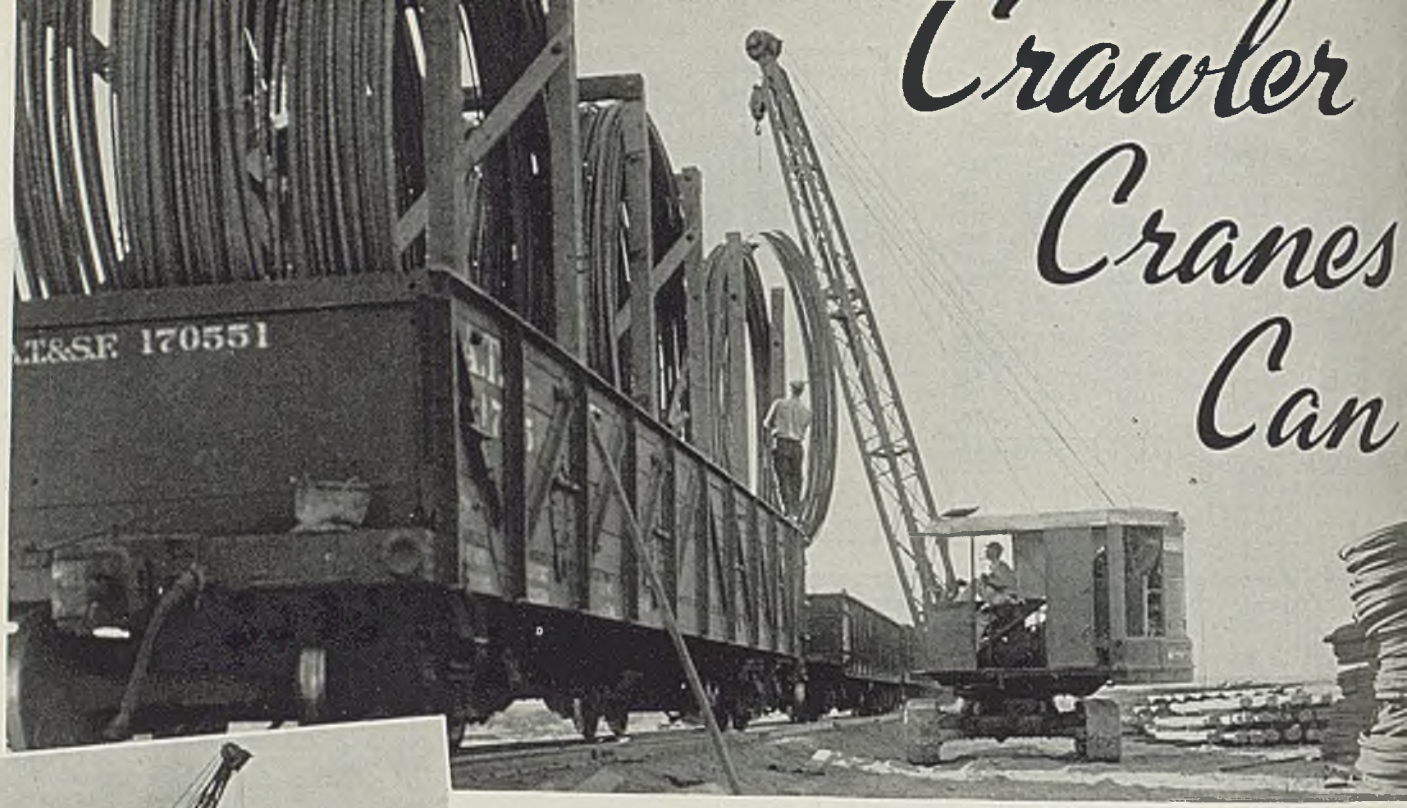


Iron and Steel Exports

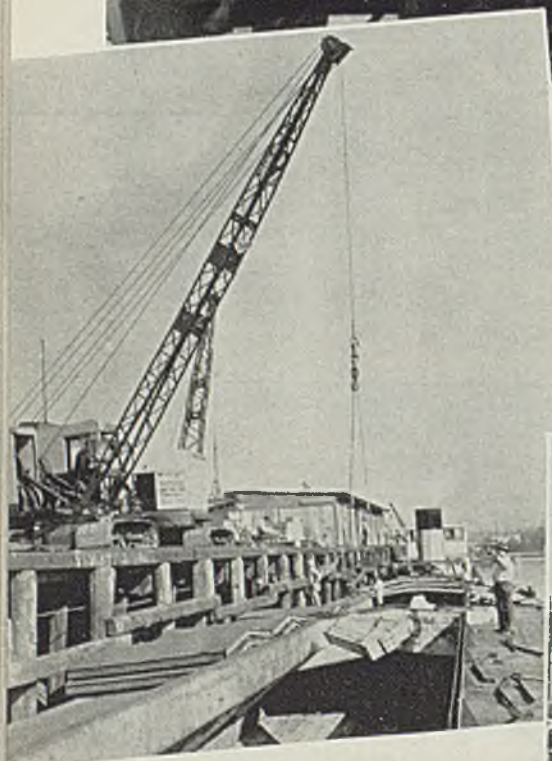
(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1940	1939	1940	1939	1940
Jan.	396.1	134.8	187.5	227.9	583.5
Feb.	436.6	134.8	234.7	224.9	671.3
Mar.	457.1	162.1	206.9	312.3	664.0
April	391.8	153.9	221.2	240.1	612.9
May	471.5	147.8	312.5	384.9	784.0
June	617.7	190.0	318.4	398.9	936.0
July	707.8	163.6	327.1	350.1	1034.9
Aug.	1046.1	185.2	346.1	291.9	1402.1
Sept.	965.4	244.9	251.1	330.7	1221.1
Oct.	846.6	255.1	258.5	336.8	1105.5
Nov.	713.8	332.9	74.3	272.7	788.2
Dec.	735.2	394.0	70.0	206.4	805.2
Total	7,785.5	2,499.0	2,823.1	3,577.4	10,608.6

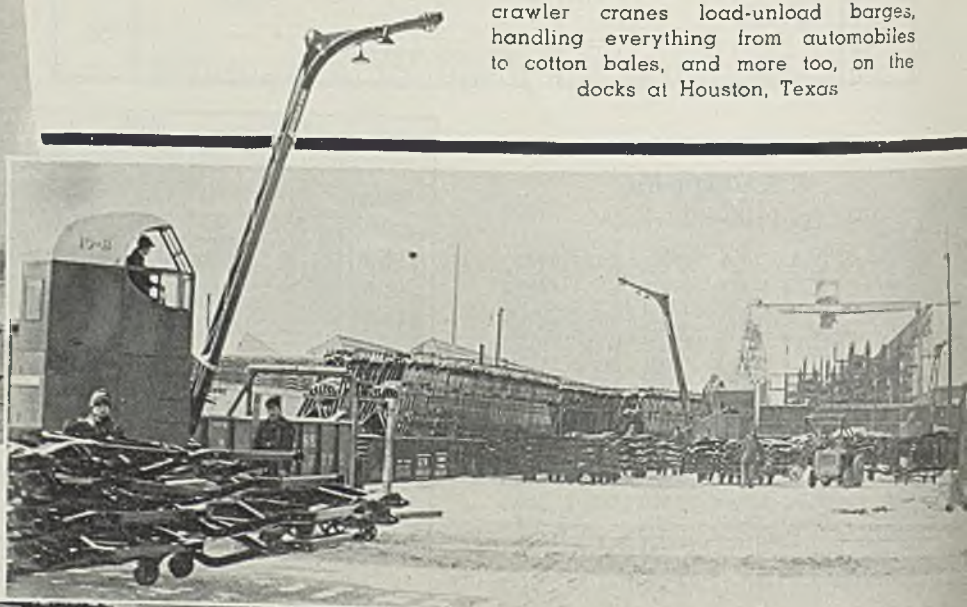
Crawler Cranes Can

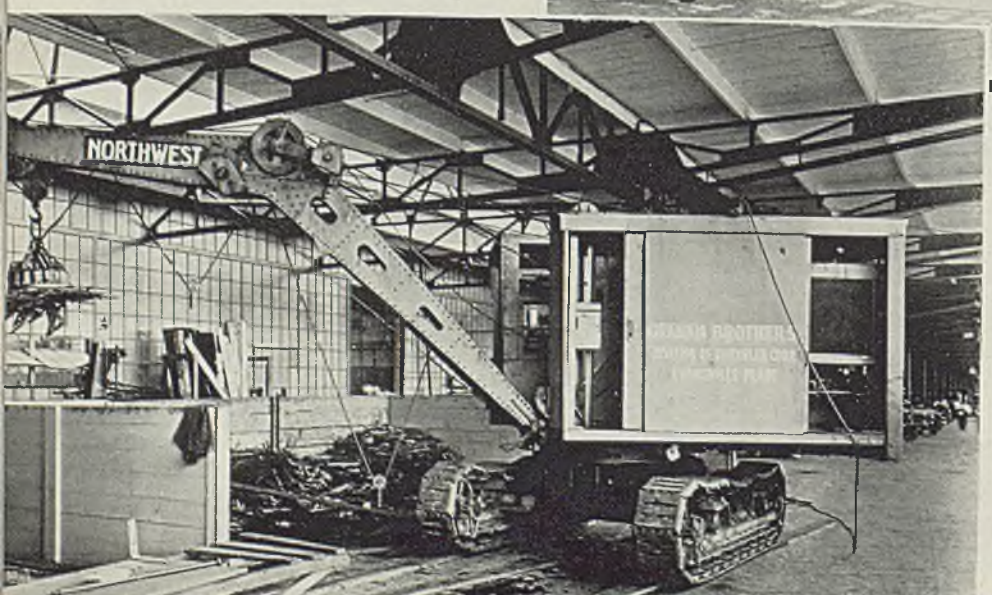


Imagine two men trying to load 225 tons of large-diameter preformed reinforcing rods per day with anything except a small, highly efficient crawler crane such as this Lorain unit shown directly above



Immediate left, these two Lorain-40 crawler cranes load-unload barges, handling everything from automobiles to cotton bales, and more too, on the docks at Houston, Texas





Special "2-story" cabs and gooseneck booms make these two Bucyrus-Erie crawler cranes, shown directly above, exceptionally valuable in handling automobile frames at a Milwaukee plant. Equipped with self-powered electric lights, they work 24 hours a day, prove valuable supplement to the outdoor overhead crane system seen in the background here

Load-Unload

Almost Any Thing
Almost Any Place
Almost Any Time

■ IN ADDITION to the familiar application in erecting steelwork and using shovel or hoe attachments for moving dirt in road construction and similar operations, crawler cranes are regarded as extremely versatile and useful materials handling equipment in many industrial plants.

They are more than just portable cranes — actually they are highly efficient and dependable materials handling machines. In many a plant where they were first purchased to help in erecting a building or for other construction work, they now are continually employed in a wide variety of materials handling applications, surprising their owners with their versatility.

Principal advantage of the crawler crane is its ability to move everywhere about a yard without regard to tracks or soil conditions. Also it easily moves about in restricted areas where it would be impossible to use any other type of crane. Its maneuverability is exceptionally high.

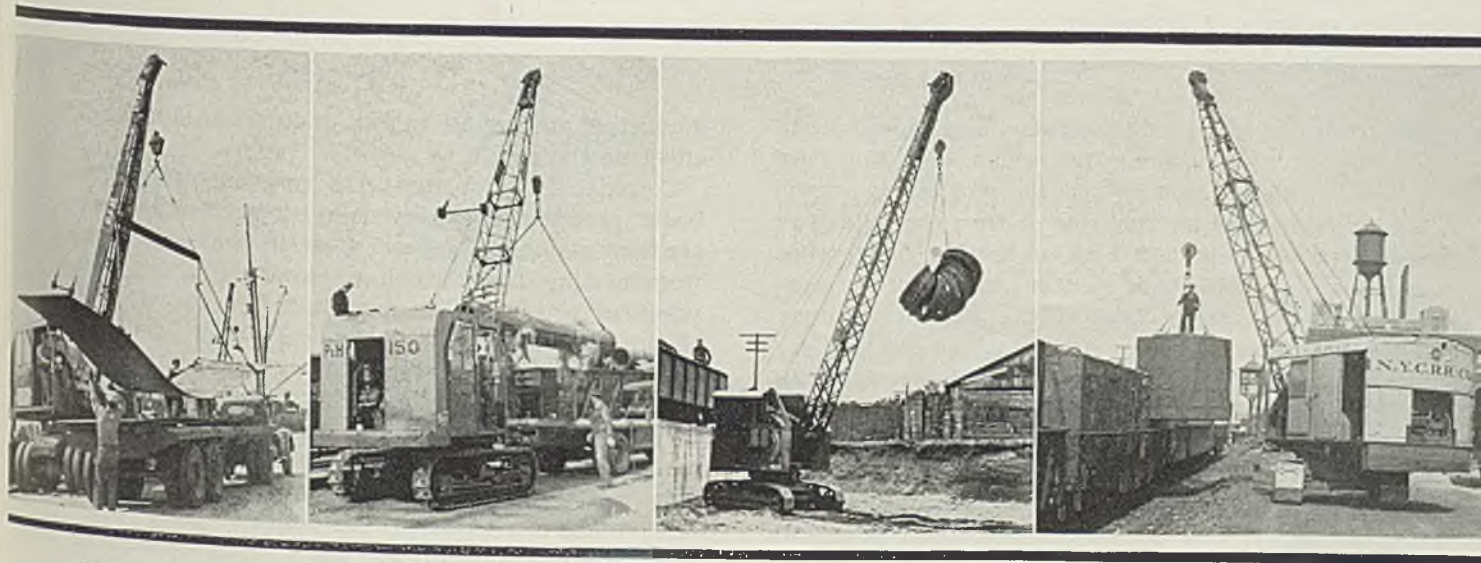
A principal use found for the crawler crane in many industrial plants is in loading and unloading freight cars and highway truck and trailer outfits where the versatility of the crawler crane probably is most apparent. It easily operates at sides of railroad cars with a short boom. Switching of cars is unnecessary when loading or unloading them with the crawler cranes as the crane itself easily moves to place the work exactly where desired.

Too, unusual economy is available with present diesel, gasoline or electric motor powered units.

There are many places about industrial plants, especially the larger ones with scattered buildings, where construction of an outdoor crane system is not warranted but where some type of mechanical handling system would be particularly desirable. With a crawler crane, add jobs can easily be done quickly and economically in such areas as the crane is entirely independent of roads, tracks or runways.

The extreme versatility as to the type of work which the crawler crane can do also makes it pay big dividends. The average industrial plant often has use for a pile driver, dragline, power shovel as well as a hook crane, clamshell or magnet crane. Any or all these services may be had by simply changing booms or attachments on standard crawler cranes. Thus the machine may easily be kept busy at all times on various types of work and so earn a large return.

Accompanying illustrations show a few typical loading-unloading applications.



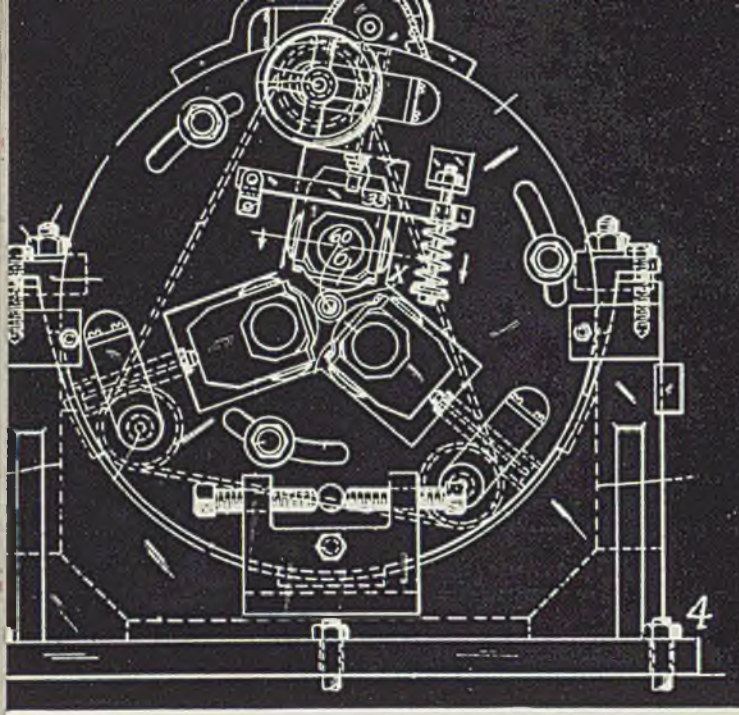
Unloading steel, left, above, from a highway truck in California with a Harnischfeger truck crane is no trick at all

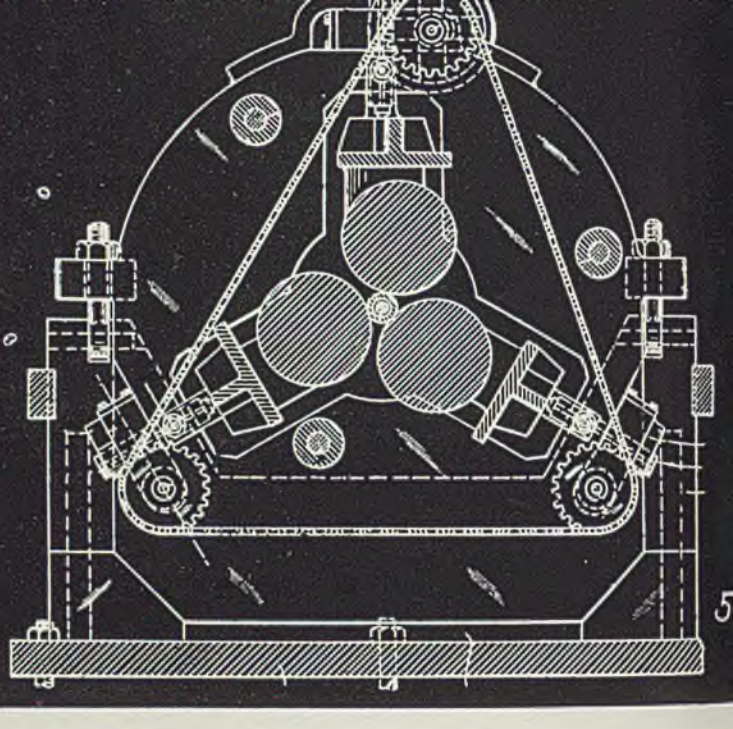
Right, above, lifting cast iron pipe from open freight cars onto bed of a truck. Awkward heavy loads mean little to a crawler crane like this Harnischfeger unit

The 7-ton capacity Northwest crawler crane, lower left, opposite page, has a special "gooseneck" boom and was originally purchased solely to unload sheet steel from open cars under a low headroom shed. It not only effected a 24-cent per ton saving in this work but proved equally valuable for many other uses around the plant—handling scrap as shown is a typical example

Believe it or not, this 4½-ton Northwest crawler crane, shown directly above, unloads wire from cars and delivers it to a conveyor system on the second floor level of the plant, thus shortcircuiting lowering and relifting operations that otherwise would ensue

The New York Central railroad employs a Lorain crawler crane, shown at the right, above, in handling LCL container units. The containers are loaded, unloaded and sorted with this machine easily and quickly with no spotting of cars nor any overhead structure being needed





Shaping Steel To Form High-Explosive

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

■ *After some historical background in section one and metallurgical information in section two, the third article in this series dealt with the problem of parting off the billet from the cast slug or from the rolled bar, and with the important task of heating for forging. Now, we have arrived at another crossing of the ways where several roads lead in the desired direction. Which of these offers the smoothest and quickest passage? Here we have on the one hand the specifications of the finished forging and there stands an orange hot block of steel which is to assume the form of a shell. What is best to do?*

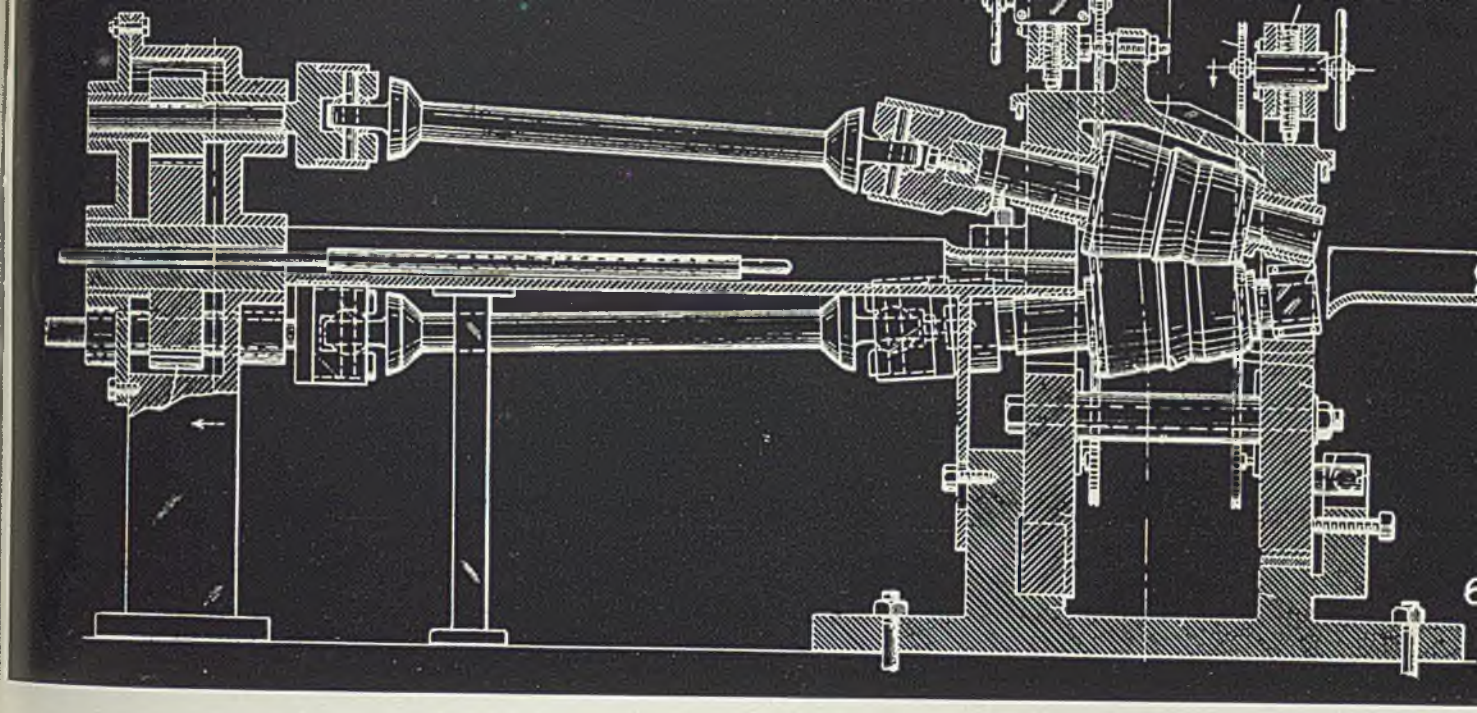
Don't forget to look next week for the fifth article in this series. It will discuss considerations governing trends in shell-forging methods; the Baldwin-Omes forging machine; means to reduce time of contact between billet and forging tools; various modes of causing metal flow; the upset method and machine; tool and die life; production rates; forging machine costs; characteristics of frame design; over-and-under arm slides; toggle-arm die closure.

■ STEEL is queer stuff. At elevated temperatures it assumes a putty-like character but it still takes an extraordinary amount of power to make it change its shape. Nor has anyone been able to predict with any pretense to mathematical accuracy, the amount of power involved in making such changes, since the manner of making alterations of form has a profound effect on the result.

Consider for a moment the various more or less basic procedures employed to shape steel. These are hammering, rolling and pressing, aside, of course, from casting itself which we cannot consider as a practical possibility at present in the manufacture of gun shell.

It is easy to see why hammering was the first method employed by man in shaping metals, for great pressures between the hammer face and the metal can be produced with relatively light equipment. However, it is well known that the effects of hammering are localized, the desirable grain refinement associated with hot work being confined to the exterior portions of the metal. In general, the high resistance of the steel to deformation under shock, coupled with the intermittent character of the action, makes shaping a slow process.

The forging press, a recent invention compared with the hammer, has a very different effect. The slow steady advance of the ram produces a sort of kneading effect on the metal and the strain (i.e. change of shape) penetrates very deep. Aside, however, from its beneficial effects on the steel, the absence of shock is advantageous both from the standpoint of machine construction and operation. Generally speaking, the cost of hot forming (forging)



Shell

It does not seem possible that a hollow cyclinder can be formed by rolling. Yet that is exactly what can be done. How and with what is explained here by Professor Macconochie. He also details the application of this process to forging of shell bodies on a high-production basis, discussing the Mannesmann and Assel mills and the Witter method of forging shell

with the press is less than in the case of the hammer because material reduction is greater, fewer men are required and fuel costs per ton of output are lower since a much higher proportion of the total work done by the machine reaches the job. However, die forging under the hammer has its advantages if the molds are not very deep. But hammer rods break, and it may cost as much as $600 for a new one.

Why Not Roll It: Finally we come to the interesting possibilities of rolling the shell. Learned books have been written pretending to clarify the rolling process, but it still remains very much of an art, requiring long years of experience for its proper understanding. Most of us, when we think of rolling, visualize a stand with the axes of the rolls lying in the same plane, however odd the profiles of the rolls may be. However, this is not the only possibility as we shall presently show. The axes of the rolls may not lie in the same plane, the rolls themselves may assume the queerest form and yet produce a tube with a closed end which is, after all, just what a shell is.

Some four or five years ago, the attention of the writer was directed to the possibilities of *rolling* shell carcasses much nearer to finished size than had formerly been possible by squeezing on the press, by Lieut. Commander R. E. W. Harrison, then vice president of

Fig. 1A—Etched cross section of a drop forged shell blank right, center. Note the uniform grain structure and particularly the metal flow at the closed end

Fig. 1B—Etched cross section of a completed shell forging after rolling on the reducing mill. Note again the excellent grain flow and the clean, smooth interior of the shell. No variation in wall thickness can be detected. The shadow at bottom brings out how closely the shell is rolled to mandrel smoothness. See illustration at immediate right

Fig. 4—End view of Assel mill showing set of three rollers used to elongate the shell body. Fig. 5—This cross section of the Assel mill through the rolls shows also the means for simultaneously moving all three rollers in or out to accommodate various sizes of pierced shell blanks. The roller chain ties movements together. Fig. 6—Side view of the Assel mill. Gears at left connected to power source drive the forming rollers at right through double universal joints which permit roll angles to be changed and a wide range of shell sizes accommodated in the one mill

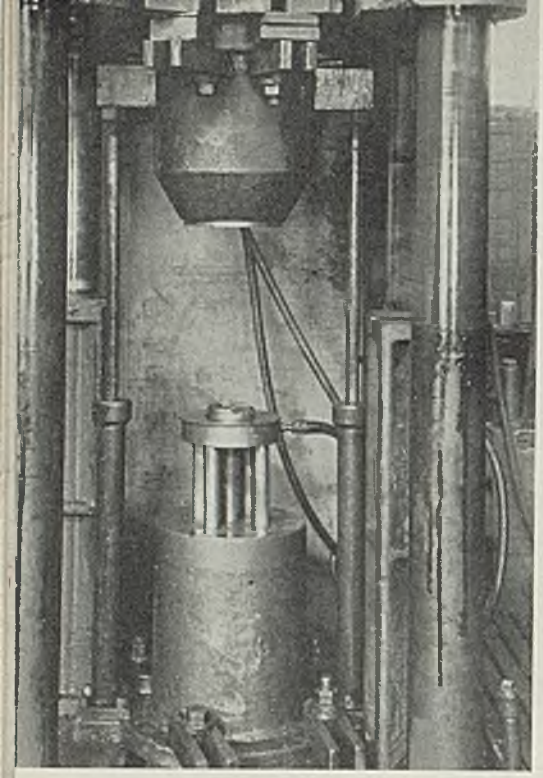


Fig. 2—Shell blanks are pierced in an upside-down position in this Southwark 350-ton hydraulic press with a 30-inch stroke on the moving head. Hot billet is placed on circular pad for lower die, the "pot" or top die moves down over it and presses it down over the lower punch which is stationary. The floating circular pad strips forging from punch, and top stripper removes it from the pot on the return stroke

the Chambersburg Engineering Co., Chambersburg, Pa. Experiments were conducted on a model employing three rolls which were modified hyperboloids of revolution, having their axes inclined to the major axis of the assembly. Successful shell bodies of modeling clay were produced. Other interests supervened and the matter was not pursued, but it appeared then and still would seem to be one of the most promising developments of the several proposals which the urgency of the present situation has brought forth for cheapening and improving this vital war-time product.

Piercing Comes First: Familiar practice is in general agreement as to the necessity of a preliminary opening-up operation which may be done on the hammer, on the upsetter or in the hydraulic press. Fig. 1A shows etched cross section of a drop forged shell blank in which grain structure and lines of metal flow are all that could be desired. The hammer and the mechanical press appear to have something of an advantage over the hydraulic press in the matter of speed for the former are credited with a capacity of 125 cups for 75-millimeter shell per hour apiece, while the latter will deliver only about 100. Formerly a certain amount of extrusion or lengthening of the carcass took place in the first piercing operation, but nowadays the tendency is to use square billets with rounded corners, thus permitting the cupping operation to take place without any large amount of extrusion past the punch.

Piercing Dies: Fig. 2 shows a Southwark single-cylinder hydraulic press employed in piercing operations in a Canadian shellmaking plant, the National Steel Car Corp. Ltd., Hamilton, Ont. As may perhaps be observed from Fig. 2, the billet is pierced in the inverted position, the "pot" descending upon it and forcing the heated billet over the stationary punch. This upper die consists of a steel outer casing surrounding a water-cooled inner die or "pot." This inner die has a reducing diameter at its upper end designed to initiate some of the streamlining or "boat-tailing" necessary at the base of the shell. The floating stripper bar shown is actuated by two side rods and moves in a horizontal slot. A centrally located circular plunger mounted on this bar pushes out the forging on the return stroke of the press.

Bottom die in Fig. 2 consists of a hydraulic cylinder with the piston supporting four pressure pins on which is mounted the circular pad which carries the seat for locating the heated billet.

In operation, the carefully heated billet, after removal of the scale from the end about to be pierced, is placed on the locating seat of the circular pad mounted on the four pressure pins. Thereafter the die, which is a close fit for the billet across the corners, descends and engages the collar on the pad, thus ensuring good concentricity during the pierce which supervenes as descent continues. On the reverse stroke, the bottom pressure pad strips the forging from the punch and the top stripper removes the forging from the die pot. The lubricant used is a mixture of quenching oil and graphite in the proportion of one part of graphite to five parts of quenching oil. One operator and two helpers are required to handle production at the rate of 100 cups per hour.

It Is Rolled: Reference was made previously to the possibility of forming the body of the shell by means of a rolling action. In a familiar application of this action, five sets

Other Articles on Production of Ordnance

This is another of STEEL'S series of articles on ordnance manufacture. For others already published, see issue of 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 and p. 42 of same issue for Tooling for Machining Torpedo Parts; March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnell 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; Dec. 30, 1940, p. 38, for Naval Torpedoes; Nov. 11, 1940, p. 46, for Design and Construction of Mobile Repair Shops for the Army; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines.

Fig. 3—Manfred Weiss type hydraulic forging machine of 75-inch maximum stroke and used by National Steel Car Corp. Ltd., Hamilton, Ont. Speed is 100 feet per minute. Pierced billet is pushed through five sets of reducing rolls mounted in the circular cast-steel housing at extreme right. Each set of rolls consists of three radially arranged rollers mounted on bronze bushings

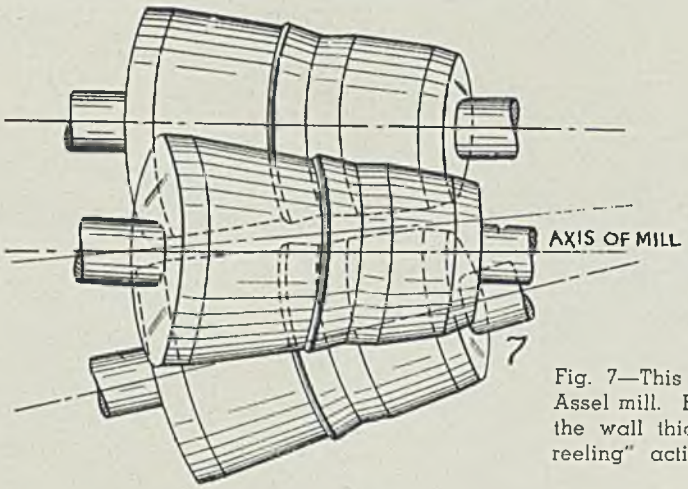
Safe—and Easy to Clean!

When plant production moves into high gear, non-skid floors are a practical necessity. With "A.W." Rolled Steel Floor Plate, the danger of slipping and falling accidents is reduced to a minimum. Traffic moves safely on factory and power plant floors, catwalks around machinery, stair treads, runways, fire escapes. No worn surfaces. No cracks or ridges. Easy to clean, quick to drain. Fire-proof, heat-proof, crack-proof. Write for folder showing five patterns and giving complete engineering data.

"A.W." *Rolled Steel* FLOOR PLATE

ALAN WOOD STEEL CO., CONSHOHOCKEN, PA.

District Offices and Representatives—Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Paul, St. Louis, Los Angeles, San Francisco, Seattle, Montreal.



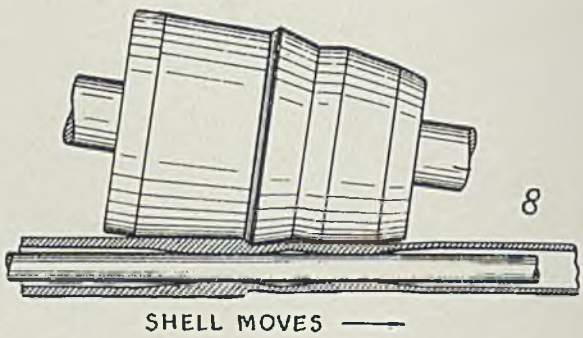


Fig. 7—This is a typical angular arrangement of the rolls in the Assel mill. Fig. 8—Here is shown how the ridge on the rolls reduces the wall thickness while the shell body is elongated by the "unreeling" action that takes place further to the right as the shell moves in that direction

of reducing rolls are employed, each set consisting of three radially arranged rollers mounted in bronze bushings and housed in a circular steel casing seen at the right in Fig. 3, which shows a Manfred Wiess-type hydraulic forging machine at National Steel Car Corp. Ltd., Hamilton, Ont.

The finishing punch is driven by a 50-ton hydraulic ram operating under a line pressure of 1500 pounds per square inch and moving at 20 inches per second. Normal stroke is 73 inches; maximum, 75 inches. In operation, the pierced billet, after removal from the preceding press operation is transferred to a V-shaped locating block directly in front of the finishing punch. The latter is carried in a close-fitting sleeve which forms the extension of the hydraulic piston of the machine. The control valve is then opened and the punch advanced until it enters and bottoms in the cavity of the forged shell blank.

Continuing at constant speed, the forging with punch enclosed proceeds to advance through the five sets of reducing rolls which are so formed as to run a slight depression in the body along the line of each joint in the succeeding roll assembly. Thus a slight ridging where the rolls fail to complete the circle may be avoided. Coming from the fifth set of rollers, two spring-actuated stripping bars contact the metal surrounding the open end of the shell, which then is stripped from the forming punch on the retreat of the latter. The forward stroke is arrested and the return stroke made through automatic valve control.

Embodying a straight line hydraulic press and roller-type draw bench, the method just outlined results in a very acceptable shell carcass, losses from defective forgings being in the neighborhood of but 3 per cent. The concentricity of the bore and outside surface are maintained within very close limits, the finish of the cavity being acceptable without machining. The small percentage of shell which reveals minor cavity defects after shot blasting are subjected to an internal grind which makes virtually all such cases acceptable. The total investment in rotary furnace, hydraulic press and roller-type draw bench for 3.45-inch shell is about $45,000. As previously noted, the production is around 100 shells per hour.

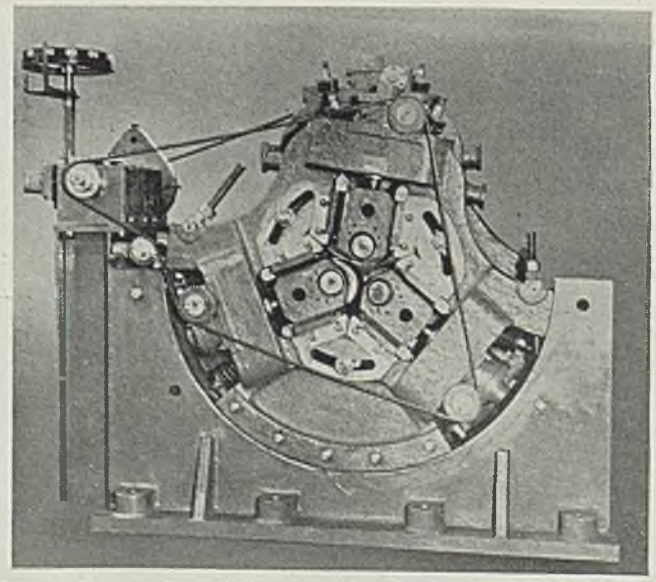


Fig. 9—Detail of discharge end of the Assel mill used in the Witter shell forging process. Note the roller chain which ties together the radial positioning of the rolls and the indicator at upper left also tied into this adjustment. This unit was built by United Engineering & Foundry Co., Pittsburgh, for the Salem Engineering Co., Salem, O.

Speed It Up: While no criticism can be offered of the product delivered by the arrangements just described, there are evident possibilities of increasing the speed. By using a turret head on the pierce to afford the tools time to cool and by driving the ram at a higher speed, either hydraulically or mechanically, the output can be raised. As far as the draw bench is concerned, the principal weakness is our inability to apply power to the rolls. Thus we are limited to such a speed of advance of the forming punch as will obviate the possibility of injuring the carcass by an attempt to drive it through the reducing rolls at too high a speed. By cocking the rolls out of the normal plane, it is evident that they may be driven, but what might be the end result of a proposal of this kind?

Working Seamless Tube Started It: Perhaps the earliest notice of an attempt to work a seamless tube is by Ehrhardt of Germany, a square block of mild steel being used and a round punch entered to expand the billet into a cup exactly after the modern fashion of making a shell. Thereafter the steel was drawn through solid dies. . . . Next a cylinder of mild steel at a bright red heat was placed between rolls, the axes of which were parallel, and which were made to revolve in the same direction. The billet being somewhat larger than the space between the rolls, slight flattening and extension of the top and bottom sides of the piece took place, resulting in a tendency toward the formation of a crack or fissure at the center as rolling proceeded. The action, however, was confined to a very short length and the process was not continuous.

Suppose, now, these cylindrical rolls while still in the horizontal plane have their axes inclined at an angle A with each other. On

(*Please turn to Page 91*)

Precision-

. . . BY MEN AND MACHINES

Youngstown Bars are a combination of fine materials, excellent production equipment, and highly skilled men. And the greatest of these is men!

Anybody can buy machinery and materials but the skill in a man's hands must be built by years of the most painstaking effort—an effort that must be continuous, untiring, and inspired by ambition and loyalty.

That this is the stuff of which Youngstown's steel makers are made has been recognized by many of our steel mill visitors, who never cease to marvel at the obvious spirit of cooperation that inspires this force. We in the sales department know of it, of course, which is one very important reason why we are proud to offer you Youngstown Bars and Rods as products that are uniform, high in quality and well fitted to your needs.

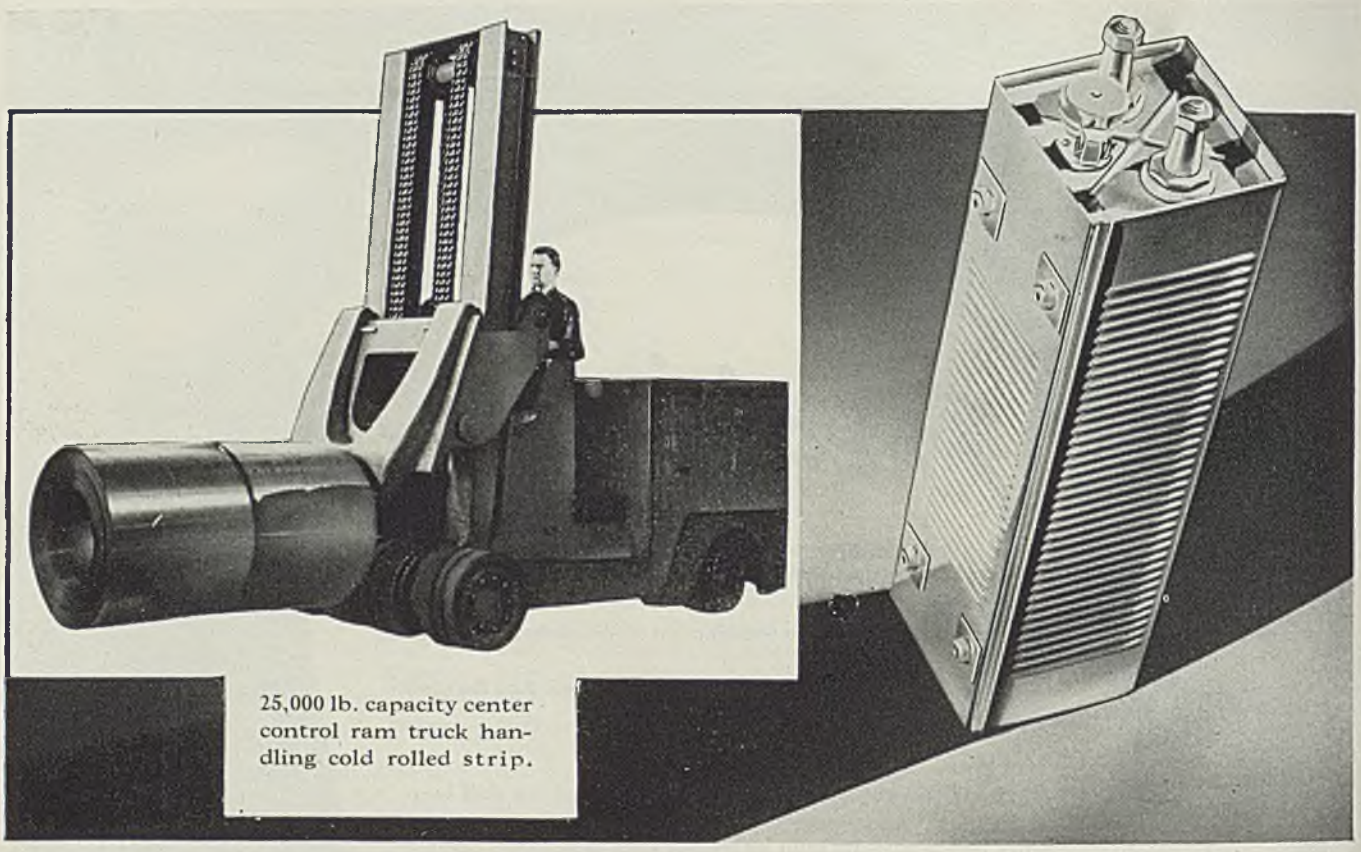
Bars • Sheets • Plates • Pipe and Tubular Products • Conduit • Tin Plate • Rods Wire • Nails • Tie Plates and Spikes

CARBON AND ALLOY STEEL BARS
TRADE MARK
YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steels

General Offices - YOUNGSTOWN, OHIO



25,000 lb. capacity center control ram truck handling cold rolled strip.

Production Allies—1941

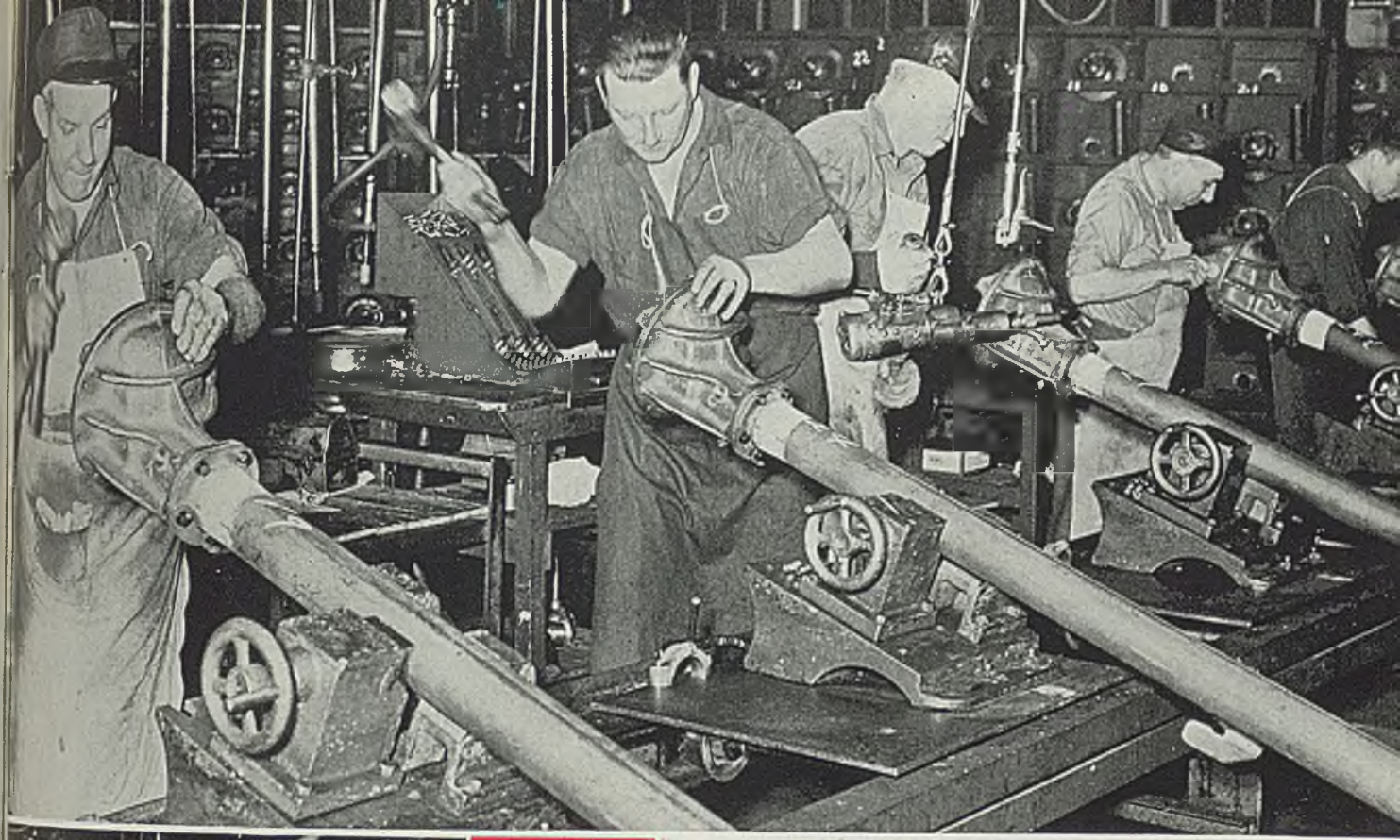
Here you see how the same plant, the same machinery and the same men can produce *more* in 1941 than they did in 1940. Where modern material-handling methods are introduced, efficiency climbs up. In most plants "handling" alone can revitalize the production picture . . .

The industrial truck powered by an Edison Steel-Alkaline Battery is a dependable way to keep men supplied with work—and to take it away when they're through. The routing of work is as important as the work itself. And because of its inherent qualities as a power source, it permits the close-scheduling of materials' movement. It is as dependable as the line current with which you charge it. Electrochemically sound, mechanically simple and structurally strong, it can take on a big job in your plant and do it unfailingly.

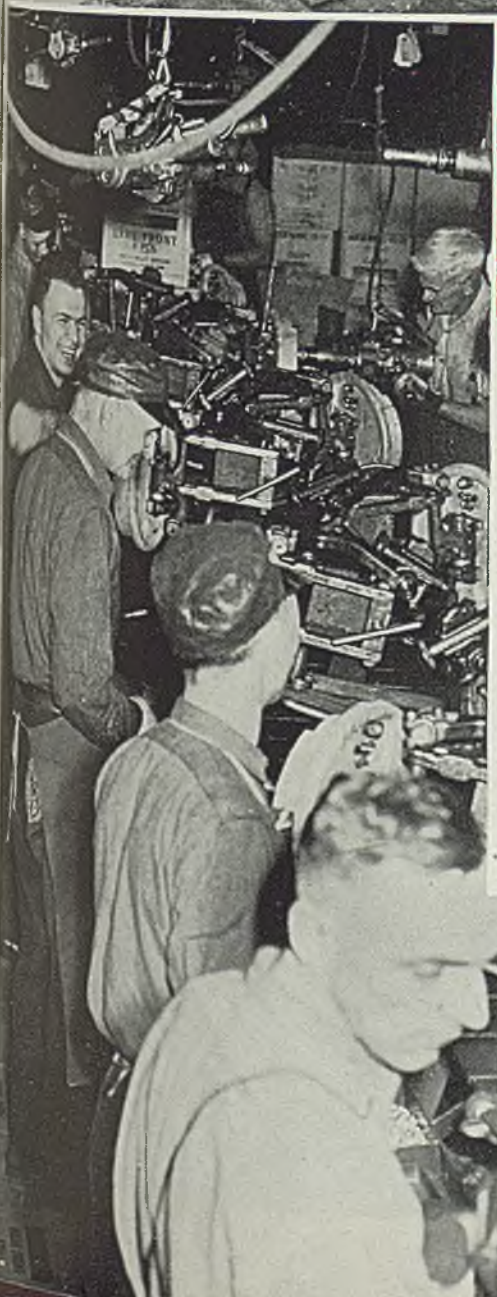
The fact is that in most instances, the Edison Battery provides the most economical power source for industrial trucks as well as the most dependable. If you are interested in hearing more about modern material handling and the place of the Edison Battery in it, write for our current literature.

STORAGE
Edison Battery

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, N. J.



Carousel conveyor for third-member assemblies



MATERIALS HANDLING

New Plant Features

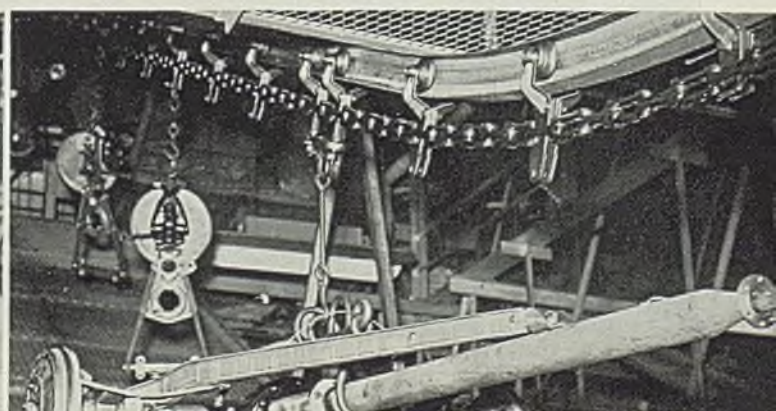
35 Separate Conveyor Syste

Typical of the special conveying equipment utilized for particular jobs are the numerous applications of power elevating conveyors which move parts from one machine to the next on subassembly lines, the second machine being mounted above floor level. Limit switches at upper end of conveyor stop unit when filled, start it when machine operator takes off top piece from conveyor

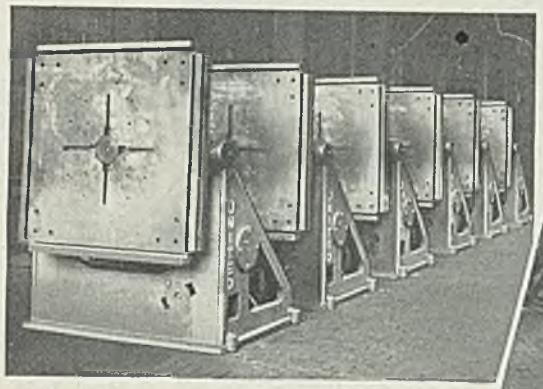
(Concluded from Last Week)

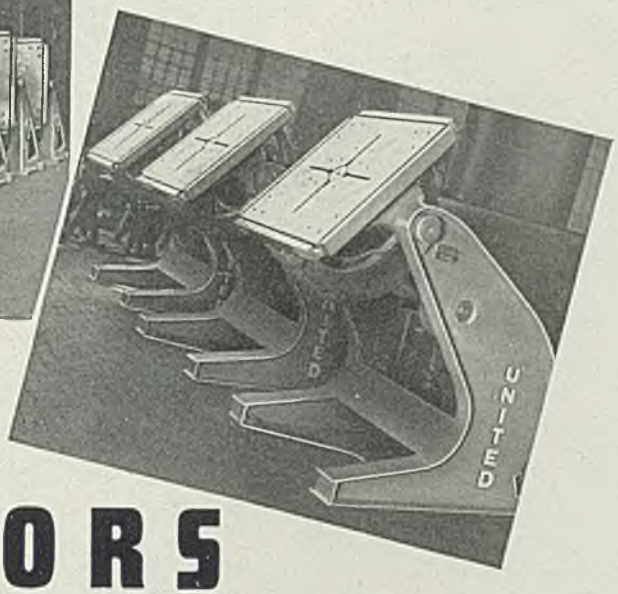
■ TRACING through the detail manufacturing and assembly operations for the rear suspension and drive system shows the vast amount of work to be correlated and co-ordinated. Differential housing of welded steel, produced by an outside supplier, is machined on the ends, drilled and washed with alkali, then wire brushed and moved on a gravity roll conveyor to a press which forces on the wheel bearings. Pinion and propeller shaft are as-

Left, view of front axle final assembly line. View at bottom right shows the method of loading front and rear systems on the main delivery conveyor




UNITED
QUALITY
STANDARD SIZES CARRIED IN STOCK





WELDING MANIPULATORS

Standard Sizes Range

3,000 TO 30,000 POUNDS AT PROPORTIONATE CENTER OF GRAVITY

Existing designs available in larger sizes

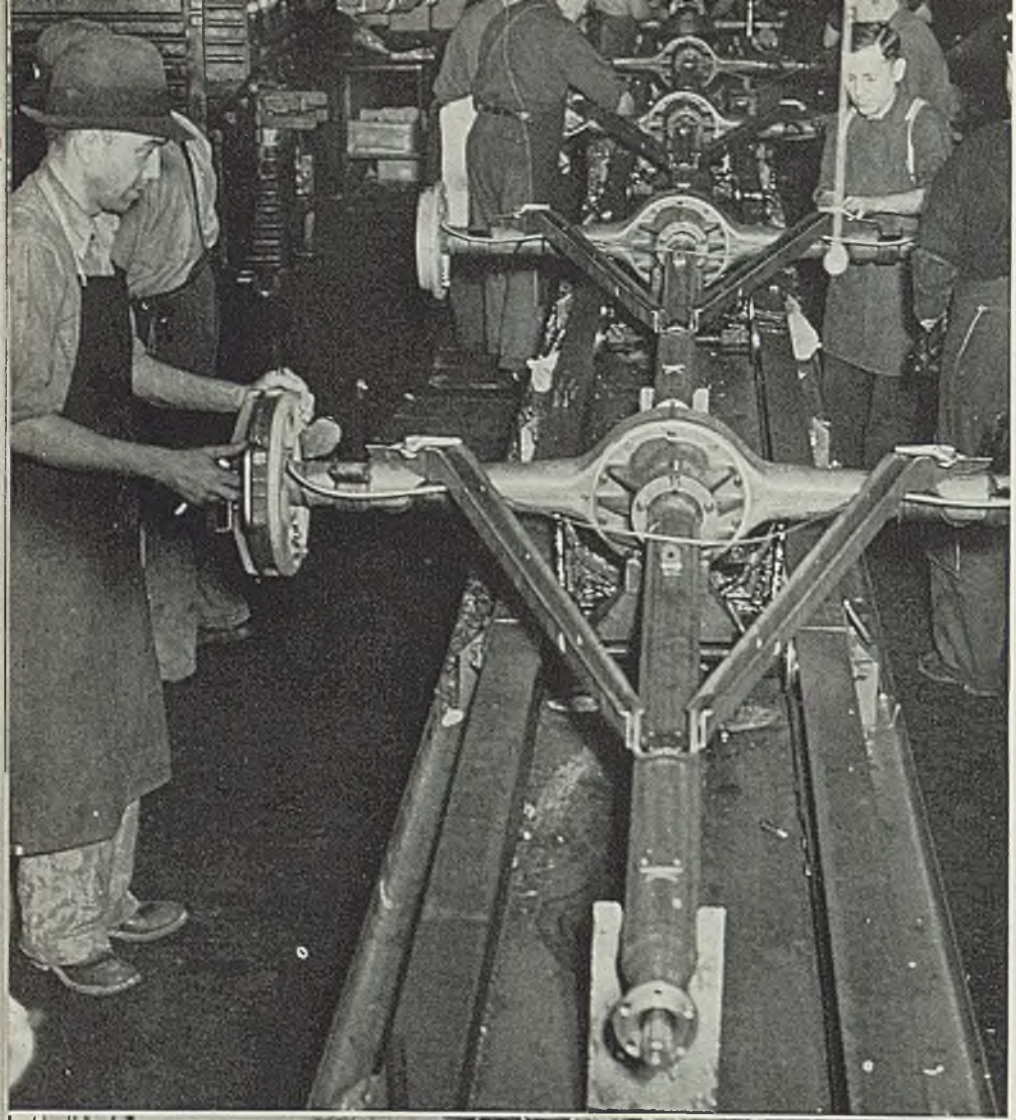
ADVANTAGES

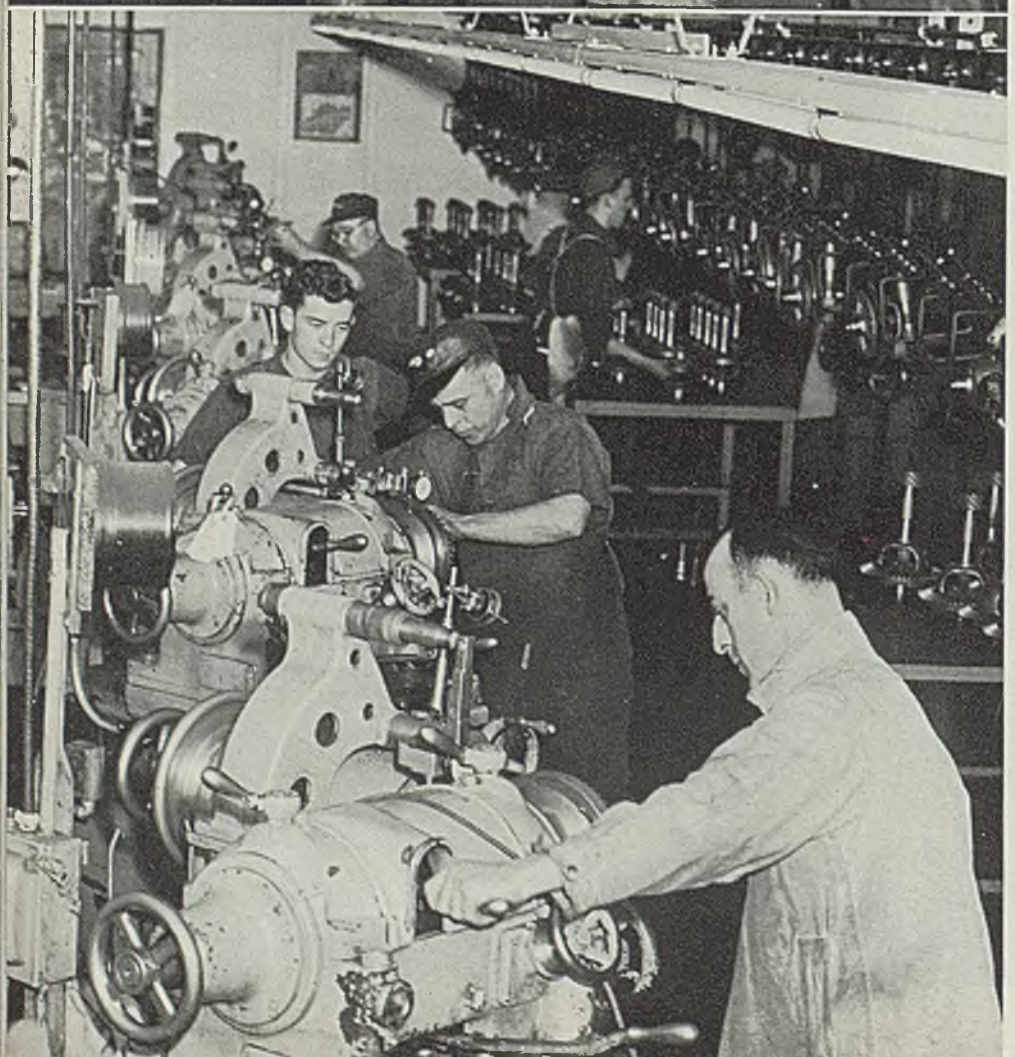
- ★ Weld of desired contour and appearance
- ★ Undercutting entirely eliminated
- ★ Larger dia. rods and more heat
- ★ Controlled warpage
- ★ Less rod waste
- ★ Reduced costs

UNITED ENGINEERING and FOUNDRY COMPANY

Pittsburgh, Penna.

DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND · DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q. · UNITED INTERNATIONAL, S. A. PARIS, FRANCE · SHIBAURA-UNITED ENGINEERING CO., TOKYO, JAPAN





sembled, and the unit then straightened and balanced on General Motors Research balancing machines, added metal being welded on to bring the assembly into balance. At this point the finished ring gears meet the line, as well as the "third member unit." The assembljy is balanced again and goes on to the final rear axle and suspension assembly line.

Torque tubes are rolled and welded from strip steel and carry at either end a flange produced by extruding a flat blank over a large steel ball. In assembly, the small ends of the flanges are faced on 24-inch vertical milling machines, with 2-spindle heads and four stations on the table. Cardboard washers are placed in the flanges to keep out sparks during the subsequent welding operation in which the flanges are flash welded to the tube in a 425-kilovolt-ampere dual-flash welder with a special air cylinder attachment to unload welded parts.

Gear Ratios Indicated

Prior to the welding, the tube is faced and the ends swaged on a horizontal upsetter. After welding, the flash is trimmed off inside and outside, the flange drilled and the unit placed on an overhead conveyor. Propeller shaft coupling is welded to one end of the tube and the drive spline to the other in 400-kilovolt-ampere roll welders.

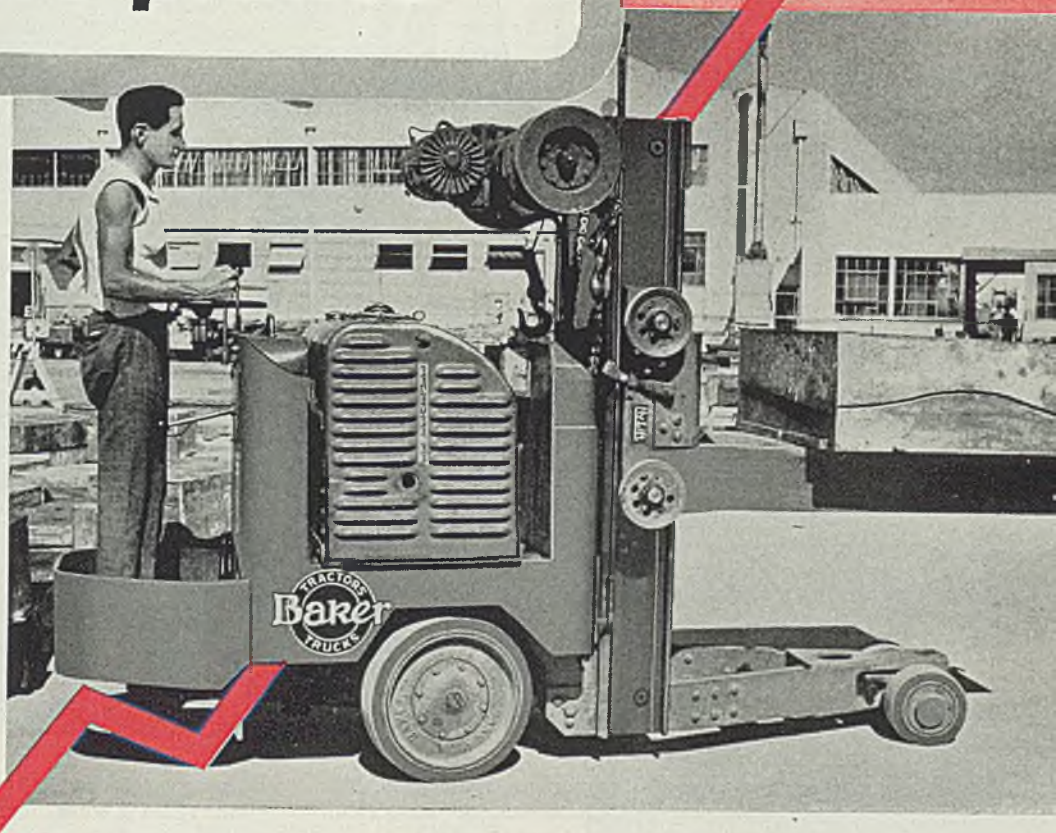
Brake drums are turned and balanced with the axle shafts. Axle ends are painted with a particular color that indicates the gear ratio for the assembly, since several different gear ratios are produced for different models.

Turning to the front assembly, steering knuckles are produced in a separate forge shop by a new press forging operation and then delivered to the axle plant. They are inspected for flaws 100 per cent by the Magnaflux method, as are all steering arms. Small cracks unobservable to the naked eye and possible focal points for fatigue failures, are readily detected by the Magnaflux equipment.

Steering knuckles and supports, steering arms, front hubs, front brake drums and drum and hub assemblies—all are machined and inspected on crosswise subassembly lines feeding to the main front suspension line which meets the main delivery conveyor at the center of the plant. On these subassembly lines are numerous applications of power elevating conveyors which move parts from one machine to the next, the second machine being mounted above the floor. Limit switches at the upper end of the conveyor stop the drive motor

View of rear axle final assembly line, top. Below, sound test room for gears

BAKER TRUCKS
step up production in aircraft plants



BAKER TRUCK AT NORTH AMERICAN (Right) Changing and moving dies is a much faster, simpler and safer operation with this 6000 lb. capacity Hy-Lift Truck with die-pulling winch, in service at the North American Aviation plant at Inglewood, California.

BAKER TRUCK AT WRIGHT AERONAUTICAL (Below) Six radial engine crankcases are handled easily with this Baker Low-Lift Elevating Truck — one of 8 in service at the Wright Aeronautical Corporation, Paterson, N. J.

To the manufacturer already taxing his plant capacity and still trying to increase production, Baker Trucks provide a ready answer. In Aircraft, particularly — where plants are vast, parts bulky, and handling operations complicated, transportation is most important. The trackless freedom, smooth, fast travel, high capacity and precise control of Baker Trucks is effecting lowered manufacturing costs and increased production in many installations . . . . Let us show you how they apply to your problems.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2167 WEST 25th STREET • • • CLEVELAND, OHIO

Trade mark Registered U. S. Pat. Off.
Baker

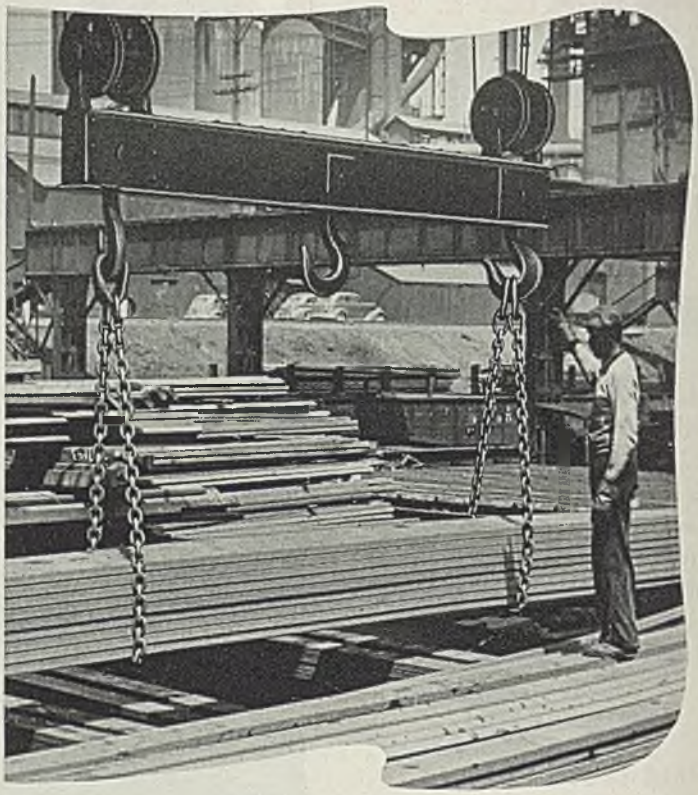
In Canada: Railway and Power Engineering Corporation, Ltd.

INDUSTRIAL TRUCKS

One More

AMERICAN CHAIN

a step ahead of the Needs of Industry



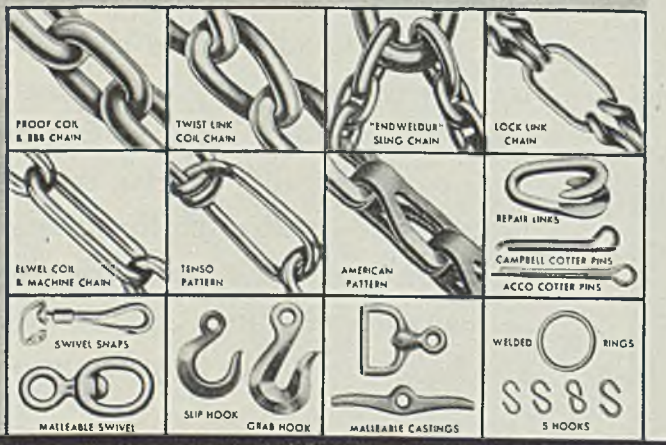
"ENDWELDUR"

● In the few months since its introduction, remarkable new service records have been set by "ENDWELDUR" sling chain (its links electrically welded at one end, not the side).

The end welds—perfect hinging—uniform material—normalized links free from internal strain—all assure resistance to moderate impact loads, bending and gouging. This chain provides safe, sure performance in extremely high and subzero temperatures. Every feature has proved itself in service.

But there is something more in this than "ENDWELDUR" endurance and dependability. *It's this.* "ENDWELDUR" is one more tangible and indisputable proof of American Chain foresight, for when extraordinary governmental and industrial demands came along "ENDWELDUR" was ready.

FOUNDATION OF A COMPLETE CHAIN SERVICE



Chain, Fittings, Attachments for Every Purpose

It is important to know that the American Chain line is the most complete in the world, containing as it does all types of welded and weldless chains together with fittings and attachments. Such a line is the very foundation of a complete and comprehensive service. American Chain offers also a vast fund of information as to where and how to apply chains to individual services. For example—

Free Booklet on Sling Chain

This booklet explains the use and care of iron, steel and alloy sling chains, and how to get the utmost in safe service. The booklet tells about "ENDWELDUR" too. Write our engineers about your chain problems. Their suggestions are made without charge or obligation.

AMERICAN CHAIN DIVISION • YORK, PENN.

AMERICAN CHAIN & CABLE COMPANY, Inc.

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

when the conveyor is filled, and as the machine operator removes the topmost part the conveyor starts again to move the line ahead. The arrangement saves labor in moving parts from one machine to another and also permits a more flexible arrangement of machines, since those mounted above the floor level require no excavation and can be moved to new locations more easily, should rearrangement be dictated.

For details of the building layout and tabulation of the conveyors and their uses, refer to section one which appeared on page 62 of STEEL for Feb. 10, 1941.

This welding machine, above, applies the flanges to the torque tubes. Immediate right, magnaflux testing equipment for steering knuckles

Hard Cutting Alloy Now Available in Two Forms

■ A new general purpose hard cutting alloy, Tantung G, is announced by Fansteel Metallurgical Corp., North Chicago, Ill., for use where higher cutting speeds than are possible with high-speed steel are desired. Composed of tungsten and tantalum carbide in a matrix of cobalt and chromium, it also machines cast iron, brass, aluminum and many other materials.

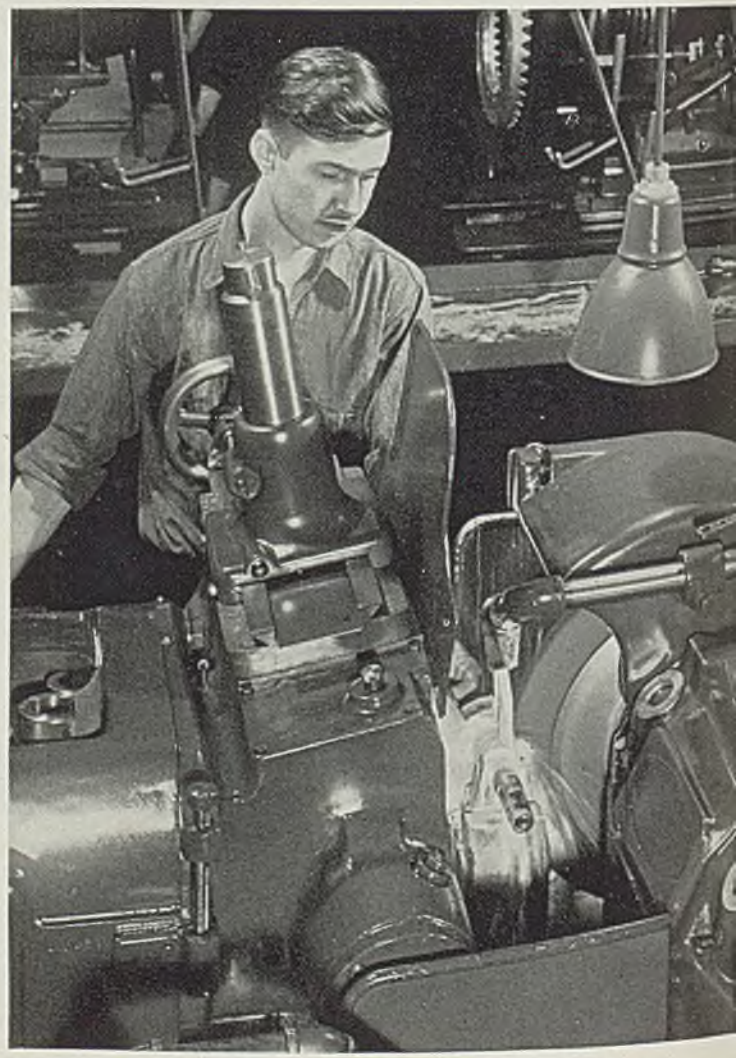
The alloy is obtainable in two forms—in solid tool bits for use in tool holders and in the form of Economy tools. The Economy tool bit is securely brazed to a recessed steel shank approximately twice the cross section and length dimensions of the Tantung bit. This construction conserves the cutting alloy, at the same time adding strength and support. Tantung G Economy tools are furnished ground with a 7-degree clearance angle across the diagonal in such a manner that the same tool serves for right or left-hand cutting.

New Alloy Has Free Machining Qualities

■ A nonferrous alloy which features free machining characteristics and physical properties similar to K Monel is now offered by International Nickel Co. Inc., 67 Wall street, New York. Known as KR Monel, it has high strength, can be fabricated in automatic screw machinery, resists corrosion and can be heat treated after fabrication to provide an extra measure of strength and hardness.

Produced in rod and wire forms only, the new metal is nonmagnetic and is suitable for service in the airplane and other industries, where resistance to magnetic influences is important.

13 out of 14-
that's a Record



Number one hydraulic fluid medium! That's the unmatched position of Gargoyle D. T. E. Oils in shops throughout United States industry. Machine operators swear by the stability and purity of these oils. Small wonder that today—13 out of 14 leading manufacturers of hydraulic machines give famous Gargoyle D.T.E. Oils their unqualified approval. That's a record no other hydraulic fluid medium can approach.

CALL IN **Socony-Vacuum** for

WHEN YOU CALL in SOCONY-VACUUM, you're assured top-quality lubricants of the correct type. You profit by: 75 YEARS' EXPERIENCE... greatest in the Petroleum industry; A COMPLETE LINE...the scientifically correct oil or grease for each and every job in your plant; NEW LUBRICANTS ahead of new needs; HALF-A-MILLION CASE HISTORIES; ENGINE BUILDERS' APPROVAL of our products; DISTRIBUTION throughout the world of high-quality lubricants.

• • •

SOCONY-VACUUM OIL CO., INC.—Standard Oil of New York Division · White Star Division · Lubrite Division · Chicago Division · White Eagle Division · Wadhams Division · Magnolia Petroleum Co. · General Petroleum Corp. of Calif.

"Correct Lubrication"

BETWEEN HEATS

WITH *Shorty*

■ Say Fellers:

Over in the picklin' department one day last week some of the boys were in a huddle arguing to beat the devil over the construction of picklin' tanks. What kinda wood was best for holdin' the picklin' liquor 'n what kinda timber for the rinse tanks 'n they were all goin' to town with their 'pinions.

Rocco Ricci sez to the fellers:

"So you aska me whadda I think about best kinda wood for picklin' box, huh? Well, I tellya, I like 'em what you call 'em yellow pine. Plenty heavy with lottsa stickem. She make 'em ona gooda tank."

"Remember the vats we used to push sheets through down at old No. 2 plant?" Slim Wiley asked. "I was holdin' down my job on the pickler and you were lookin' after the rinsers. Remember?"

"Yeh. Had lottsa trouble, too. Big boss he say, 'Hey you wop, getta shovel queek. Tank she gotta da leak.' Sure 'nough she ooze 'em out through black knot hole but we plug 'em up and geta goin' again. But those box—they no call 'em pine. Call 'em, what y' say, cy--press 'n douglas-a-fir. Alla time, plenty trouble. Jeemanie whiz, feller, we alla time fixem leaks."

Puts Question in Chuck's Lap

"Sure, Rocco, I 'member those old tubs," sez Hoopy Mason. 'N turnin' to Chuck Lane, he sez: "Weren't they made outta pine, Chuck?"

"Naw. Rocco has the dope. The ones we used for the acid were built outta cypress. They're alright but they're not the cat's whiskers when it comes to usin' them for holdin' the picklin' liquor. They're just the ticket for rinse water and the like."

"Thata's sorta my idea too, Chuck. I was talkin' to one of the guys who put the tanks together and he told me cypress and fir are not as satisfactory as pine. In his opinion they're inferior to pitchy pine from the chemical standpoint and weaker mechanically."

"I check with him 100 per cent," sez Chuck. "You take a dense, heavy, pitchy yellow pine grown in the Gulf states, put 'er together with good strong joints, 'n pull 'er up tight with the right kinda tierods and y' gotta picklin' tank that'll last y' plenty long 'nough."

"I double checks with y', Chuck. You're clickin' like a dandy," Limpy Hall sez, shakin' 'is head up 'n down while he was talkin'.

"Well, I'll tellya, fellers," continued Chuck, "I've always found that pitch puts the punch into yellow pine—not sap such as y' find in some kinds a wood. Don't know whether y' guys know it or not but there's a difference 'tween pitch and sap. Pitch is sticky, sap is watery. 'N when you get a lotta sticky, gooey stuff on the inside of a picklin' tank, y' gotta tank that'll hold acid 'till the bottom wears out. Y' know that, Limpy."

"Yes" Man Speaks Up

"Yea, you're right. Can't pick any flaws outta you're gift of gab, son. But whaddaya sayin', Baldy. Havin' any trouble with your picklin lines over in the strip mill?"

"Yeh, we've got plenty of headaches, Limpy. Y' see we've been kickin' our picklin' speeds up to 'round 325 feet per minute 'n we've been runnin' into high temperatures in the picklin' bath."

"How high y' been hittin'?" asked Chuck.

"O, sometimes the ol' temperature chart hits 'round 215 or so 'n then we get into a mess. Y' see we got a different setup than you guys over here. The tanks we're messin' with are rubber lined 'n then on top this we've got a layer of brick laid up with a sulphur base cement. 'N lottsa times when the brick temperature gets on the high side they'll 'xpand 'n bend the angles 'n snap a few bolts at the center of the tank," sez Baldy.

"Shucks, son, I thought y' said y' had some headaches."

"Sure we 'ave, Chuck," Baldy replied. "We got plenty of 'em with the joints, too. Y' see when the ol' picklin' liquor gets above 200 she gets the ol' sulphur cement expandin' 'n away goes the joint."

"Ah balonie, Baldy. Balonie," sez young Rocco. "No getta 'nough sleep. Whadda y' wanta do is to grab big hand on clock 'n hold 'er back awhile so y' canna getta more tonnage through your old tubs. Sure thing, I betcha."

"Naw, Rocco, I'm not passin' out any bunk. Y' get the brick expandin' and the cement holdin' the brick doin' the same thing 'n you got trouble tryin' to shake your hand."

"Haw, Haw," laughed Rocco, "I'm a try to give a y' for one loud a horse laugh, Baldy. Y' a tell 'em that to jackass, right away she start 'em kickin', I betcha."

Hands Out the Dope

"No, that' right, Rocco. Y' take on one of our picklin' lines over in the strip mill we jus' got through overhaulin'. Right in the middle of the tank we cut out a section of the brickwork, O I suppose she was about 4 or 5 feet. 'N when we came to puttin' back some new brick we installed a couple of ⅜-inch rubber joints to take care of expansion I'm tellin' y' 'bout. 'N then I'll tellya somethin' else we did. Y' know where the two halves of the tank come together? Well, we put in a new strip of rubber to cover the joint 'n we scraped off ½-inch or so of the sulphur cement joints in the brickwork and then we plastered on some phenolic resin cement. We've been runnin' the tank for many months now 'n haven't had a bit of trouble since we fixed 'er like I'm tellin' y' fellers," sez Baldy.

"Do y' watch 'er pretty close when your bath is runnin' at higher temperature than usual?" inquired Chuck.

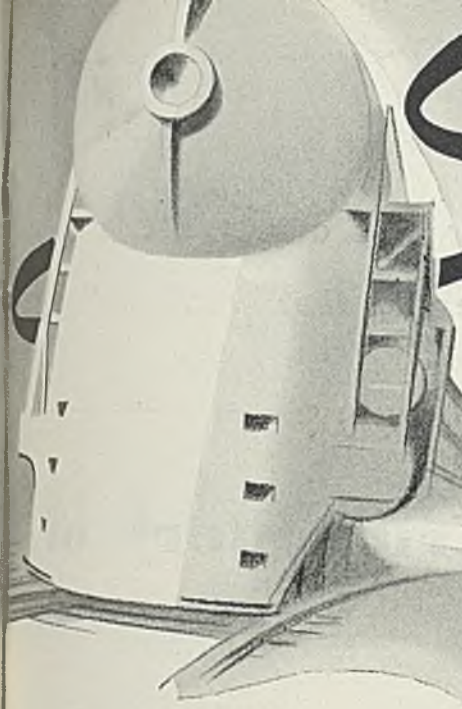
"Yeh, we keep watching for any slight bend in the angles where the two sections of the tank butt together for it gives us a good indication that there's trouble ahead."

'N that ended the clinic 'n it was jus' as good as though the big boss had put their legs under the table 'n talked matters over. 'Course I liked it a little better 'cause the fellers weren't under any pressure.

Well, so long fellers. If y' got any picklin' lines in your plant, you'd better take a couple of squints for bent angles. Won't do any harm. I'll be seein' you.

Shorty.

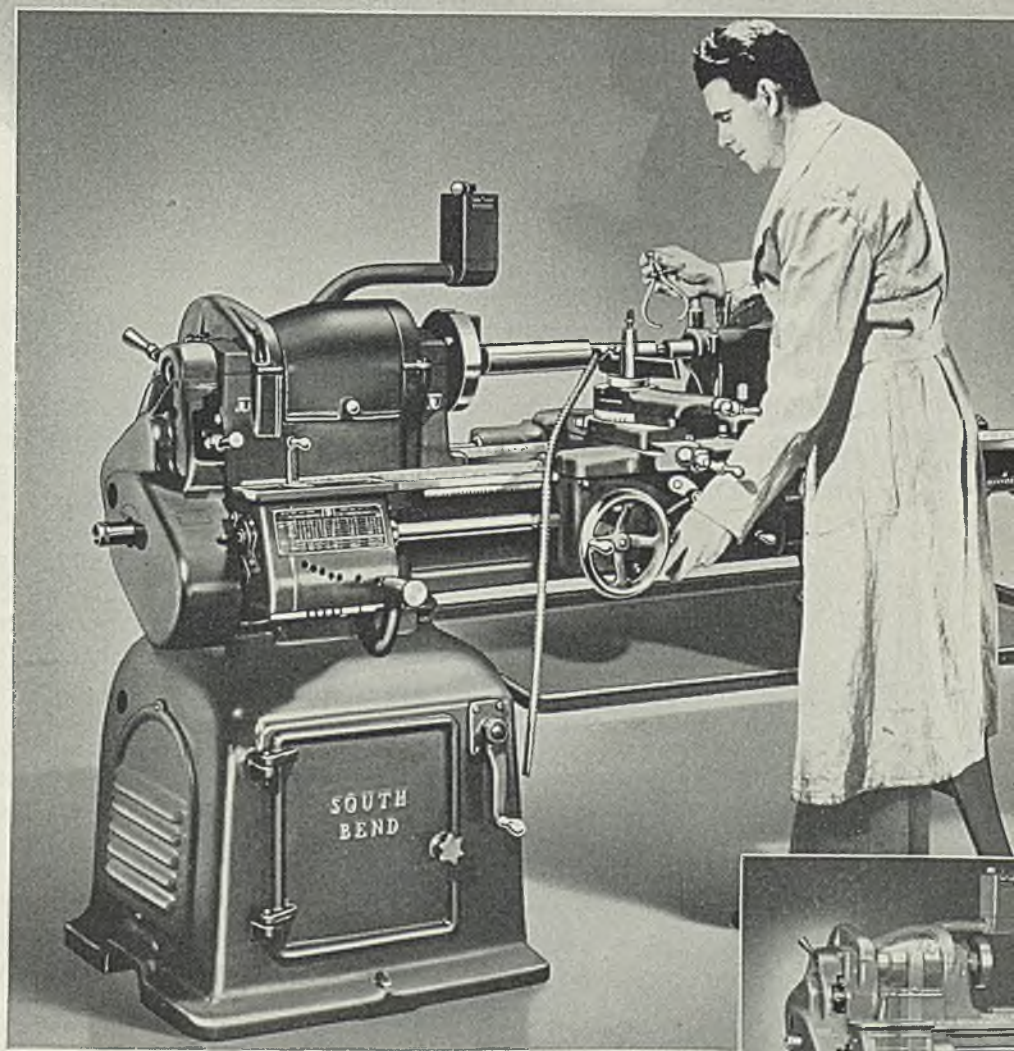
"Shorty" Long



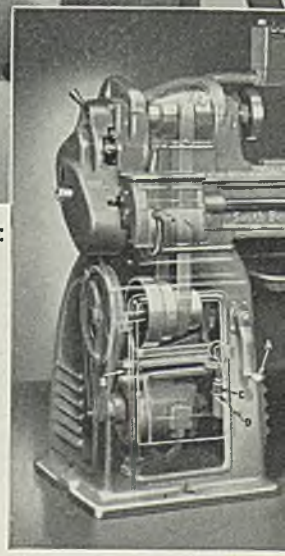
Streamline

YOUR SHOP EQUIPMEN

HUNDREDS of nationally known manufacturers have selected South Bend Lathes when streamlining their shop equipment to meet present day needs. Ease of operation, speed, power, accuracy and efficiency are some of the features responsible for their selection. Substantial savings in capital investment, power consumption, floor space and labor costs have resulted from their installation.



14½" SWING x 6' UNDERNEATH MOTOR DRIVEN SOUTH BEND LATHE



Phantom view of direct drive

The South Bend Underneath Belt Motor Drive provides an unusually wide range of spindle speeds. The direct belt drive to the spindle assures smooth operation, free from vibration, even at high speed. When slow speeds are required for machining large diameters, a wrenchless bull gear lock permits engaging the back-gears quickly. This fully enclosed drive is compact, silent in operation, trim in appearance, powerful and economical.

SOUTH BEND LATHE WORKS

Lathe Builders Since 1906

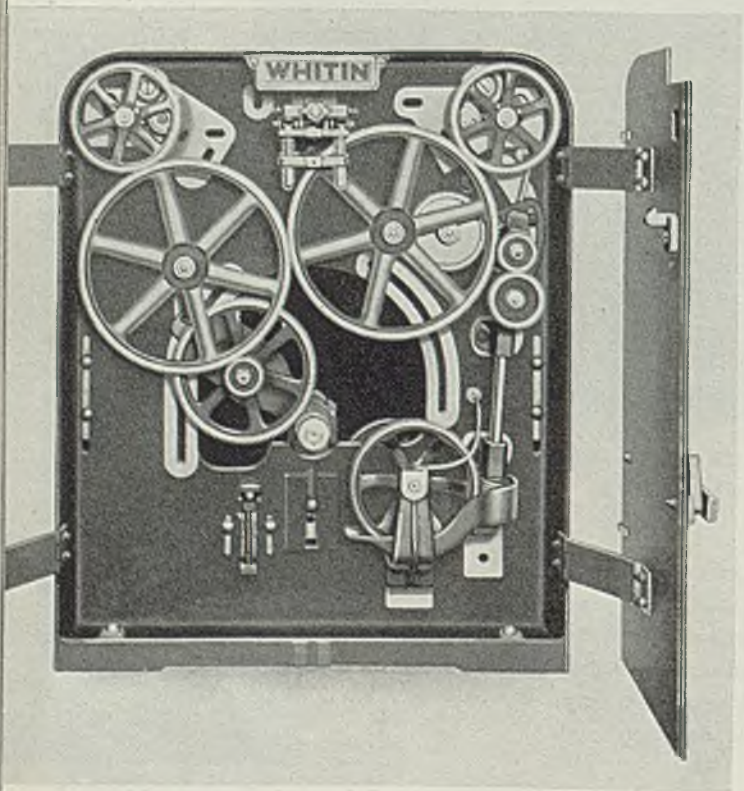
"So-and-so's castings always did machine better than ours . . . . . ."

"In the good old days, cast irons machined so easily that . . . . . ."

BUT DID THEY???

Tests Tell the True Story of

A highly satisfactory machinability test is described and data presented to show how it eliminates those test variables which often make machinability tests inaccurate. Then using the test, some interesting comparisons are made, comparing irons from different shops and irons cast long ago



Machinability of the iron is of utmost importance in making castings for assemblies such as this head end of a textile machine

■ THE EVER present problem of machinability of cast iron reaches its maximum in manufacturing organizations having both foundry and machine shop. Foundries making castings for sale as rough parts have plenty of complaints as machine shops buying castings from jobbing foundries are not slow in registering complaints. They, however, have a relatively mild "headache" compared to the plant having both machine shop and foundry, especially if an efficient shop 'phone is handy at every desk.

The only condition that can relieve the situation is the presence of a metallurgist. Not that the metallurgist can correct any of the conditions but only that he acts as a buffer, taking the attack from both sides. And the life of a buffer has never been a happy one.

Many shops use machinability tests to check machinability of their irons. These tests, when correlated with shop experience, aid in maintaining quality and serve to stop unsatisfactory material before the condition becomes too serious. These tests have never been standardized. Some information has been published from time to time since a test was first suggested many years ago. All the tests now used follow the same general pattern but differ in detail of procedure. This makes it impossible to correlate accurately the work done by any two laboratories.

One method makes use of a machine-sharpened drill working under constant point pressure, the machinability being determined by measuring the time required to drill a specified depth. Another uses the same procedure but measures the depth penetrated in a specified time.

A method that has considerable merit makes use of a positive feed on the drill and measures the point pressure developed. With some refinements, such as providing a pilot hole and use of a calibrated spring

By JOHN P. WALSTED
Metallurgist
Whitin Machine Works
Whitinsville, Mass.

MACHINABILITY

as a measuring device, *this test may be regarded as the best at present.*

However, even where tests are made daily in a laboratory under uniform conditions, many unexplainable variations are encountered. Machinability tests are not new. Nevertheless, it may be well to review the possibilities of a test such as the third one mentioned above. Of course many factors influence machinability. Determining these factors and controlling them is more difficult but a fairly reliable test such as described here, however, may prove extremely helpful.

Also, it may seem that time and money are being spent on a somewhat inexact determination that gives little promise of leading to positive methods of control of foundry irons. It is felt, however, that the work pays dividends in an added feeling of security in the foundry.

The machinability test used by the author for some time with good results is made under the following conditions:

Drill—¼-inch, high speed
Point Pressure—60 pounds
Speed—490 revolutions per minute
Point Angle—118 degrees
Grinding—On new drill grinder, always by same man and same machine, with same setting.
Operator—Same operator makes all tests
Drills are discarded before web thickness begins to influence results

Procedure is both simple and rapid. The foundry skin is first ground off to prevent unnecessary dulling of the drill before the body of the metal is reached. The drill is started and as soon as a full cut is being taken, a stop watch is started. At ½-inch depth, the time is recorded. Machinability factor is a figure that is calculated from drilling time and represents inches per minute x 100. In this way high figures indicate good machinability and low figures poor machinability. Multiplying by 100 simply puts the decimal, as one can readily see, in a more logical position.

For example, for a drilling time of 0.60 minutes for a ½-inch depth, 0.5 divided by 0.60 and multiplied by 100 gives 83.3 as the machinability factor.

To check the accuracy of the test and at the same time obtain information on uniformity of new drills, four new drills taken from stock and used on a slab of cast iron gave the results shown in Table I. It is evident that new drills are not sufficiently uniform to give comparable results, though the results, with any one drill are fairly uniform. So 12 new drills were machine sharpened and all used to drill holes ½-inch deep in the same piece of cast iron. Three holes were drilled with each drill. Results are shown in Table II.

Since variations in results from use of any one

TABLE I—Time to Drill 1" in Cast Iron

Test No.	New Drills—Minutes Drill No. 1	Drill No. 2	Drill No. 3	Drill No. 4
1	1.48	1.63	1.83	1.39
2	1.54	1.62	1.79	1.38
3	1.47	1.49	1.79	1.46
4	1.56	1.61	1.76	1.43
5	1.51	1.60	1.81	1.40
6	1.50	1.49	1.77	1.30

TABLE II—Machine Sharpened Drill

Drill No.	Time to Drill ½-inch Cast Iron, Minutes			Average Time, Minutes	Machinability Factor
1	.73	.76	.69	.726	68.8
2	.69	.75	.69	.710	70.5
3	.69	.65	.70	.680	73.6
4	.75	.67	.78	.733	68.3
5	.63	.75	.71	.696	71.7
6	.72	.70	.71	.710	70.5
7	.66	.72	.63	.670	74.6
8	.70	.70	.66	.686	72.9
9	.74	.72	.74	.733	68.3
10	.75	.69	.65	.696	71.9
11	.67	.64	.63	.646	77.4
12	.72	.64	.74	.700	71.5
Average	..	..	..	.6988	71.6

Drill No.	Machinability			Variation
5	79.4	66.7	70.4	12.7
6	69.4	71.4	70.4	2.0

drill are quite wide, a spread of from 2.0 to 12.7 points, tests made with a single drill cannot be regarded as an accurate measure of machinability. *But when combined with results of other drills to get an average figure and interpreted within the limits of accuracy, the results are of some value as will be shown.* The figures at the bottom of Table II give the extremes of variation found with a single drill. Drill 6 gave results that checked closely while drill 5 showed a wide variation. To eliminate these variations from drill to drill, it is now standard practice to drill four holes with four separate drills on each test block. Drills are lined up so they may be kept in the same order. The first block is drilled with drill Nos. 1, 2, 3 and 4. Block No. 2 is drilled with drills Nos. 2, 3, 4 and 5. Variations due to nonuniformity of drills is thus eliminated.

In soft cast iron, little or no variation may be expected from wear of drills as each drill is limited to a reasonable number of holes. Table III shows the results obtained by drilling 51 holes in a 3 x 1-inch block of cast iron with the same drill. No appreciable loss in machinability factor due to drill wear is evident.

One feature of the machinability test that has furnished a great deal of entertainment is the testing of iron from other shops. Often men visit other shops and come back with a long song and dance about the superiority of the other shop's castings. The chips are softer, tool life is better, better production is obtained, and so on. . . . Usually they bring back castings to prove the point. By taking a casting of equivalent section and grade of iron some interesting comparisons have been obtained. Table IV shows such a comparison.

Better than the other man's iron is the raking over of the dead ashes of the good old days. It seems that no one had any trouble twenty years ago. Everything was perfect and all irons machined with such ease that the chips fell off by themselves. Table V shows such a comparison made on the same type of castings with equivalent sections. The numbers "25" and "35" indicate the number of years since the last of the particular design was made, so the castings were that old or older. It was necessary to rob the museum to get them, but so far no criminal action has been taken. These are all annealed irons, which accounts for the high machinability. Incidentally, the Libby 25 roll stand base quite evidently had not been annealed. Such a business to be found out after 25 years. (He is probably dead).

The manufacturer of textile machinery, like all other industrialists, has felt the pinch of competition. The days when you could throw away a casting and get another have passed into that dim vault of tradition where they are safely shelved alongside the perpetual motion machine and processes for hardening copper. More important than competition are the increased demands of textile mills themselves; gear noise must be reduced, shafts must run truer, spindles must run with less vibration. All these mean closer tolerances, better materials, and they must be produced at attractive prices. A very definite influence has been the introduction of a host of new fibers with new properties and requiring new machinery. A lot of 100 frames, with several thousand parts per frame, is a mass production setup. All parts must go through the production line alike. One hard casting, requiring the regrinding of a single tool, may mean several hours of lost time in resetting an expensive tool assembly.

At present, we hope temporarily, delivery dates on machinery are of vital importance. Castings that must be made over easily lengthen delivery dates. While this may result in added revenue for telegraph and telephone companies, it means a disproportionate loss both to the textile mill and machinery manufacturers. Anything that will serve to give better control of manufacturing processes will pay ample returns . . . and machinability testing appears well worth the little time it takes to do it accurately.

TABLE III—Drill Life Test

(All Holes with Same Drill)

Hole No.	M. F.	Hole No.	M. F.	Hole No.	M. F.	Hole No.	M. F.
1	78.1	14	87.7	27	74.7	40	74.7
2	78.1	15	82.0	28	71.4	41	72.4
3	80.5	16	82.0	29	82.0	42	75.8
4	80.5	17	80.5	30	79.4	43	69.5
5	80.5	18	79.4	31	80.5	44	74.7
6	84.7	19	73.5	32	73.5	45	72.4
7	78.1	20	76.8	33	82.0	46	76.8
8	78.1	21	86.2	34	73.5	47	74.7
9	79.4	22	79.4	35	71.4	48	84.7
10	86.2	23	80.5	36	83.3	49	87.7
11	76.8	24	79.4	37	80.5	50	84.7
12	75.8	25	78.1	38	76.8	51	76.8
13	90.8	26	73.5	39	89.3	..	...

Highest—90.8; Lowest—71.4
Average 1st three holes—78.9; Average last three holes—81.1

TABLE IV—Comparison of Irons from Other Shops

	1	2	3	4	Ave.	M. F.	BHN
Outside—Soft	.57	.52	.58	.57	.560	89.4	202
Outside—Soft	.59	.60	.54	.56	.573	87.3	212
Outside—Steel	.74	.77	.76	.74	.753	66.4	223
Own—Soft						83.3	202
Own—Soft						108.7	202
Own—Soft						77.0	212
Own—Soft						89.3	217
Own—Steel						76.0	228
Own—Steel						70.0	217

TABLE V—Old Irons

	1	2	3	4	Ave.	M. F.	BHN
Roll Stand Base							
Libby 25	.54	.55	.53	.54	.540	92.8	196
Libby 35	.37	.34	.34	.34	.348	144.0	170
New	.33	.33	.31	.31	.320	156.0	156
Roll Stand Slide							
Libby 25	.34	.31	.31	.31	.318	157.0	146
Libby 35	.34	.35	.34	.33	.340	147.0	156
New	.30	.30	.33	.30	.308	162.0	137

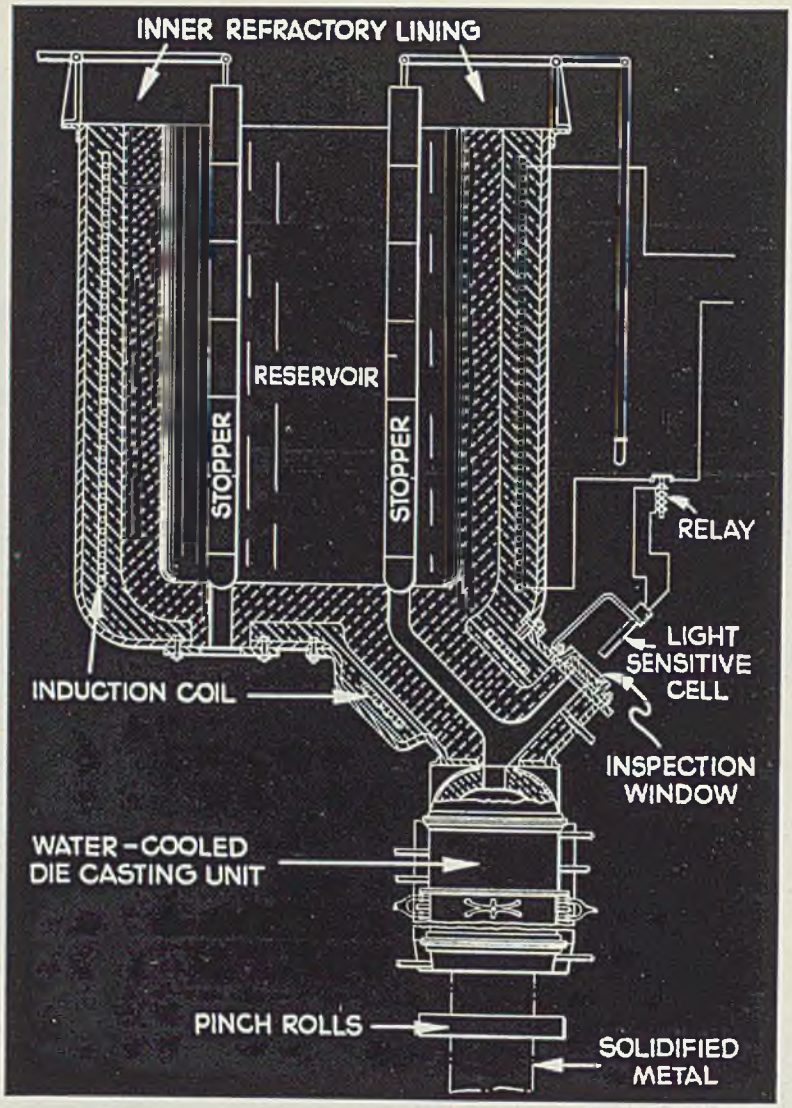
Manual of Commercial Laws in Revised Form

■ *Credit Manual of Commercial Laws*, 1941, cloth, 800 pages 6 x 9 inches; published by National Association of Credit Men, 1 Park avenue, New York, at $6.50.

This is the thirty-third edition of this reference work, which was compiled to fill a definite need. At first it contained only a short compendium of the laws of contracts and sales and has grown steadily to its present impressive coverage.

Revised and enlarged, the 1941 edition has been provided with a thumbnail or dictionary index cut into the face, giving instant reference to eight important divisions.

Discussion of sales and use taxes in the several states, with a complete table showing important features of these levies is included. The new excess profits tax law is summarized by an authority in the accounting field.



Insulated feeder ladle and preforming chamber used for casting metal continuously

Continuous Casting of Metals

Many methods of casting metals continuously have been announced in recent years. One of the latest devised on a commercial scale for high quality as to physical and surface characteristics of the cast metal is the Goss process. The procedure followed and the apparatus employed are described

■ WHEN MOLTEN metal first contacts the chill surface of the mold, a tender skin forms and tends to shrink away from the chill surface. This surface of the solid skin will tend to remain in contact with the chill surface as long as the ferrostatic pressure of the partially solid and molten metal contained within the skin of solid metal exceeds the forces of contraction. However, a small air gap is continually forming as the skin constantly comes in contact with the mold wall and then shrinks away. This process is repeated until the skin becomes strong enough to support the internal ferrostatic pressure, after which the metal shrinks away, because of contraction brought about by a decrease in temperature. When the air gap becomes more or less permanent, the extraction from the cooling metal is greatly reduced, because air is a poor conductor of heat.

Because the solidified metal does not contact the surface of the mold uniformly but only at numerous points, adhesions result, which when severed, will cause undesirable flaws to develop on the surface. Surface defects, therefore, may develop due to the following:

1. Bleeding, caused when the metal shrinks away too far from the chill surface, with the result that the skin reheats repeatedly and molten metal from the interior ruptures and leaks out.

2. Surface fissures due to adhesions which are caused by the steel sticking to the wall of the mold.

In a new process for casting metal, devised and patented by Norman E. Goss, Youngstown, O., these and other phenomena taking place during solidification can be so controlled that these difficulties are overcome during the continuous casting of metals by the steady movement of the solidifying metal through a water-cooled mold, or die, open at each end. This is accomplished in the following manner.

Molten metal is maintained at a temperature slightly above the melting point in a so-called "feeder ladle," which is well insulated. Heat is supplied by means of an electric arc to keep the metal molten during the casting operation. In order to prevent the metal freezing in the pouring nozzle, sufficient heat is supplied to balance that loss by radiation.

As the molten metal leaves the nozzle it enters a preforming chamber. The chill surface is a refractory tile and is water-cooled by a

360° VISIBILITY FOR CRANE OPERATORS

NEW MONITOR-TYPE CAB ON INDUSTRIAL BROWNHOIST DIESEL RAILROAD CRANES ALLOWS CLEAR VISION IN EVERY DIRECTION . .

CLEAR VISION LEFT

CLEAR VISION AHEAD

CLEAR VISION REAR

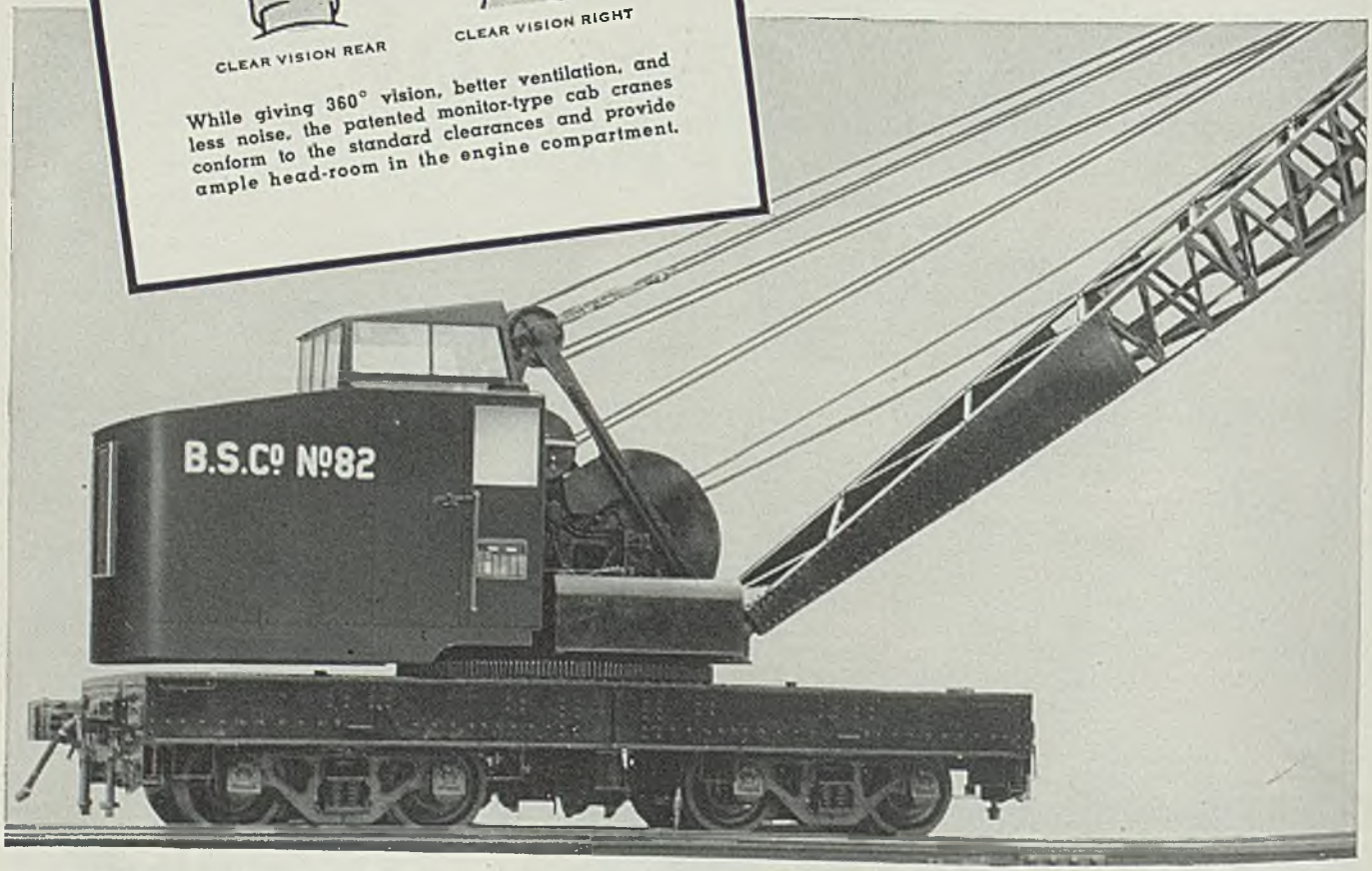
CLEAR VISION RIGHT

While giving 360° vision, better ventilation, and less noise, the patented monitor-type cab cranes conform to the standard clearances and provide ample head-room in the engine compartment.

The new patented monitor-type cab found only on Industrial Brownhoist Diesel and gasoline railroad cranes increases an operator's safety, comfort and efficiency. From the full-view windows the operator can see both the tip and feet of the boom. Ventilation is far better than in ordinary cabs, and at the same time noise is considerably reduced.

And yet the new monitor-type cab is only one of the many advantages you get in an Industrial Brownhoist Diesel Crane. For example, a group of these cranes selected at random in a recent survey **consumed an average of only 2.01 gallons of fuel oil per hour.** Their average age was 4.4 years, their average capacity 29.5 tons, and each and every one was on the job 8 to 24 hours a day.

If you are interested in learning how Industrial Brownhoist Diesel cranes can reduce your material handling costs, get in touch with your nearest Industrial Brownhoist engineer or write direct to us here in Bay City.



INDUSTRIAL BROWNHOIST CRANES · SHOVELS · BUCKETS

GENERAL OFFICES: BAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

jacket surrounding it. The initial skin must be formed on a nonwetting surface or else it will stick at points, causing defects on the surface. Sufficient heat is removed in this chamber to cause a tender skin to form upon the column of molten metal.

After the formation of this tender skin the column of metal enters a casting chamber which is water-cooled and made of copper or graphite. The tender skin is more drastically chilled in this chamber and therefore is considerably stronger. The copper surface is made nonwetting by the addition of some graphite though this is not always essential. The chill surface of this casting chamber is drastically cooled and preferably should be nonwetting. Feeder ports in the walls of the casting chamber are provided with means for continuously feeding graphite or the like to the inner surface of chamber. As the tender skin which has formed upon the molten metal passes by a feeder port it rubs off a small amount of graphite which serves as a surface lubricant.

Sticking Is Eliminated

The graphite prevents the metal from sticking, reduces the friction between the metallic surface of the moving column of metal and the die surface, protects the surface of the metal from developing undesirable flaws, and protects the mold wall from galling and reduces the rate of fire crackling which occurs on the surface of the die.

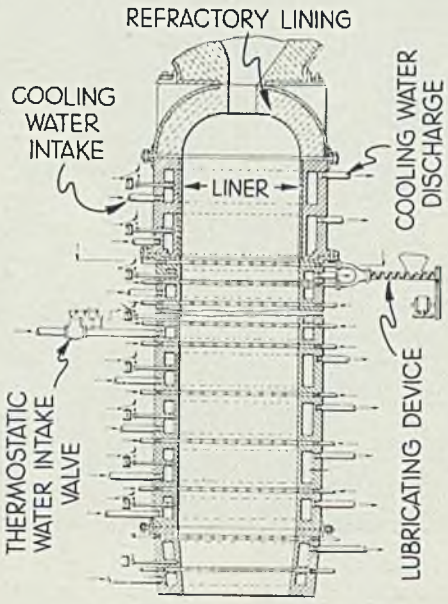
Further along the casting chamber the steel passes another lubrication feeder port where greater force may be exerted since the skin is stronger and the air gap between the mold wall and surface of the steel is greater. At this point, the graphite not only lubricates the surface but also fills the air gap and thus improves the heat transfer. Conductivity of graphite is far better than air.

Recent experiments disclose that even when the skin of solid metal surrounding the partially solid interior is thick the metal is still plastic.

Hot metal leaving the mold has a skin strong enough to resist distortion. A protective atmosphere may surround the metal as it leaves the mold. When the metal is free of the pull-out rolls it is cut to the desired length and hot rolled.

The casting process is started by placing a metal bar in the die. The metal flow is then started by opening the stopper and placing the pinch rolls in operation.

Slow casting of metal and of small cross section is advantageous in both the oxidized and open steels since it results in rapid solidification after casting, thereby affording the finest grain size, less segregation and pipe. Slow casting of open steels permits the gases to pass off and gives thicker skinned ingots.



Water-cooled die casting unit where the initial solid skin is formed on the metal

The Goss method is similar to that used in the pioneer experiments of Rowley at the United States Horseshoe Co. in 1920 in that the feeder ladle is attached directly to the mold. Rowley's machine worked for a certain short period, that is, lengths from 100 to 150 feet could be drawn continuously and then failure would occur, the bar sticking in the mold being pulled apart by the rolls.

Inspection disclosed the wall of the die was rough a short distance from the top. The chilled surfaces picked up small particles of metal pulled off of the surface of the hot billet going through the molds and this made it necessary to dress the chill surface after only short runs thus making the process entirely too expensive. The introduction of graphite and the use of nonwetting chill surfaces overcame the difficulty, which earlier was encountered by Rowley.

Photomicrograph of grain structure of 2½ x 9-inch slab-cast ingot made by the Goss process of continuous casting

In Greenidge's patent No. 2,206,888, the mold wall is coated with a layer of rolling mill lubricant before casting is started. It is claimed that the grease lasts a long time because the mold walls are cooled drastically and little oxygen is present to burn the grease. He states that the coking of grease or lubricant facilitates the removal of solidified metal from the mold.

In the Goss process graphite is supplied continuously at various stages or levels thus affording the use of a long mold and greater casting speed. In the Junghns process short molds are used since the lubricant in the form of a high flash point oil is introduced along the hot edge of the mold.

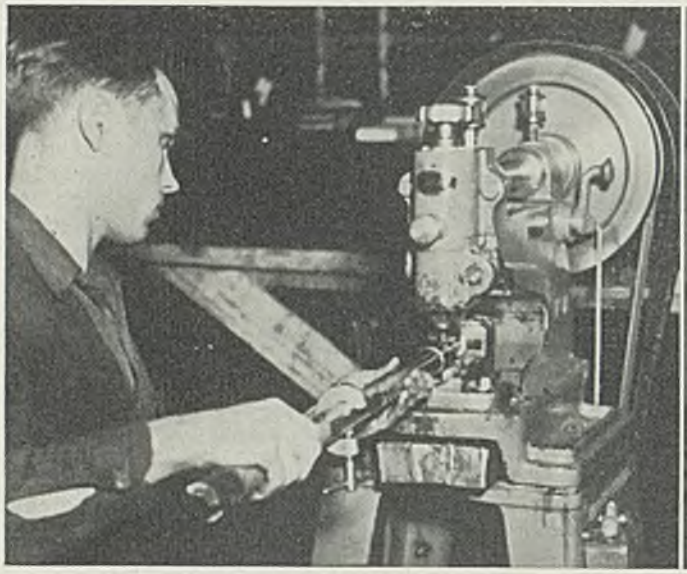
Process Speeds Making of Steel

■ A new method of making steel by the open hearth process, which is said to produce a cleaner steel in a shorter heating time and with less consumption of added materials than heretofore, is the subject of a patent issued to Charles H. Herty Jr. of Bethlehem, Pa. The process, patent rights to which are assigned to Bethlehem Steel Co., in thus raising steel production, may speed rearmament.

The method is based on controlling the iron oxide content of the slag by a procedure which gives more time for making additions to the charge, for dissolving the additions and permitting them to react. The amount of iron oxide in the slag at the end of the heating treatment is said to be controlled by the ratio of lime to silica added to the charge of scrap metal being converted into steel.

In the new method, samples are taken at half-hour intervals before the charge has completely melted. The iron oxide content of these samples is analyzed chemically and the viscosity or stickiness of the molten metal measured.

From these measurements and with the aid of a chart on which viscosity is plotted against iron oxide content, the steelmaker can quickly determine how much lime, sand or iron oxide to add to get the desired range of iron oxide in the slag for the particular steel he wants to produce.



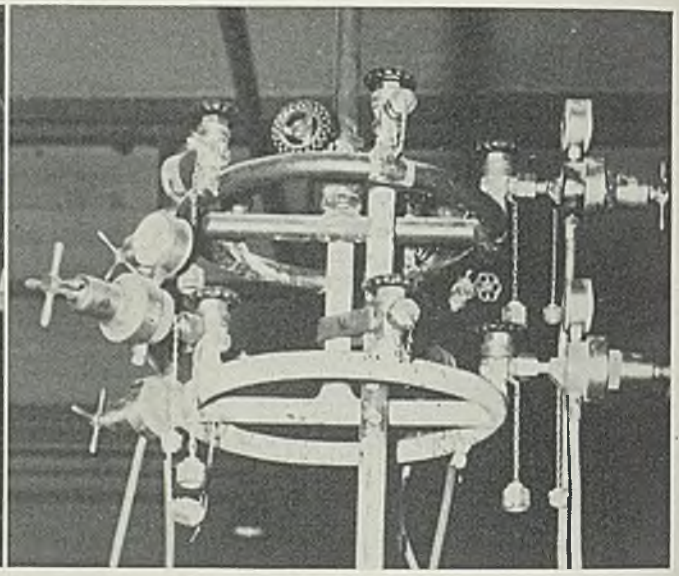


Fig. 3—This bronze-welded jig, left, is being used for shaping the ends of a tubular member. Fig. 4—Floor space is conserved by supplying oxygen and acetylene to the welding stations through drop rings like this shown at right

How Piper Aircraft Uses an Improved Technique for

Welding Chrome-Moly Steel

In this section, Mr. Eckman details production welding work employing the excess acetylene welding method, a metallurgical discussion of which appeared in STEEL, Feb. 10, 1941, p. 80. . . . Gas is delivered to 124 welding stations without obstructing floor areas. Special fixtures permit fuselages to be positioned and moved along line for fast, efficient welding

By HANFORD ECKMAN
Production Manager and Superintendent
Piper Aircraft Corp.
Lock Haven, Pa.

(Concluded from Last Week)

■ **Welding Applications:** Up to this point, the basic problems and metallurgy of welding chromium-molybdenum tubing by the oxyacetylene process have been presented at some length. This is because the greatest amount of welding is done on this material. Now details of actual production will be presented. In our plant, we use about 85 different sizes of tubing ranging from ¼ to 2 inches in diameter. Wall thicknesses vary from 1/64 to ⅛-inch.

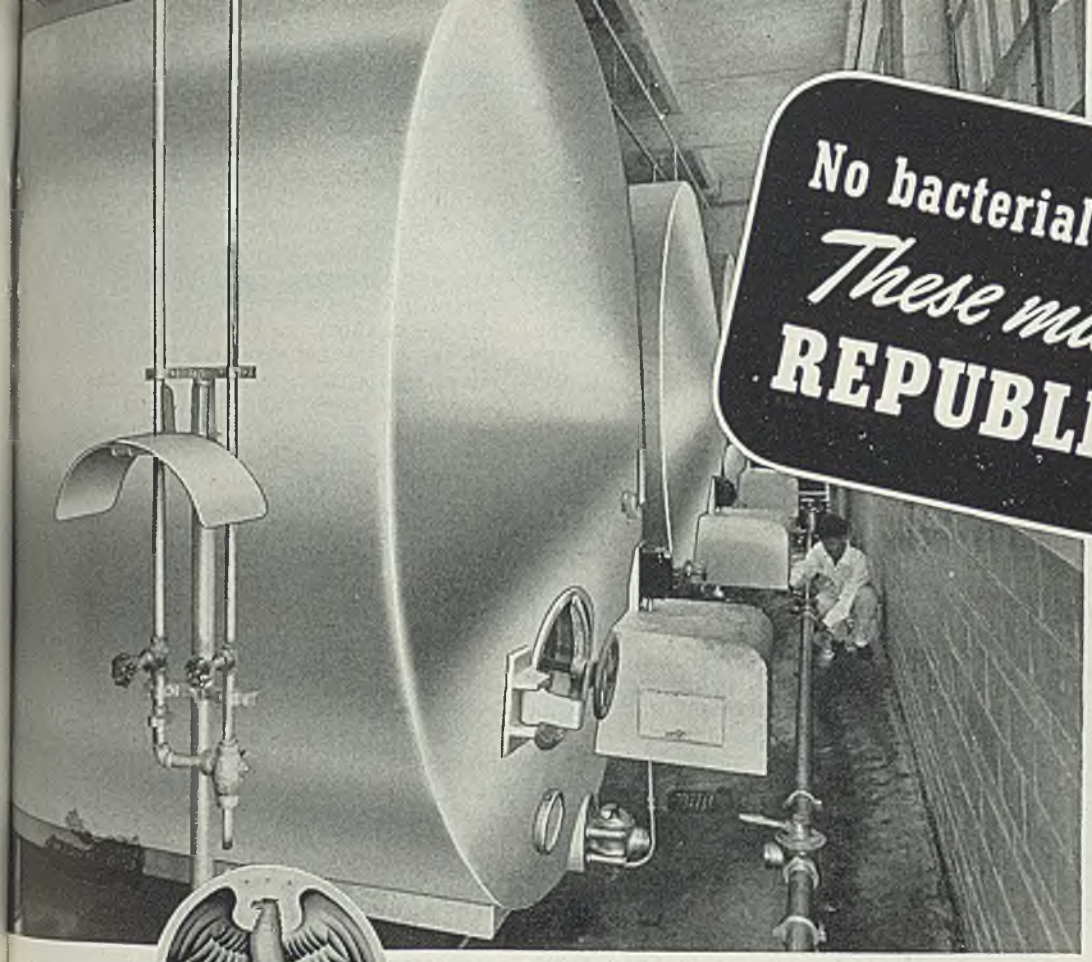
Stock tubing, received in lengths of from 12 to 20 feet, is cut to size and then shaped for assembly. At this stage of production, welding is encountered for the first time. The various jigs used for holding the tubing during the shaping operations are fabricated in the tool department by bronze welding, a process which is particularly effective for this type of work because of its great flexibility and speed. More than 400 jigs are used in shaping the tubing before assembly. Fig. 3 shows one of the jigs in use while forming the ends of a tubular member.

From this point, the various tubular members are transported to the adjacent fuselage and bench welding departments for fabrication into component aircraft parts. Manifolded oxygen and generated acetylene are supplied through a piping system which terminates in a number of strategically located drop rings similar to the one shown in Fig. 4. These drops provide at present for a total of 124 welding stations, all of which are so positioned as to provide a maximum effective working range for each operator. In addition, the method of suspension from above prevents valuable floor space from being obstructed all the way along the line.

In the fuselage department, the shaped sections of tubing are first set up in jigs for tack welding. General views of this stage of construction are shown in Figs. 5 and 6. The jigs are of reasonably heavy, rigid construction and were designed along three basic principles: To provide for exact positioning of the tubular members and for clamping them in place until they are joined; wherever there is a possibility of unfavorable warpage taking place, provision is made to keep the body of the metal cool during welding; yet their construction prevents the edges to be joined from becoming unduly chilled.

On completion of the tack welding, fuselages are mounted for and aft in wheeled dollies like that shown in Fig. 7, and are passed along to the finish-welding section of the fuselage department. Here all tack

From paper presented at twenty-first annual meeting of the American Welding society, Oct. 20-25, 1940, Cleveland.



No bacterial contamination h
These milk tanks are
REPUBLIC ENDURO

Three 13,500-gallon milk tanks made by welding Republic Enduro Stainless Steel Sheets.

REPUBLIC STEEL — DEFENSE FOR AMERICA

To the Metal Working Industries it is not news that the present demand for steel is enormous. Industry will do its share of carrying forward the National Defense program. At the same time it must provide for the needs of a nation with the world's highest standards of living. All this requires large quantities of steel.

During its ten years of existence, Republic Steel has been constantly improving equipment, enlarging capacity, training men. Now this organization is setting new records for the production of steel . . . records of which our men of steel are proud.

In both mills and offices the men of Republic are doing their level best to serve the nation with *steel —first line of national defense.*

R. J. Wysor
PRESIDENT

Wherever food products must be processed, ENDURO* is the answer. The consumer demands freedom from contamination and retention of natural flavor of product. The processor insists upon long equipment life, freedom from product spoilage, low cleaning and maintenance costs. The equipment maker requires a uniform material to spin, form, forge, machine, weld —to fashion into useful shape. Republic ENDURO is that material.

"The Fabrication of ENDURO" is a handy book—a practical time- and money-saver in any shop. May we send your copy?

REPUBLIC STEEL CORPORATION
General Offices: Cleveland, O.

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY

*Reg. U. S. Pat. Off.

REPUBLIC ENDURO
STAINLESS STEEL

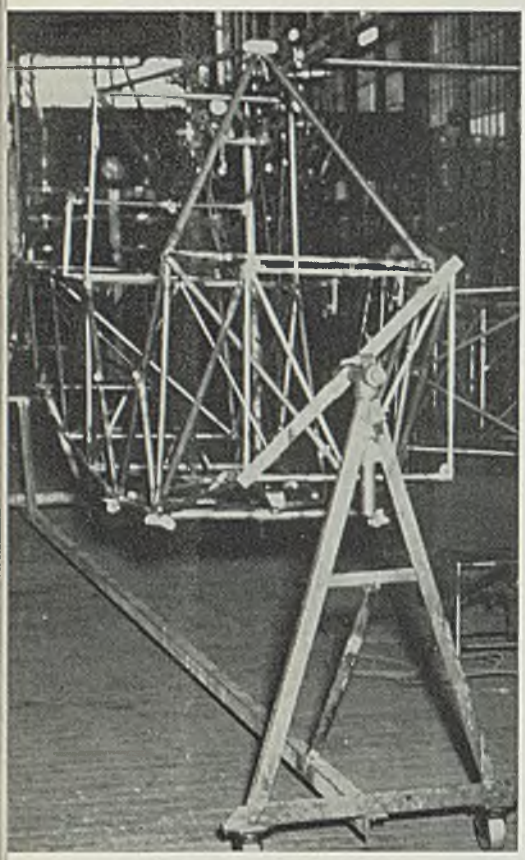


Fig. 7—Finish welding in wheeled dollies like this is fast work because a single point mounting fore and aft permits the entire fuselage to be rotated as a unit to any position desired. Wheels on dollies permit easy motion along line of work

welds are finished by experienced operators. Their task is facilitated by being able to rotate the entire fuselage in the dolly, thus obtaining the best possible welding position for each joint.

The total number of steel welds in clusters, fittings and turtle decks in a given airplane varies according to the model, but the average number is close to 150. In addition, bronze welds for some of the smaller fittings, guides for control cables and other similar parts average over 200. In these latter operations, production has been considerably speeded by use of a vapor flux dispenser.

Automatic Fluxing: This piece of equipment is connected between the regulator or hydraulic back-pressure valve and the blowpipe so all the acetylene used passes through the dispenser. The acetylene, as it flows toward the blowpipe, bubblesthrough a special liquid flux within the dispenser and picks up the required amount of flux in vapor form. The vapor flux then passes through the hose and blowpipe directly to the point of welding where the required fluxing is produced upon the parts being joined. Application of the flux is thus automatically and mechanically controlled. No more than the required amount of flux can be deposited and it is placed at the exact point where wanted. Thus waste from excessive flux is eliminated, and sound bronze welds of excellent appearance are speedily obtained.

Bench Welding: As the fuselages are being constructed, the bench-welding department is busy fabricating fittings and hundreds of small assemblies. The necessary operations here include fusion welding of chromium-molybdenum steel and stainless steel as well as bronze welding. The operator in Fig. 8 is welding a chromium-molybdenum steel axle assembly for the landing gear.

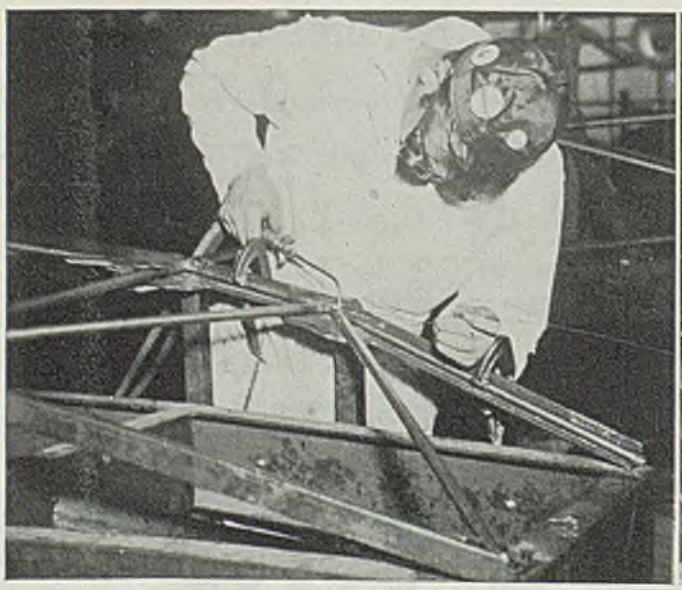
Other parts welded from this material include motor supports as in Fig. 9, control-stick torque tubes; fire-wall supports; wing compression webs; tail-surface assemblies, including elevators, rudders, fins and stabilizers; bell-crank brackets; and many other parts. Stainless steel welding on present models is confined to mufflers, auxiliary fuel tanks, and exhaust manifolds, Fig. 10.

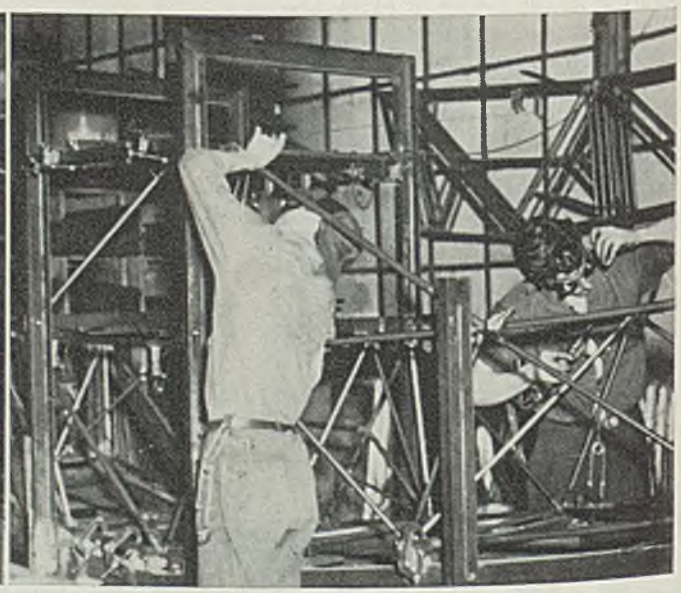
Our assembly operations, in a plant with an area of 140,000 square feet, cannot be called strictly straight line because two floors are used. However, major assemblies are moved through the shop by means of an overhead conveyor system (see STEEL, Sept. 23, 1940, p. 74) which terminates in the final assembly department and our layout is organized so all assemblies, subassemblies and single parts arrive in the various departments at the precise moment to insure smooth production. Our potential capacity is about 600 planes a month.

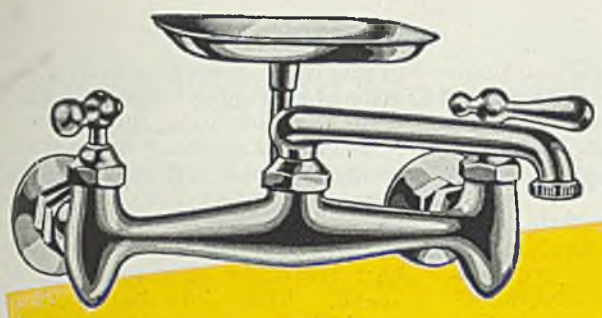
Summarizing: It would seem that welded tubular design at the present moment is still the most satisfactory method of construction for light airplanes. In fabrication of component parts from the widely employed chromium-molybdenum tubing, welding by the excess acetylene method has largely supplanted fusion welding by the neutral flame method for several important reasons: The excess acetylene method is faster, and it permits more attention to be given to rod manipulation. (See STEEL, Feb. 10, 1941, p. 80, for discussion of metallurgical factors involved.) Welding is carried on at a lower temperature, thereby resulting in reduced grain growth with corresponding improved physical properties in the weld.

Because the newer process is adaptable to either the forehand or the backhand technique, it can assist materially in overcoming ex-

Fig. 5—Closeup of chrome-moly tubing being welded in an angle-iron jig, left
Fig. 6—Bronze welding is employed widely in making jigs such as this one at right, for welding tubing to make fuselage assemblies







Pennsalt Cleaner

saves $170.35 per month in a single cleaning operation for Bohn Aluminum & Brass Corp.

THE Capitol Brass Works Division of Bohn Aluminum & Brass Corp. makes the kind of plumbers' brass goods that helps to bring chrome-plated beauty to modern kitchens and bathrooms. The metal cleaning operation prior to plating involves some special problems, one of which is the removal of the buffing compound used to polish the brass castings.

Too strong a metal cleaner could discolor the brass, yet ordinary cleaners were not effective. But one of the Pennsalt Cleaners was found to be completely effective, safe, and ... exceedingly economical.

By saving time and materials, it saves an average of $170.35 per month in the cost of a single metal cleaning operation.

This is but one example of what the Pennsalt Cleaners are doing for many industries. They have won their place in each plant by doing a better job at lower cost. For heavy-duty operations there is Orthosil, the original product in this line. For varied and extreme requirements there is a series of other Pennsalt Cleaners that meet every need with laboratory precision.

They all have tremendous dissolving and emulsifying action; unusual lasting power; and insure quick, efficient cleaning. Why not test their savings in your own processes? Write Dept. E. Pennsalt Cleaner Division, Pennsylvania Salt Mfg. Co., Widener Building, Phila., Pa.

Other Pennsylvania Salt Chemical Products used in large quantity by industry

Anhydrous Ferric Chloride		Carbon Tetrachloride
Mineral Acids	Kryolith	Soda Ash
Caustic Soda	Sal Ammoniac	Acid-Proof Cements

PENNSALT

CLEANERS FOR INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

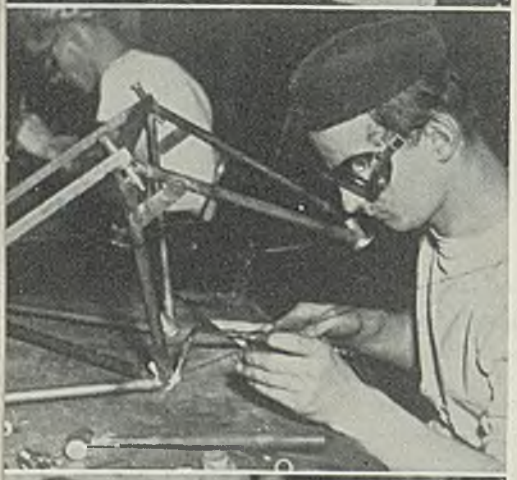


Fig. 8—Welding an axle assembly, top, for a landing gear. Fig. 9—Motor mount, center, made of welded chrome-moly tubing. Fig. 10—Assembling a stainless-steel exhaust manifold by welding, bottom

pansion and contraction problems. Finally, the carburizing or reducing atmosphere of the excess acetylene flame tends to eliminate a decarburized surface on the tubing at the weld.

A second important aid in speeding the production of light planes is the vapor flux dispenser previously described. This piece of apparatus makes fluxing for bronze welding completely automatic by mechanically delivering the exact amount of flux at the actual point of welding and at the precise moment it is needed thus greatly eliminating the human element in this respect. It results in bronze welds speedily made and of a uniformly sound and excellent appearance.

Adhesives Make Strong Metal-to-Metal Bonds

■ Two adhesive solutions made of Vinylite resins, and which produce unusually strong, impact-resistant metal-to-metal or phenolic-to-phenolic bonds, are now available according to Plastics division of Carbide & Carbon Chemicals Corp., 30 East Forty-second street, New York. They both are thermoplastic cementing agents of high quality and can be used for assembling either molded or laminated phenolic materials.

Designated as XL-5041 and XL-5075, the former is a 24.5 per cent solution of a modified polyvinyl acetate in toluol, and the latter, a 28 per cent solution of the same resinous material in methyl acetate. Both produce strong bonds, and the choice of which to use depends only upon the speed of drying required, the XL-5075 adhesive drying considerably faster.

The bond strength of the adhesives is remarkably high. Tension tests of metal samples bonded indicate a shear strength of the order of 6000 pounds per square inch. In addition, parts bonded are able to withstand sharp blows.

Takes the "Clang" Out of Copper

■ At a meeting of the American Physical society in New York, Dr. Thomas A. Read, Westinghouse research physicist, performed a "neat" scientific trick, according to the *New York Times*. He picked up a bar of cast copper, tapped it with a hammer and made it sing like a tuning fork. Then he picked up a similar bar which had been slightly squeezed in a press, tapped that and got only a dull "clunk." Merely dropping a bar on a table was also enough to take the "clang" out of it. Pounding or cold-working the copper restored the "clang."

No one knows why copper should lose and regain its musical quality in this way. According to Dr. Read, dislocated copper atoms probably stifle the ability to ring.

"If given a chance," he says "the atoms of copper will arrange themselves in perfect rows and layers as they cool slowly from the molten state or during the careful heat treatment of a solid piece of metal. They join hands, so to speak, to form an ideal latticework. When they are struck they vibrate in unison. We hear the vibration as a musical note."

When this latticework is jarred by dropping or squeezing the bar, some of the atoms are pushed out of place. These disturbed atoms can move about, and as they move they can absorb the musical vibrations.

Dr. Read believes that his studies of copper's elusive "clang" may help metallurgists to improve their alloys and may help reveal why some metals are hard and others soft, thus aiding the metallurgist to make better alloys. In his laboratory, he uses alternating current to set up vibrations in short copper bars no longer than lead pencils. He is thus able to measure the amount of energy needed to keep a bar oscillating between 30,000 and 40,000 vibrations a second—too high a pitch to be heard.

Develops Light Weight Stainless Armor Plate

■ A new type of light weight armor plate is announced by Colonial Alloys Co., East Somerset and Martha streets, Philadelphia. A surface hardness up to 1000 brinell can be produced. The process is an electrical and chemical one. Total thickness of the plate and depth of the hardened portion can be controlled over wide ranges. The material is said not to shatter under impact.

With a heat dispersion rate said to be several times greater than steel armor plate, penetration of a projectile due to a plastic state formed by frictional heat is reduced. The new material takes an exceptionally high polish before it is hardened and retains this high polish after hardening to afford a surface of maximum resistance to corrosion, pitting and oxidation. Also it causes bullets to glance off, preventing "biting" into the metal to start penetration. Physical and chemical characteristics are said to make the surface resistant to ice formation also.

Material can be supplied in many forms, including sheets, plates, tubes, angles, extrusions and others. There need be no production bottleneck on this material since each aircraft factory can have its own processing plant. Heat-treating operations or expensive equipment are not necessary.

Revamping Old Stacks with Modern Equipment Increases Output

Installation of replaceable inwall lining affords an increase of 27 per cent in the volume above the mantle of the furnace, a net saving in the fuel consumption of 400 pounds of coke per ton of iron, and a reduction in the amount of flue dust blown over into the dust catcher

By J. P. DOVEL

President
James P. Dovel & Co.
Birmingham, Ala.

■ ADDITIONAL output from present blast furnaces or the building of additional stacks is necessitated by the national defense program. If new blast furnaces are to be built to meet this situation they will likely be additions to existing plants, while if they are constructed to meet expanding domestic requirements, the location in most cases will be selected with a view to future market requirements, and at locations where future supply of ore and scrap iron can be assembled cheaply.

Under these circumstances it would be a much better economic policy to revamp present blast furnaces in accordance wth the modern inventions and improvements that would increase the output of the great majority of our present stacks from 25 to 30 per cent of their present capacity. This has been done on a few cases and is a proved method.

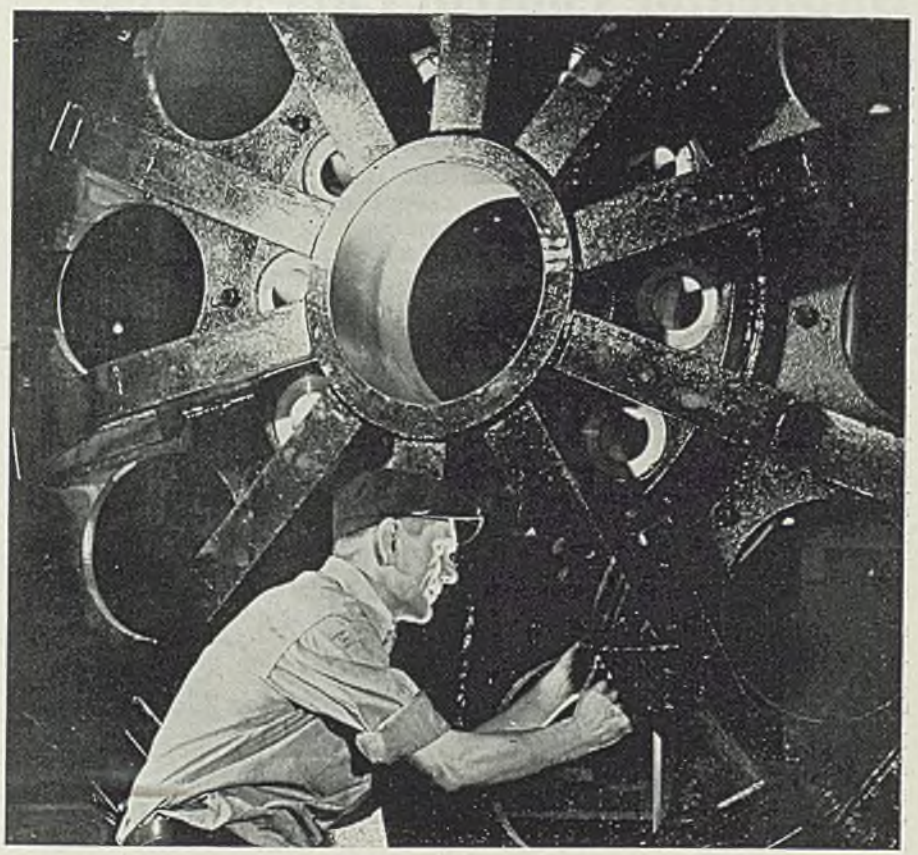
Most Furnaces Large Enough

Most blast furnaces are already large enough to get increased production by simply using thin self-replaceable linings, thereby increasing the heating surface above the bosh in many cases as much as 25 per cent, while at the same time reducing flue dust losses to a minimum. It is well known that flue dust losses in many instances run as high as 500 pounds per ton of iron produced and especially when furnaces are blown for maximum output as is always done when the metal is badly needed.

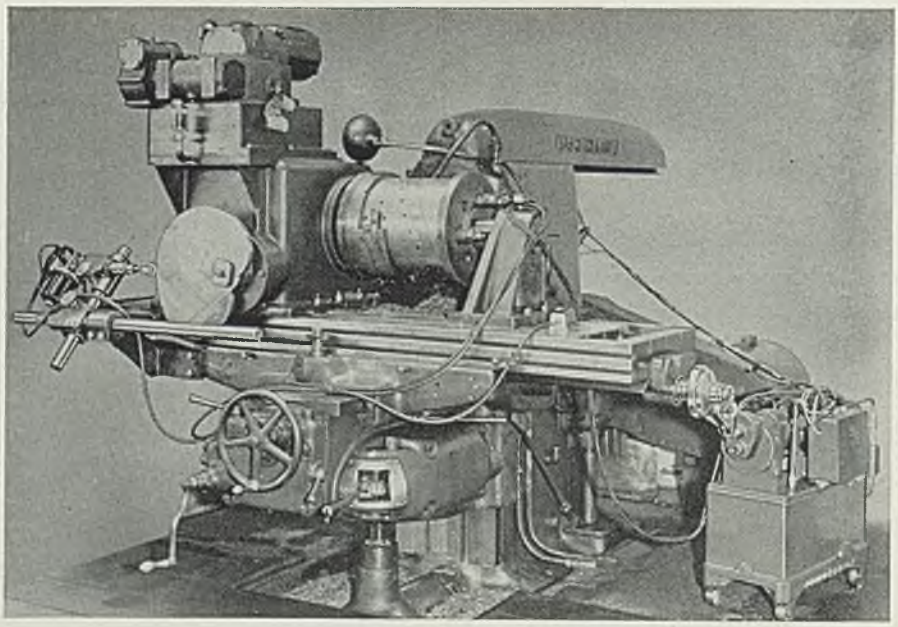
Another feature that should have serious consideration at this particular time is the fact that it is unnecessary to blow out a furnace merely because of inwall failings, inasmuch as the inwall in any blast furnace can be rebuilt from the outside at a large saving of time and material. The blast furnace industry as a whole has been loathe to accept this principle, although it is a proved fact. One company which produced 1400 tons of iron per day on six or seven 13-foot blast furnaces is producing the same tonnage on two of the old 13-foot furnaces and two rebuilt 14 ¾-foot furnaces, all equipped with replaceable linings. The greatly increased area at the top stockline makes a net difference of 27 per cent in volume above the mantle with a flue dust loss of less than 10 pounds of metal per ton of iron and a net saving in coke consumption of 400 pounds per ton of iron produced. This figure has been determined by careful auditing over a period of several years. The same principle has been applied on other furnaces all of which report similar results. A number of furnaces have been abandoned and scrapped on the theory that they would not be needed to meet the demands for a number of years.

Many stacks at present have insufficient hot blast capacity to get maximum tonnage. They can be equipped with thin replaceable linings to secure enlarged volume above the mantle, but some additional blowing power will be required. The output can be increased quickly and at limited expense, thus preventing the use of new material that is needed at present for other purposes and obviating over-building of iron producing capacity that may not be needed when this emergency is past.

U.S. Ships Feature Air Gap Drives



■ This 12½-ton steel "spider web," part of one of the 22 newly developed Westinghouse electric couplings that will drive 11 United States merchant marine cargo ships now under construction, serves to "cushion" reduction gears against the pulsations of power from the diesel engines. A ¼-inch air gap separating the unit from a smaller wheel will be the only connection in the ships between the engine and propeller. The interaction of magnetic forces set up by electrical energy in the gap between the two wheels causes the propeller-connected outer wheel to revolve with the inner wheel coupled to the engine. The coupling is said to increase the maneuverability of the ships and also causes substantial reductions to be made in the weight and size of gears. Because the couplings act as disconnecting clutches which can disengage the engines from the gears immediately, a multiengined ship can be driven with half its engines pulling forward and the other half in reverse



Savings of approximately 12 hours per set can be obtained in the production milling of cams for automatic screw machines on this setup shown above by using a duplicator control

Duplicator Control Cuts Milling Time of Screw-Machine Cams

■ MILLING automatic screw machine cams by a duplicator-controlled standard milling machine has cut machining time over 80 per cent. It also has released a machine operator's helper for other work—an important consideration in the current defense program.

This process, which employs a standard duplicating mechanism manufactured by the Detroit Universal Duplicator Co., 217 St. Aubin, Detroit, was developed by Greenlee Brothers & Co., Rockford, Ill. No special training on the part of the machine operator is required.

Mills Three Kinds of Cams

The setup is employed for milling three kinds of cams: Integral drum type; stock feed (bolted-on drum type); and cross feed (edge or disk type). After the cam drum has been set up, the stock feed and cross feed cams are merely bolted to it for machining. Thus the equipment can be used economically in making a small number of cams. The accompanying photograph shows a No. 5 Cincinnati milling machine set up for cam milling. The cam track in the drum already has been milled.

The duplicating control (at right) is attached to the transverse feed, while an electric tracing mechanism is mounted on a bracket attached to the bed in such a position that the finger can follow the contour of the developed cam. As the cam rotates during the operation of the machine the tracer transmits a continuous series of interrupted electric impulses to a solenoid-controlled hydraulic valve in the duplicator control, which in turn actuates the table feed as required to generate the cam.

Once the cutting tool feed is set by the operator, it requires no further attention during the course of one complete cut. Milling a typical cam path from the solid in two cuts requires but 90 minutes by this process, as compared with a total of 9 hours for operator and helper when manual control is employed. Depth of cut of the cam path in this case is about ⅝-inch with width of 1¾ inches.

ASTM Index Covers All 1940 Standards

■ A 172-page publication entitled "Index to ASTM Standards, Including Tentative Standards" issued recently by American Society for Testing Materials, 260 South Broad street, Philadelphia, gives information on all of the 952 standards as of Dec. 1, 1940. It is of service to anyone wishing to ascertain whether the society has issued standard specifications, test methods, or definitions covering a particular engineering material or subject, and it is of help in locating the standards in the volumes where they appear.

Monarch Alloys Develops New Bearing Bronze

■ A new bearing bronze known as Monarch metal, produced for a wide range of bearing and seal applications, is announced by Monarch Alloys Co., Ravenna, O. Alloyed in various high-lead combinations, its elements are combined in a hermetically sealed crucible which protects them from contact with furnace gases or oxygen while they are melting—then they are water-cooled by means of a secret process.

Because hard abrasive tin and lead oxides are prevented in the melting and casting process, bearings made of this metal will run with less friction heat and noise than those made of ordinary high-lead bronze. The secret cooling process used in its manufacture causes better dispersion and nodulation of lead, consequently the lead will not flow under heat.

Though the lead content of the metal is unusually high, tests show it to be superior in hardness and compression resistance to other lead, tin and copper alloys. The bearings of this metal are easier and safer to break in when new and do not need a graphite solution to prevent them from galling and seizing during the period.

The process of producing this metal can be applied to the production of other nonferrous metals with substantial increases in their value as bearing materials. At present the company is experimenting with aluminum.

At left, 100-diameter micrograph of ordinary high-grade bearing bronze. The large particles visible throughout are lead. At right, 100-diameter micrograph of Monarch metal. Note the much finer lead dispersion

High-Explosive Shell

(*Concluded from Page 62*)

rotation in the same direction, the frictional force between rolls and steel may be resolved into components respectively parallel and at right angles to the piece. Thus, while rolling is being accomplished by the action of the latter component, a continuous forward motion is given the work in the direction of its own axis by the component F (sine of the angle A) where F is the frictional force between steel and rolls. This is the basis of the Mannesmann process of making seamless rolled tubes, which in its turn is the forerunner of the Assel mill used in the Witter cross-roll method of making shell. It is interesting to observe that the evolutionary progress of the shell-making art, at least in one of its important manifestations, has followed the lines of seamless tube development.

Mannesmann Process for Seamless Tubes: A solid cylindrical billet of mild steel is raised to forging heat and passed through conical rollers, the axes of which are set at a slight angle. The rolls rotate at a high velocity in the same direction causing the block to revolve and at the same time imparting to it a forward motion in the direction of the larger ends of the conical rollers. To prevent the work being forced out laterally, three rolls are actually used, two of which are known as the working rolls, the third being merely a guide or pressure roll.

The action of the rolls may be explained somewhat as follows: The cylindrical billet, being larger in diameter than the smallest distance between the rolls, is seized and caused to rotate with a helical motion. Since the diameter of the rolls constantly increases from the point where the distance between them is least and where gripping of the billet took place, there is a tendency to impart an ever increasing velocity to the periphery of the block. In the semi-plastic state of the metal, this drawing out of the periphery results in the formation of a tube from the solid billet.

Indeed it is possible, by this means, to produce a tube with closed ends, provided that the ends of the billet are reduced before rolling to a diameter which is less than the least distance between the rolls so no action takes place at the ends. The process as described, however, fails to produce tubes of uniform wall thickness and of a smooth interior. It has therefore been found necessary to roll out the tube over a conical mandrel which rotates with the tube as it is formed. Use of the mandrel gives the uniform wall thickness and smooth interior required.

TABLE I—Typical Operating Costs for Shell Forging

	Per M	Per Hour
Press punch maintenance	$4.50	$1.08
Mill Mandrel and roll maintenance	2.25	.54
Labor of four men at $1.00 per hour		4.00
Power—325 kilowatts at 1c		3.25
Total direct operating cost per hour		$8.87
Total direct operating cost per 75-millimeter forging		3.7c

The Next Step—The Assel Mill: Under date Dec. 7, 1937, patent No. 2,101,357 was granted to Walter J. Assel, Canton, O., for a cross-roll mill of which the details are set forth in the accompanying plates I, II and III. Fig. 4 is an end view looking at the rear or delivery end of the mill. Fig. 5 exhibits a section through the rolls, and Fig. 6 shows a cross-sectional side elevation. The work proceeds from left to right in this view. Fig. 7 is a plan view of the working rolls as they appear from above the mill. Fig. 8 is a detail of one roll, showing the nature of the contact between the roll and the tube.

Remembering that the original Mannesmann process was designed to produce a tube from a solid billet by an increase in the peripheral speed of the rolls with the forward movement of the work, observe that, if we start with a tube and merely desire to change wall thickness, the action may be reversed by tapering the rolls in the opposite direction to prevent enlargement and to promote longitudinal extension of the tube, thinning the walls simultaneously. The principal function of the "hump," Fig. 8, is to center the blank and to reduce the wall thickness while the "unreeling" action or longitudinal lengthening takes place in the later stages of the process or further to the right on the same rolls in Fig. 8.

Advantages of the Assel mill compared with the roller draw bench are its ability to be widely adjusted to handle tubes of many different sizes, the absence of out-of-round tubes as a result of wear of the rolls, and the elimination of any possibility of marks on the work arising from the parting or open spaces between the rolls.

The Witter Cross Roll—A Logical Development: In developing the Witter shell forging process, certain major objectives were established, including a reduction in investment for a given output, the making of substantial savings in weight of carcass due to the accuracy with which the forging was produced, and the largest possible production per square foot of floor space.

Costs: A typical setup might include a mechanical press capable of working blanks through the range from 75 to 105-millimeter and having a capacity of two-hundred-forty 75-millimeter cups per hour; and one cross roll unit, complete with sizing roll, also having a capacity of two-hundred-forty 75 millimeter shells per hour: Total first cost of the two machines, including electrical equipment, would be near $75,000. Operating costs might be as shown in Table I.

Uses a Third Less Steel: With regard to savings in weight, the 22-pound billet normally aceptable in the case of the 75-millimeter has been reduced to 16 pounds, and instead of the 53-pound billet for the 105, a carcass weighing only 37 pounds has been successfully produced—both are significant savings.

As in the Assel mill, the action of the Witter cross-roll mill is such that the pierced blank on entering the mill is rolled over a mandrel, the rolling being done by means of three "hump" rolls similar to those previously described. Each roll is separately adjusted as to relative angle with respect to the other rolls. All are driven through a speed reducer by means of a motor, the motor torque reaching the rolls by means of the three shafts shown in the side view of the mill. These shafts are provided with universal joints at both ends to permit changing the angularity of the rolls, individually and collectively. As may be gathered from the foregoing, the design of the mill embodies no new principles, but adapts those which have been successfully applied.

Introduces Lubricant For "Hot" Bearings

■ A method of lubricating bearings operating at high temperatures is announced by Acheson Colloids Corp., Port Huron, Mich. It improves lubrication under conditions wherein the oil or other vehicle is vaporized at the particular temperature of operation, as in ovens or furnaces. It also does not leave a residue or generate objectionable fumes.

The lubricant consists of about 0.2 to 2 per cent by weight of Dag colloidal graphite, a nonflocculating graphite dispersed in a suitable volatile vehicle. The colloidal graphite penetrates wherever the volatile vehicle will penetrate.

Obtaining a 25 Per Cent Strength Increase In Copper-Bearing High-Tensile Steels by

PRECIPITATION HARDENING

By J. W. HALLEY
Metallurgist
Inland Steel Co.
East Chicago, Ind.

Many fabricators appear to be overlooking an important characteristic of low-alloy high-tensile steels containing 1 to 2 per cent copper. By a precipitation hardening treatment, tensile strengths can be increased 20,000 to 25,000 pounds per square inch, yield points similarly increasing. Hardness is increased as much as 70 brinell with freedom from distortion and mass effect. Such a steel can be cold formed in the most ductile, normalized or hot-rolled condition, followed shortly by precipitation hardening to the maximum strength

COPPER has frequently been recommended as an alloying element for steel, and some investigation already has been done on the precipitation hardening of steels containing from 1 to 2 per cent copper. The straight copper steels, however, have not been used extensively. The precipitation-hardening characteristics of complex steels containing appreciable amounts of copper are rarely used. A satisfactory surface is difficult to produce on the straight copper steels, and undoubtedly this has discouraged their use.

During recent years, many steels in the low-alloy high-tensile group, designed primarily for use in the hot-rolled condition, have had enough copper in them to be susceptible to precipitation hardening. Little emphasis has been placed on the possibility of strengthening those steels containing substantial amounts of copper by precipitation hardening.

Early investigators studying this subject found that the higher carbon content decreased the rate of hardening at various temperatures for different steels containing 1 per cent copper. Various investigators studying the relationship between time and temperature for maximum hardening obtained considerable variation in their results. However, there is a certain correlation.

For many precipitation-hardening alloys it has been found that a plot of the reciprocal of the absolute

(*Please turn to Page* 102)

From technical publication No. 1213, American Institute of Mining and Metallurgical Engineers Inc., 29 West Thirty-ninth street, New York.

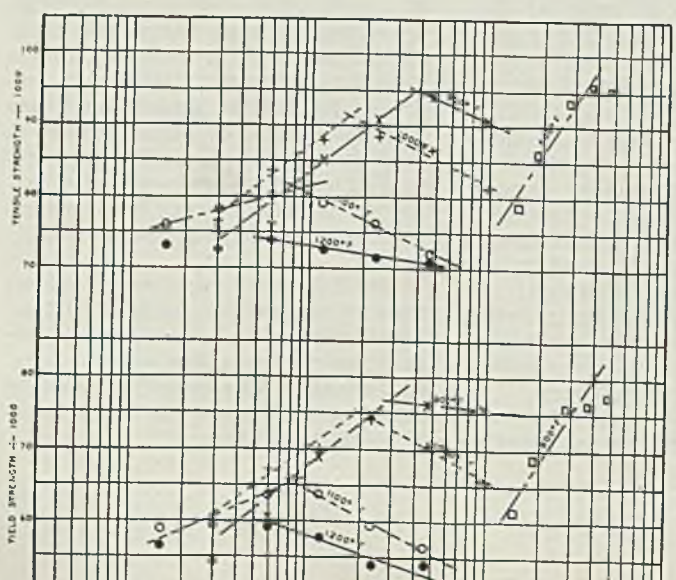
TABLE I—Physical Properties Obtained by Precipitation-Hardening of Low-Silicon Copper-Nickel-Phosphorus Steel No. 2

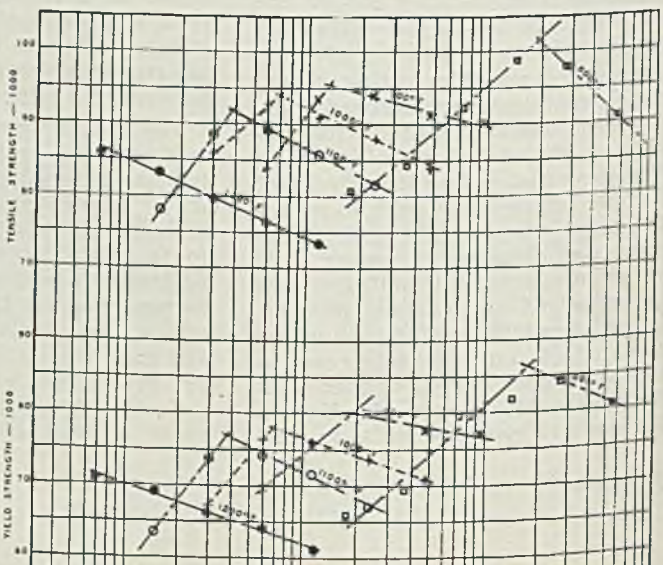
Temperature Deg. Fahr.	Time of Treatment	Yield Strength, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation in 2 in., Per Cent	Reduction of Area, Per Cent	Rockwell Hardness, B
800	32 hr.	81,470	98,650	27.0	62.2	93
900	2 hr. 30 min.	80,200	93,800	26.0	64.0	90.5
1000	1 hr.	76,640	92,100	27.8	65.8	89
1100	36 min.	74,300	88,900	27.0	65.6	88
1200	7 min.	71,730	86,420	28.00	67.4	86.5

Note: Normalized, this low silicon steel No. 2 had a tensile strength of 74,720 pounds per square inch, yield strength of 58,750 pounds per square inch.

Fig. 1. (Left)—Aging of steel No. 1. Here tensile strength and yield strength are shown as functions of temperature and time of aging

Fig. 2. (Right)—Aging of steel No. 2, containing lowest amount of silicon. Note this steel requires approximately half the time of steel No. 1 to attain maximum hardness. Here also tensile strength and yield strength are shown as functions of temperature and time of aging





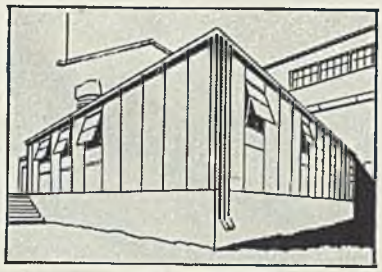
"We're using U·S·S Copper Steel Sheets on this job

BECAUSE IT'S GOT TO LAST!"

THE national preparedness program has called for additions and improvements in many plants and factories, and while the nature of this work calls for speed, ultimate permanency is important, too. The invested dollar must "pull its weight over the long haul" —today as well as any other time. That's why U·S·S Copper Steel Sheets have been chosen, time and again, for many of the fabricating jobs connected with plant and factory expansion work — such as roofing, siding, heating and air-conditioning ducts, housings, smoke stacks, ventilators, utility buildings of all kinds and various other equipment exposed to weather.

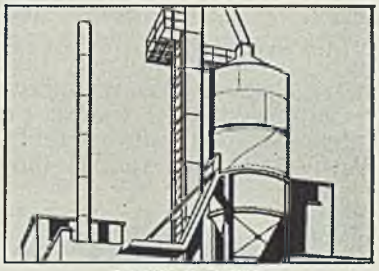
For utility, fast construction on the job, and long life, too—the first choice has been U·S·S Copper Steel Sheets. Extensive tests conducted by the A.S.T.M. over a period of 21 years, prove that corrosion-resisting Copper Steel, when exposed to atmospheric conditions, lasts more than twice as long as other comparable materials.

U·S·S COPPER STEEL SHEETS are available in all important cities. Your request mailed to any of the companies below will bring complete information.

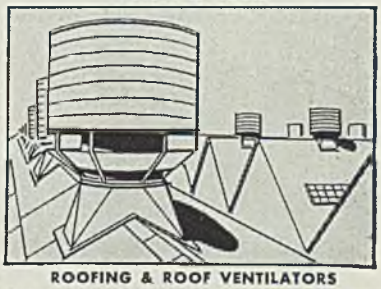


PLANT EXTENSIONS

ALL KINDS OF DUCT WORK



STACKS & TANKS



ROOFING & ROOF VENTILATORS

This chart compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of tests carried on at Annapolis, Md. from 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated). Other materials were decidedly inferior.

U·S·S COPPER STEEL SHEETS

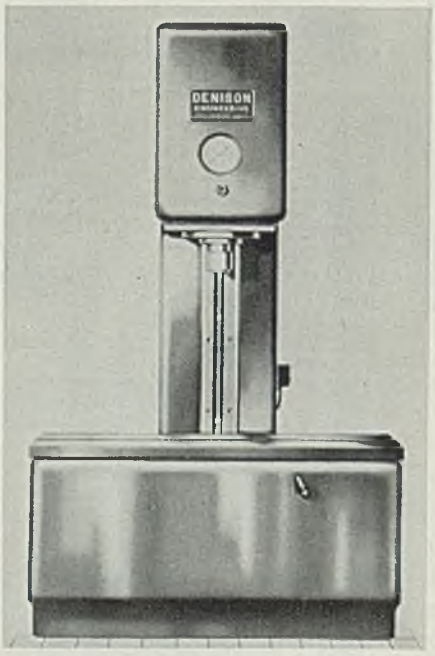
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

Industrial Equipment

Straightening Press

■ Denison Engineering Co., Columbus, O., has introduced a type DLSC2 hydraulic straightening press adapted to a wide range of production straightening operations. It will handle round bars, flats, tubes, structural shapes, castings and finished parts on a production or small lot basis with equal speed, precision and efficiency. Self-contained and "modernized," it is free of projections and more convenient to operate. The press ram is threaded



internally for attaching bending or straightening tools, and standard bolsters are provided with a slot for locating bending or straightening anvils, spinning rolls, gaging equipment or other tools. The ram and cylinder assembly is located in the upper part of the C frame. The directional control valve and its operating mechanism are incorporated in the upper part of the vertical column of the frame. The motor, pumps and tonnage control is in the center and the oil reservoir is located in the lower section. The press can be furnished with a hand lever control in either one of two locations or with a foot pedal control. Control is arranged so that tonnage applied to the work is controlled by the operator and in accordance with the requirements of the operation. The press is available in 25 or 50-ton capacities.

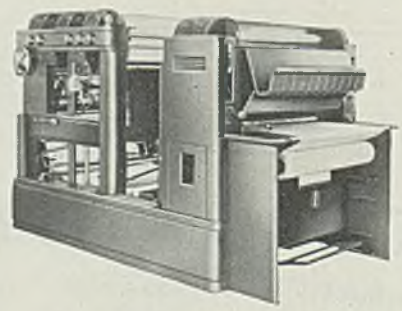
Paving Breaker

■ Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a new No. 23 medium weight paving breaker which is more powerful and can be used where handling ease is the main requirement. It is designed for general demolition of all kinds—street and wall openings, asphalt

cutting, digging, and on odd jobs of many kinds where only a single tool is needed. It also has the hard hitting power necessary for sustained demolition on the biggest construction job. The breaker also can be fitted with a special head for driving spikes up to 12 inches long.

Blue Printing Machine

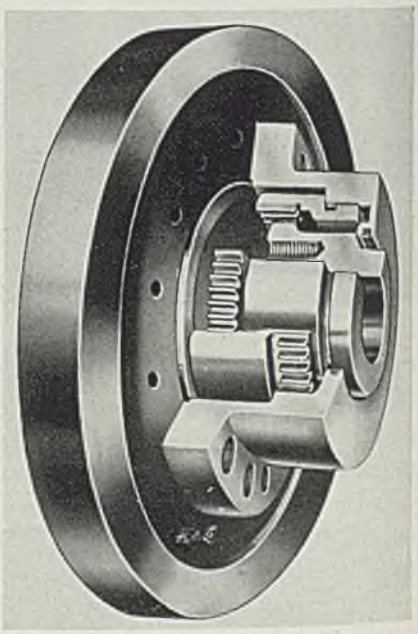
■ C. F. Pease Co., 2601 West Irving Park road, Chicago, has placed on the market a new model 22-16 continuous blueprinting machine, consisting of a combination of the model 22 printer operating in conjunction with a model 12 washing and drying unit. Although its printing speed exceeds the speed of the washer and dryer, only large prints can be fed at extreme speeds. Features of the model 22 include sliding contact which smooths out all inequalities present in all tracings and gives 23¾ inches of uninterrupted exposure area; three-speed lamp control which allows the lamps



to be operated on 10, 15 or 20 amperes as desired, and Actinic arc lamps which furnish uniform light. The washer and dryer includes a horizontal water wash that floats the exposed paper horizontally, quick change chemical applicator which gives a changeover from blueprints to negatives in thirty seconds and five 8-inch aluminum drying drums heated either with gas or electricity which provide gradual drying without distorting the paper. This combination produces uniform, contrasty prints with clean-cut sharp lines.

Flexible Coupling

■ Farrel-Birmingham Co. Inc., Buffalo, has introduced a Manger flexible coupling said to save space and at the same time secure full flexibility. It is adapted for connecting a shaft directly to a flywheel, brake drum or flange. It is equally applicable for connecting two free-ended shafts in combination with a solid, flanged and half coupling. In this unit compensation for misalignment is made by an internal sleeve which floats between an externally geared hub and an internally geared covering sleeve. The internal sleeve is free to slide and rock, adjusting for differences in alignment. The



driving member of the coupling can be either the geared hub or the covering sleeve. Compensation also is provided for offset, angular and combined misalignment without resistance to free lateral float of the connected shafts. Contact areas are large and heavy oil lubricating the contact surfaces provides a cushion against shock without using flexing materials.

Units and Accessories For Hobbing Machines

■ Barber-Colman Co., Rockford, Ill., announces new special units and accessories for its No. 3 standard and precision hobbing machines. These may be applied to either machine and include a vertical feed,

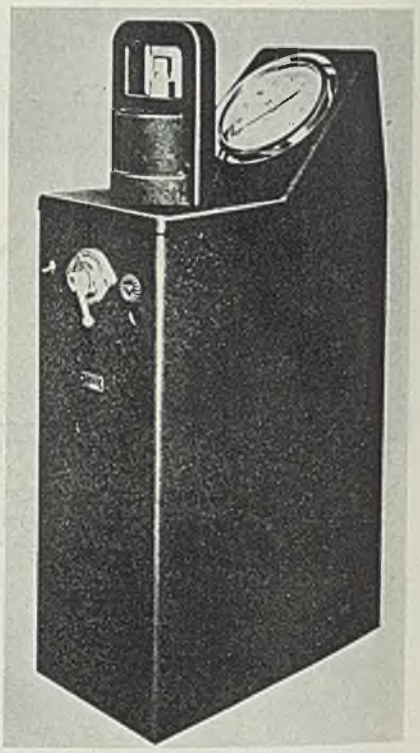
horizontal cam feed, hand-wheel operated collet, lever-operated collet, special hob swivel, left-hand hob swivel, micrometer adjustment, one-shot oiling machine, taper hob spindle and high-speed hob swivel. The vertical feed is for cutting worms and worm gears, while the horizontal cam feed is for feeding the hob slide forward short distances, after which the slide is returned rapidly. The hand wheel operated collet is particularly adapted to work occurring in small lots. Adapted to high production hobbing work, the lever-operated collet provides a very rapid method for chucking pieces. The special hob swivel is used for work of too high an angle for the standard swivel to accommodate. It is made without outboard support to the hob spindle. The left-hand hob swivel is used for hobbing right-hand helical gears which have large angles ranging between approximately 30 and 60 degrees, while the micrometer adjustment for the hob slide is for making new hob settings

The one-shot oiling system available is provided for manually lubricating all important bearings of the machine at one time. It consists of a reservoir mounted on the upright and is connected to all bearings by a fixed and flexible tubing. The taper hob spindle is designed to obtain extra fine finish. It permits the hobs to be located on the spindle with consistent accuracy.

The high-speed hob swivel is available for fine pitch class of work, and small diameter work which usually requires smaller diameter hobs than the minimum size made for the standard ¾-inch spindle.

Briquetting Press

■ Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, has placed on the market a No. 3500 specimen briquetting press for briquetting powders, borings and milled chips of metals and many powdered and granular materials into tablets. Sturdily constructed, the machine consists of a a hydraulic pressure system and a press containing the mold to form the tablet of the test sample. The pressure under which the tablets are formed may be set to a predetermined value, the load applied, being indicated on a 10-inch diameter dial gage. It also may be manually controlled by the by-pass valve so that setting of the automatic pressure regulator need not be disturbed should operator have a few samples of material to briquette that require a lower pressure such as soft metals. The material to be analyzed is placed in the mold which has an inside diameter of ¼-inch and is 1 inch in depth, and top of which is funnel shaped. Cast iron, steel and other hard materials are briquetted with a pressure of a 15,000-pound load. Soft materials such as aluminum and die cast metals are briquetted at loads as low as 4000 pounds. Either one or two tablets may be used in the spark gap for excitation. The accuracy of spectro-chemical analysis when briquetted tablets are used for specimens is equal to the accuracy obtained with cast pencil specimens. Two specimens are used for a test; one in the upper and the other in the lower electrode. The specimen



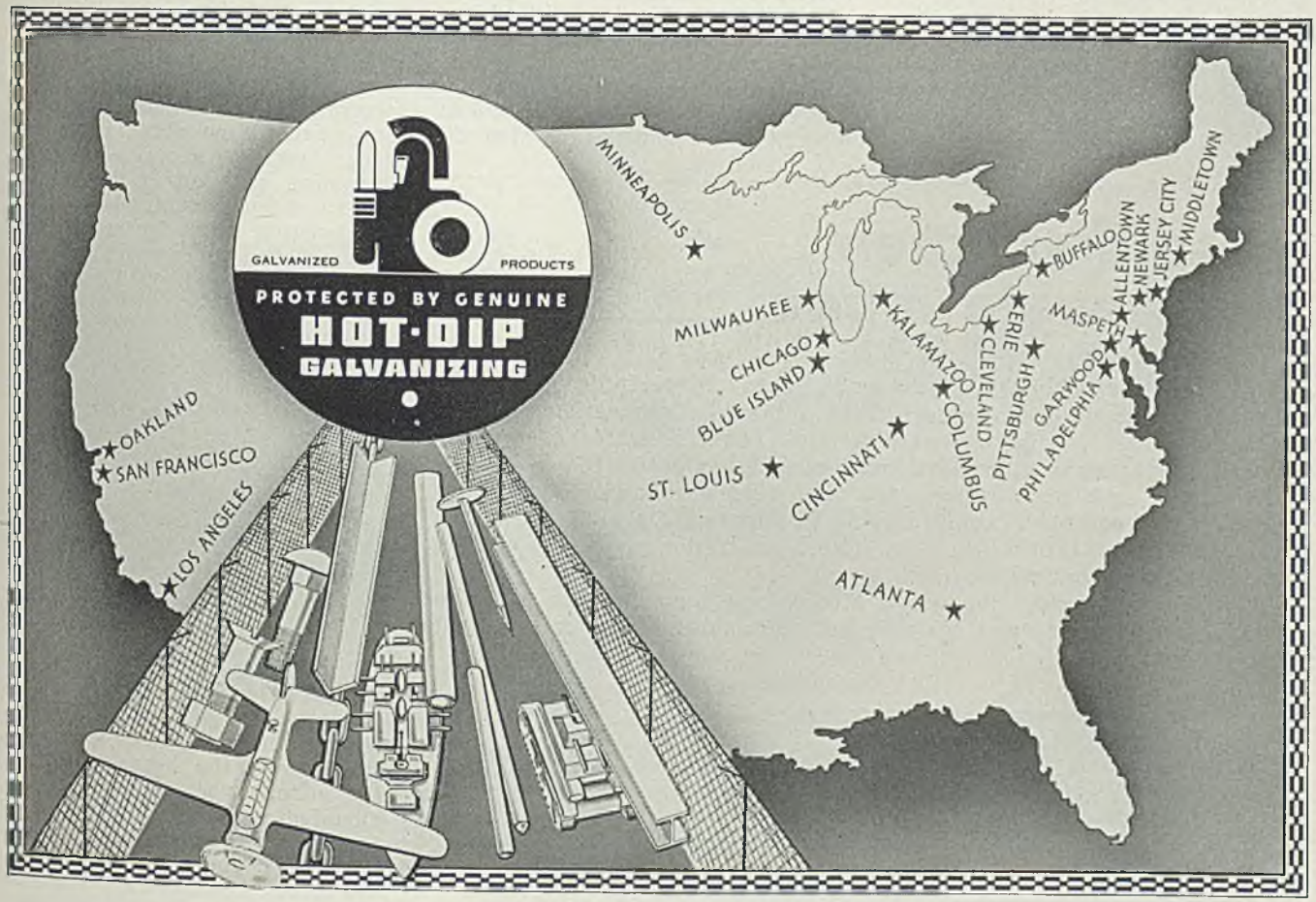
is excited with either alternating current, arc or with high voltage spark. The light from this electric discharge is photographed to determine the elements contained in the specimen and also the quantity. A complete analysis may be made with steels in eight minutes. In some laboratories using the spectrograph for the analysis of steels, cast specimens have been used since molten metal is not always available. Specimens cut from thin sheets also have been used.

Fluorescent Lamps

■ General Electric Co., Lamp department, Nela Park, Cleveland, has introduced three new Mazda fluorescent lamps, rated at 100, 15 and 14 watts, respectively. The new 100-watt Mazda F lamp produces a daylight light and is similar to the 60-inch T17 lamp announced last November. Its approximate initial lumens are given as 3350. The new 15-watt Mazda F lamp produces a soft white light. It is 18 inches

AMERICAN HOT DIP Galvanizers Association

STRATEGICALLY LOCATED WITH REFERENCE TO STEEL



WHEREVER THERE'S A NEED . . . THERE'S A MEMBER

Rigidly *adhering* to the highest standards of quality at reasonable prices, *maintaining* the most modern and completely equipped shops, *employing* expertly trained personnel, *enjoying* the constant help of an efficient research department, this association represents *the* pioneering, stabilizing anchor of the galvanizing world . . . It is *your guarantee* of getting good work quickly and a genuine Hot Dip Job every time . . . Why gamble—deal with a *known* quality—patronize our very conveniently located members. WE ARE ORGANIZED FOR HIGH SPEED, EFFICIENT PRODUCTION. American Hot Dip Galvanizers Association, Inc., American Bank Bldg., Pittsburgh, Pennsylvania.

IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

Know the truth about Galvanizing. Write for official specification sheet and new folder giving actual data on life of Hot Dip Galvanized Products under various conditions.

Acme Galvanizing, Inc., Milwaukee, Wis. ★ Acme Steel & Malleable Iron Works, Buffalo, N. Y. ★ American Tinning & Galvanizing Co., Erie, Pa. ★ Atlantic Steel Co., Atlanta, Georgia ★ Buffalo Galvanizing & Tinning Works, Inc., Buffalo, N.Y. ★ Diamond Expansion Bolt Co., Inc., Garwood, N.J. ★ Equipment Steel Products Division of Union Asbestos and Rubber Co., Blue Island, Ill. ★ The Fanner Mfg. Company, Cleveland, Ohio ★ John Finn Metal Works, San Francisco, Cal. ★ Thomas Gregory Galvanizing Works, Maspeth, N.Y. ★ Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa. ★ Hubbard & Co., Oakland, Cal. ★ Independent Galvanizing Co., Newark, N.J. ★ International-Stacey Corp., Columbus, Ohio ★ Isaacson Iron Works, Seattle, Wash. ★ Joslyn Co. of California, Los Angeles, Cal. ★ Joslyn Mfg. & Supply Co., Chicago, Ill. ★ L. O. Koven & Brother, Inc., Jersey City, N. J. ★ Lehigh Structural Steel Co., Allentown, Pa. ★ Lewis Bolt & Nut Co., Minneapolis, Minn. ★ Missouri Rolling Mill Corp., St. Louis, Mo. ★ The National Telephone Supply Co., Cleveland, Ohio ★ Penn Galvanizing Co., Philadelphia, Pa. ★ Riverside Foundry & Galvanizing Co., Kalamazoo, Mich. ★ San Francisco Galvanizing Works, San Francisco, Cal. ★ The Sanitary Tinning Company, Cleveland, O. ★ Standard Galvanizing Co., Chicago, Ill. ★ Wilcox, Crittenden & Company, Inc., Middletown, Conn. ★ The Witt Cornice Company, Cincinnati, O.

in length, comes in a T12 bulb and is rated at approximately 435 lumens. Measuring some 15 inches in length, the new 14-watt Mazda F lamp produces a daylight quality of light. It comes in a T12 bulb and is rated at approximately 370 lumens.

Lighting Fixture

■ Hygrade Sylvania Corp., Salem, Mass., is marketing a new 200 watt C-205 Miralume fluorescent lighting fixture. Measuring 49 inches long, 14½ inches wide and 7½ inches high, it has plastic diffusing panels and bottom louvers. It embodies four 40-watt fluorescent lamps in either daylight or white finish. The unit weighs approximately 45 pounds.

Excavating Machine

■ Osgood Co., Marion, O., has introduced a new type 20, model 200, ½-cubic yard shovel embodying the latest features for excavating and handling materials. Packing much power, it is convertible to any type of service. It also is designed for various types of mountings, such as crawler, standard truck and special wheel mounting. Power from either a gasoline or diesel engine is taken direct to the swing and travel shaft, by a triple strand enclosed roller chain. Clutches and brakes on the swing and travel shaft are of large diameter, and are controlled by a hand lever located at the operator's position.

The clutches and brakes on the drum shaft are controlled by a Servo mechanism. The vertical shafts reversing, swing intermediate and travel shafts are recessed in the deck, keeping out all dirt and foreign matter. The boom hoist is a separate unit, and is mounted in the left hand side frame. It embodies a self-locking steel worm and bronze worm wheel. The machine's crowding motion is powerful, and the retract fast. For shovel service, the crowding sprocket is mounted on the right hand drum, which also is the hoisting drum for crane, dragline and clamshell operations. When changing from shovel to crane, etc.,

the crowding sprocket used for the shovel, and the lagging used for the other types of service, are mounted on the drum in two pieces. Laggings of various diameters can be applied. These are keyed to the drum. The shipper shaft is now located above the center of the boom, giving increased working ranges. The vacuum dipper trip is placed so it can be operated by a touch of the operator's elbow. Latest improvements are incorporated in giving all-weather protection and full operating vision.

Magnetic Starters

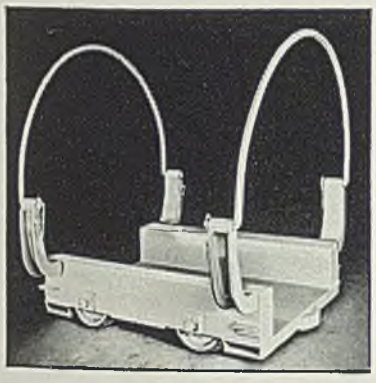
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces new across-the-line magnetic starters for multispeed squirrel cage motors of from 220 to 600 volts, 1 to 100 horsepower. They start the motor across-the-line at any speed, the different speeds being obtained by changing connections to the motor so as to change its number of poles.

Starters are available for the following types of multispeed motors in 2, 3 or 4 speed types: Constant horsepower, constant torque, variable torque, single winding motors and double winding motors. Features include pushbutton speed sel-

ection, accurate overload protection, low voltage protection, De-Ion arc quenchers and front of board wiring with accessible terminals. Optional operational features include selective speed control, compelled slow speed start, automatic sequence acceleration and deceleration. All sizes are available in standard or dust-tight sheet steel enclosures.

All-Welded Tie Car

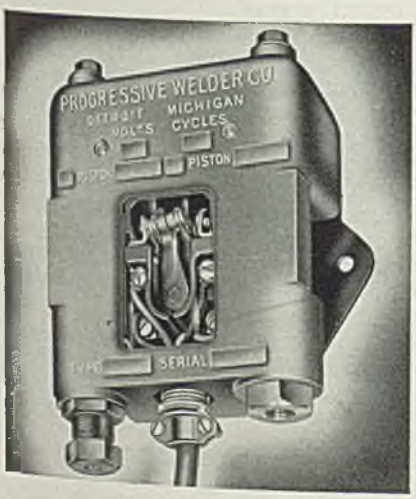
■ Allis-Chalmers Mfg. Co., Milwaukee, announces a newly improved, all welded tie car for their standard 8-foot wood preserving pressure cylinders. Built for standard gage track, and equipped with Timken



roller bearings, the car is designed for maximum possible loading capacity and for minimum waste of treating space inside the pressure cylinder.

Pressure Switch

■ Progressive Welder Co., 303 East Outer drive, Detroit, has developed a new universal nonflutter, positive snap-action, hydraulic pressure switch for heavy duty continuous



operation under adverse conditions. It is so designed that it can be used throughout the entire range of two separate capacities with only a nominal change. Thus, by removing and replacing the piston assembly the capacity of the switch can be used interchangeably over an operating range of from 200 to 1000 pounds to a maximum of 900 to 3000 pounds per square inch operating range. Adjustment of the switch to balance the hydraulic pressure at any selected point is by means of a spring loaded screw. With it adjustments can be made to permit working to within 5 pounds. Electrical connections are arranged so the switch can be used as normally open or closed and also used to control the cycling of more than one machine or process. A glass window in its front permits the operator to determine whether the electrical contact is in the "on" or "off" position. Any voltages can be handled provided 30 amperes is not exceeded. The switch measures approximately 2½ x 5 x 6 inches and weighs about 10 pounds. Hydraulic connection is through ¼-inch standard pipe fitting.

Plugs and Receptacles

■ Pyle-National Co., 1334 North Kostner avenue, Chicago, announces a new line of heavy duty plugs, receptacles and cord connectors for use with portable electrical equipment. While this line has the

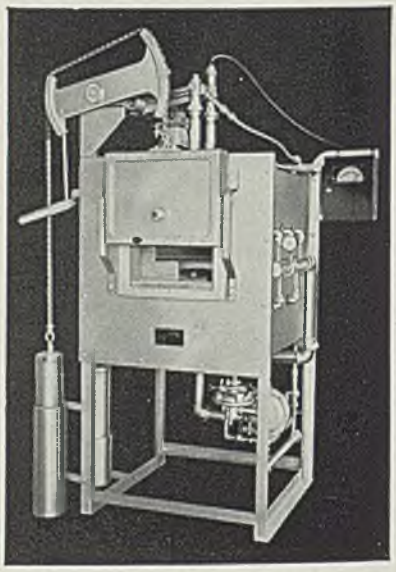
same electrical rating and is approximately the same size as standard attachment plugs and outlet receptacles, it embodies the heavy duty design of the larger Triploc plugs and receptacles for industrial use.

All 2, 3 and 4-pole contact units are interchangeable. They are reversible and the enclosed female contacts may be assembled in either a plug shell or receptable housing.

Three and 4-pole contact units can be furnished with one pole grounded. The grounded contacts are extra long to insure making contact first and breaking contact last. The plug shells and cord connector receptacle housings are heavy pressed steel, with black Pentrate finish. The Midget Triploc plug shells extend beyond the length of the contacts and embody an automatic bayonet lock which engages a lock post on the receptacle housing. Seven types of receptacle housings are available, in addition to the cord connector type receptacle housing. Pressed steel receptacle housings are furnished for use with rectangular Pylets—FS-FD single and 2-gang Pylets, sheet metal wall outlet boxes, 3¼ and 4-inch outlet boxes and in flush and surface types for mounting on panels or sheet metal cabinets. Two types of galvanized cast iron receptacle housings with a weatherproof hinged spring door and gasket also are available.

Bell-Oven Furnace

■ American Gas Furnace Co., Elizabeth, N. J., announces a new bell-oven furnace which can be used with various gas atmospheres for clean hardening, carburizing, nitriding and Ni-Carbiding. Its bell is raised or lowered quickly and easily by the door-lifting mechanism and does not delay the operation in any way. The thermocouple is inserted through the top of the bell into the work chamber and is consequently closely adjacent to the work. The atmosphere gas, however, is introduced through a second inlet. It escapes through a sand seal in which the bell rests and is combusted in the furnace. Any desired atmosphere gas or combination of gases can be



introduced into the bell for the desired heat treatment, or, if preferred, a small amount of charcoal may be placed on the hearth under the bell to provide a high carbon monoxide atmosphere. Extreme uniformity is obtained because the bell is entirely enclosed within the furnace and is heated by burners firing both above and below from both sides. The bell is gas-tight and does not "breathe." This furnace also incorporates gas saving insulating refractory and block insulation lining and bottom venting. It has a single valve control, top and bottom burners of heat resisting alloy and features quick heat up time.

Combination Shovel

■ Lima Locomotive works Inc., Shovel and Crane division, Lima, O., has developed a Super-Paymaster—a ¾ yard combination shovel, dragline, crane and pull shovel for handling all kinds of

heavy material. When equipped as a crane, it has a 13 ton capacity, as a shovel it is equipped with an 18-foot boom and 15-foot dipper handle. It is fast with ample strength to give steady dependable service. All machinery and the power plant of this material mover is placed to the extreme rear of the rotating frame so that greater capacities can be obtained without affecting the weight of the machine. Hook rollers relieve the center pintle of all digging shocks. Machinery supports are mounted on the one-piece steel cast rotating base with finished bolts. The swing clutches are the internal expanding band type, toggle operated, with housings 17 inches in diameter by 6 inches wide. The crawler truck is equipped with a lock for locking both crawlers from the operator's position. Width of

the crawler treads is 22 inches featuring 6-point connections. The independent boom hoist is of all-steel box type construction, welded throughout. The dipper handle is a single seamless type, 7 inches in diameter, with a single rack welded the entire length of the handle. A winter front incorporated on the cab enables the unit to work in all weather. It is housed in the top of the cab when not in use and can easily be lowered or raised with one hand.

Diesel Engine

■ Mack Trucks Inc., Thirty-fourth street and Eighth avenue, Long Island City, N. Y., has introduced a new smaller model END-405 Mack-Lanova diesel for installation in 4-wheel truck models of the 24,000-26,000-pound weight range. Having a piston displacement of 405 cubic inches and bore and stroke of 4 x 5¾ inches, it operates at the maximum governed speed of 2200 revolutions per minute and develops 107 horsepower.

Its cylinders and crankcase are cast in the block with removable dry cylinder sleeves, the two detachable cylinder heads being held down by 32 studs. Overhead valves are operated by pushrods and rocker arms and double concentric valve springs. Injection equipment consists of a flange-mounted Bosch multiple-unit injection pump with an integral governor on one end and pintle-type nozzles.

Seven main bearings support the 147-pound crankshaft. Crankpins are of unusually large size and bored out for lightness and better cooling of connecting rod bearings. All lubrication passages are rifle-drilled out of the solid iron. Oil is fed under fixed pressure to all main and camshaft bearings, the connecting rods, valve rocker shafts, air compressor and governor, and is cooled by the full-length water jackets and the flat top of the crankcase, at the bottom of the jacket.

Aside from the water pump, fan and generator, which are driven by the conventional triangle double V-belt, all timing and accessory drive is through a train of helical gears.

Precipitation Hardening

(*Concluded from Page 92*)

temperature against the logarithm of time to maximum hardness gives a straight line. As a group, the data of previous investigators comes comparatively close to this straight line. As with other precipitation-hardening alloys, the lower temperatures give the greatest maximum hardness. Time to maximum hardness for a 1 per cent copper steel varies from 19 hours at 842 degrees Fahr. to 5 minutes at 1202 degrees Fahr. with maximum increase in hardness running from 70 brinell at 842 degrees Fahr. to 32 brinell at 1202 degrees Fahr.

However, these results and other scattered data on complex copper steels indicate that a low-alloy steel containing 1 per cent copper should be susceptible to appreciable strengthening by precipitation hardening. The variation in results obtained on plain copper steels shows that the rate of hardening must be dependent upon small changes in the steel. This rate does not appear greatly affected by the copper content since different investigators obtain approximately the same results for steel differing as much as 100 per cent in copper content.

The present study was made to find how the single factor of silicon content affected the rate of precipitation hardening. Two steels differing primarily in silicon content were used, analyzing as follows: Steel No. 1, 0.09 per cent carbon; 0.49 manganese; 0.123 phosphorus; 0.032 sulphur; 0.188 silicon; 0.99 copper; 0.49 nicke. Steel No. 2, 0.11 carbon; 0.66 manganese; 0.121 phosphorus; 0.025 sulphur; 0.020 silicon; 1.16 copper; 0.57 nickel.

Both steels were deoxidized with aluminum, the only difference in open-hearth practice being the smaller amount of silicon added to steel No. 2. Steel No. 1 was in form of ⅛-inch thick sheet, and steel No. 2 in the form of ¾-inch rounds. Both were normalized from 1650 degrees Fahr. and tensile test samples machined before aging.

Elongation Not Comparable

After normalizing, No. 1 showed a yield strength of 56,090 pounds per square inch, a tensile strength of 72,890 pounds per square inch, with 29.2 per cent elongation in 2 inches. The respective values for steel No. 2 were 58,750, 74,720, and 34 per cent. The elongation, however, is not comparable because steel No. 1 was tested in sheet form. After aging, the samples were finish machined and pulled. Two tests were made at each time and temperature, and the results averaged to give the figures recorded on the charts.

Tensile strength and yield strength of steel No. 1 as functions of temperature and time of aging are shown in Fig. 1, and similar curves for steel No. 2 are shown in Fig. 2. Straight lines are drawn arbitrarily through the points because this permits their intersection to be taken as an accurate determination of the time to maximum strength. In most tests, the tensile strength and yield strength reached a maximum at the same time.

By taking intersecting points of the lines as the time to maximum strength, it will be noted steel No. 1 varied from 70 hours at 800 degrees to 40 minutes at 1200 degrees, while steel No. 2 reached maximum strength in 32 hours and 7 minutes for the same respective temperatures. Note at all temperatures, the lower silicon steel, No. 2, required approximately half as much time to reach maximum hardness as did steel No. 1.

The comparatively short time-to-maximum-strength characteristic of the low-silicon steel recommends it because higher strength may be obtained at lower temperatures without an impractically long heat treatment. Too, after precipitation hardening, this steel not only shows an

increase in strength that is worth while, but it retains a remarkable degree of ductility. Maximum increase in strength in pounds per square inch for steel No. 1 varied from 22,830 at 800 degrees to 710 at 1200 degrees, while steel No. 2 had values of 23,930 and 11,700 for the same two temperatures.

Table I shows the physical properties obtained by precipitation-hardening treatment after optimum time at the various temperatures. These properties are comparable to those of the lower carbon SAE alloy steels when quenched and drawn.

The freedom of precipitation-hardened steels from distortion and mass effect is a decided advantage whenever extremely high strength is not required. An interesting possibility of this steel is that it may be cold formed in the most ductile, normalized or hot-rolled condition, followed by precipitation hardening to maximum strength.

This study thus showed that silicon has a marked effect on precipitation-hardening rate of copper-nickel-phosphorus steel as by reducing the silicon content from 0.188 to 0.020 per cent, the precipitation-hardening rate was more than doubled. Also it was found the physical properties resulting from a precipitation-hardening treatment of the low-silicon steel are equal to those of many quenched and drawn steels.

New Synthetic Rubber Packings Now Offered

■ Two new types of sheet packing, one made of Ameripol, its own synthetic rubber, and the other of Koroseal, are announced by B. F. Goodrich Co., Akron, O.

The product first mentioned is a dark sheet packing featuring high resistance to the action of oils. It ages well and provides excellent resistance to heat and cold as well as water absorption. Its tensile strength is approximately 1500 pounds per square inch, elongation 400 per cent, Shore durometer hardness 78 to 82.

Made to order only in 100-pound rolls, approximately 36 inches wide, in thicknesses from 1/32 to 1/4-inch inclusive, a square yard of the 1/16-inch size weighs approximately 4¾ pounds.

The Koroseal packing is especially compounded to resist the action of oils and solvents, and also resists the action of some corrosives. Its tensile strength is about 2200 pounds per square inch, elongation 300 per cent, Shore durometer hardness 73 to 77. It is furnished in 26 x 26-inch sheets, with the 1/32, 1/16, ⅛ and 3/16-inch sheets carried in stock, and other thicknesses made to order.

Introduces New System Of Rustproofing Metal

■ A new system for rustproofing metal during production is announced by International Rustproof Corp., 12507 Plover avenue, Cleveland. Known as the Corrosion Solvent process, its fundamental purpose is to provide a passive, resistant, iron phosphate surface over which to apply finish coats at a minimum cost.

The process consists of the application of Corrosol inhibitor wash followed by a Metalbond dip bath to give a heavier iron phosphate base. The inhibitor wash itself, however, is sufficient for most rustproofing needs. It cleans and conditions in a single operation, removing all foreign matter from the metal and neutralizing all rust stimulating agents. At the same time, it converts a microscopic thickness of the metal itself into iron phosphate.

If a denser iron phosphate base is desired, the Metalbond treatment is applied. This builds up on the metal a substantial deposit of basic phosphates of iron which will meet any specifications calling for an iron phosphate coating on metal.

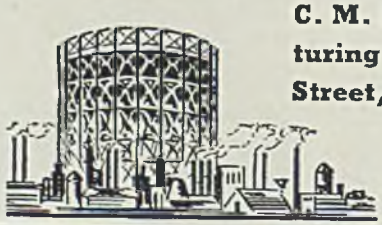
. . . . but his thumb got stuck in the ball!

Charlie's aim was deadly. His wind-up was something to behold. His reputation never failed to pack the gallery.

And now . . . all made futile by a detail . . . the size of a hole in the ball! No doubt Charlie burned with chagrin, but *he* got another chance. For America, there will be no other chance. Collectively, American industry must produce needed armament . . . or else.

Never was the steel industry, in general, better equipped for quality production at high speed. But what about your own plant? Kemp, in one way or several . . . can help to speed production, cut rejects, lower costs . . . in tin melting, in roll heating, in bright annealing. Kemp equipment, based on an exclusive, patented principle permits more accurate control, not merely of temperatures, but of flame characteristics and flame pressures, more complete utilization of fuel.

Ask steel men who are using Kemp equipment (it's in nearly every new plant in the industry) and write for details now, *before* you get your thumb in a tight place. Address The **C. M. Kemp Manufacturing Co., 405 E. Oliver Street, Baltimore, Md.**



KEMP of BALTIMORE

Steelmakers Rationing Products More Severely

Some confine 1941 shipments to 1940 tonnages by customers. Orders still top shipments. Alloy steels tightest.

MARKET IN TABLOID ★

Demand
Insistent.

Prices
Strong.

Production
Off ½-point to 96½.

■ DRASTIC steps to apportion steel equitably are being taken by several steelmakers, some having declared a truce against incoming orders from branch offices for a time. During the interim one important flat steelmaker is making a careful survey of 1940 shipments and will restrict customers this year to the tonnages they took then with due allowance for increase in defense orders. Some members of staffs of branch offices have been called to main offices to expedite bookkeeping.

Individual steelmakers can do a more efficient job of rationing, knowing more precisely the needs of consumers, than could Washington, it is still recognized generally. Supply situation becomes ever tenser, though many well-informed members of the industry believe that this is the zero hour and that by summer the confusion will have given way to a degree of calm. It is pointed out that for the first time even the most lethargic consumers have realized the tenseness of the situation, causing all to order at once.

By summer, they say, not only will customers have secured good positions on order books and have received increasing quantities of steel at their own plants, but capacity to produce will be greater and mills more efficient. Moreover early phases of the defense program have required steel in bulk, such as structurals for new plants and plates for new ships, whereas later phases of defense may require less bulk and more quality steels for processing through plants, thus causing less drain on furnaces and rolling mills.

More and more do makers insist on showing of priority slips from Washington before booking an order. Often such a slip is four or five stages removed and has to be traced through prime contractors and subcontractors.

Some warehouses have been shipping for several weeks at two and a half times their receipts from mills. In the main warehouse stocks still are rounded out, excepting for depletion of specialty items.

On many products mills are sold up for first half, though usually with a little reservation for best customers. More consumers turn to unaccustomed sources of supply but are usually turned down.

Even rejects and seconds have become scarce. Various states find it difficult to buy sheet steel for 1942 automobile license plates.

Ford Motor Co. is reported to have bought 300,000 gross tons of iron ore from four or five companies, mostly smaller operators, the price not having been divulged, though the assumption is that it was not lower than basic prices for the 1940 season. Vessel freight rates on the Great Lakes are yet to be fixed.

Steel ingot production in January totaled 6,943,084 net tons, new high, and, for the first time monthly, includes electric furnace and steel castings, according to the American Iron and Steel Institute.

Automobile production for the week ended Feb. 15 is scheduled at 127,500 units, up 2500 for the week, comparing with 95,050 for the like period of 1940.

Producers of concrete reinforcing bars are issuing new extra lists which contain revisions in the trucking extra, making charges uniform at 10 cents per 100 pounds at all points instead of the 5-cent rate which prevailed at some points. There have also been changes in bending and engineering extras.

Building steel awards and inquiries are lighter in line with predictions that a saturation point would be reached early this year.

Automobile makers are planning to use some substitute materials of equivalent quality in the manufacture of 1942 models such as plastics in place of zinc die castings to conserve defense materials. This will probably prove typical of civilian substitutes in many lines of manufacture. Steel will probably be one material conserved in this manner.

Steel ingot production last week dropped ½ point to 96½ per cent. Advances took place in two districts, Chicago improving 1½ points to 99½ per cent and New England 8 points to 100. Declines were in three centers, Cleveland, by ½ point to 84, Detroit by 4 points to 92 and Youngstown by 5 points to 90 per cent. Unchanged were: Pittsburgh 96½, eastern Pennsylvania 96, Wheeling and Birmingham 100, Buffalo 90½, Cincinnati 95 and St. Louis 93.

Due to slight adjustments in certain steelscrap specialties STEEL's composite on iron and steel advanced 3 cents to $38.23. Finished steel and steelworks scrap were unchanged, at $56.60 and $19.91, respectively.

COMPOSITE MARKET AVERAGES

	Feb. 15	Feb. 8	Feb. 1	One Month Ago Jan., 1941	Three Months Ago Nov., 1940	One Year Ago Feb., 1940	Five Years Ago Feb., 1936
Iron and Steel....	$38.23	$38.20	$38.22	$38.38	$38.08	$37.21	$33.48
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	19.91	19.91	20.09	20.88	20.72	16.98	13.83

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

	Feb. 15 1941	Jan. 1941	Nov. 1940	Feb. 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	2.15
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	2.17	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 ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Feb. 15, 1941	Jan. 1941	Nov. 1940	Feb. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.34	$24.34
Basic, Valley	23.50	23.50	22.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	25.21	24.21	24.21
No. 2 foundry, Chicago	24.00	24.00	23.00	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	24.06	23.06	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.215	25.215
Malleable, Valley	24.00	24.00	23.00	23.00
Malleable, Chicago	24.00	24.00	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	24.17	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$20.75	$22.15	$21.50	$17.75
Heavy melt, steel, No. 2, E. Pa.	18.50	19.30	19.75	16.30
Heavy melting steel, Chicago	19.25	20.25	20.25	15.75
Rails for rolling, Chicago	24.25	24.70	24.55	18.25
Railroad steel specialties, Chicago	23.25	24.05	23.25	18.50

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$4.75	$4.75
Connellsville, foundry, ovens	6.00	6.00	5.75	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

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	20-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., ⅜ 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.
⅜ 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
2¼"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. fittgs., 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 ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to ⅞-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.	24.00	24.00	23.50	24.50
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.	24.00	24.00	23.50	24.50

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

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.	24.24	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 district from Neville Island	∫ Neville base, plus 69c, 84c and $1.24 freight.			
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.

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 tricxide, 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 1.13

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 ½-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. $2.60
200-lb. kegs, lb. 2.75
Do., 100-200 lb. lots 3.00
Do., under 100-lb. lots

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	Structural 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	3.62	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.25	4.10	4.60	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.	3.50	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	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	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	3.50	4.00	6.00	3.50	3.50	5.60	3.40	6.40	5.15	....	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	5.00	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.

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.	15.50-16.00
New Eng. del. No. 1	16.75-17.25
Buffalo, No. 1	20.50-21.00
Buffalo, No. 2	18.50-19.00
Chicago, No. 1	19.00-19.50
Chicago, auto, no alloy	18.00-18.50
Cincinnati, dealers.	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†16.50-17.00
Detroit, No. 2	†15.50-16.00
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, dlrs., No. 1	11.00-11.25
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	18.50-19.00
Chicago, factory	18.50-19.00
Chicago, dealers	17.00-17.50
Cincinnati, dealers.	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.25-17.75
E. Pa., new mat.	20.00
E. Pa., old mat.	17.00
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	18.50-19.00
Buffalo, No. 2	17.00-17.50
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	12.50-13.00
Toronto, dealers	9.75

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	18.50-19.00
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	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	13.50-14.00
Cincinnati, dealers.	10.00-10.50
Cleveland, no alloy.	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	14.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.50-16.00
St. Louis	10.75-11.25
San Francisco	5.00
Toronto, dealers	†7.75- 8.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	15.50-16.00
Cleveland	14.50-15.00
Chicago	14.25-14.75
Chicago, spel, anal.	15.50-16.00
Detroit	†12.00-12.50
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.25
Buffalo	14.50-15.00
Cincinnati, dealers.	9.25- 9.75
Cleveland	14.50-15.00
Eastern Pa.	14.00
Detroit	†12.00-12.50
New York	†10.00-10.50
Pittsburgh	16.00-16.50
Toronto, dealers	†7.75- 8.00

AXLE TURNINGS

Buffalo	16.50-17.00
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	13.75-14.25
Cincinnati, dealers.	9.25- 9.75
Cleveland	14.50-15.00
Detroit	†12.00-12.50
E. Pa., chemical	15.50-16.00
New York	†11.50-12.00
St. Louis	11.00-11.50
Toronto, dealers	†7.75- 8.00

RAILROAD SPECIALTIES

Chicago	23.00-23.50

ANGLE BARS—STEEL

Chicago	22.75-23.25
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	26.00-26.50
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	26.00-26.50
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	19.00-19.50
Cleveland	24.00
Pittsburgh	24.00-24.50
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.	19.00-19.50
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	16.00-16.50

FORGE FLASHINGS

Boston district	†13.25-13.50
Buffalo	18.50-19.00
Cleveland	18.50-19.00
Detroit	†16.50-7.00
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
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	23.50-24.00
Cleveland	22.00-22.50
Detroit	†18.75-19.25
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	24.00-24.50
New York	†19.50-20.00
Eastern Pa.	26.00-26.50
St. Louis	22.00-22.50

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	24.75-25.25
Eastern Pa.	27.50-28.00
St. Louis	25.50-26.00

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	19.50-20.00
Chicago, iron	20.50-21.00
Chicago, rolled steel	22.75-23.25
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.00-23.50
Eastern Pa., steel	26.00-26.50
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.	†17.50-18.00
N. Eng., del. No. 2	18.75-19.00
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.00-22.50
Chicago, agri. net	16.00-16.50
Chicago, auto net	18.50-19.00
Chicago, railr'd net	17.50-18.00
Chicago, mach. net	20.00-20.50
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†17.50-18.00
Eastern Pa., cupola	24.00-24.50
E. Pa., No. 2	20.50
E. Pa., yard fdry.	20.50-21.00
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	†19.75-20.00

HEAVY CAST

Boston dist. break.	†16.50-16.75
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†18.00-18.50
Detroit, break.	†16.00-16.50
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	16.50-17.00
Chicago, net	14.00-14.50
Cincinnati, dealers.	13.00-13.50
Detroit, net	†11.00-11.50
Eastern Pa.	19.00-19.50
New York fdry.	†14.00-14.50
St. Louis	15.00-15.50
Toronto dealers, net	†13.75-14.00

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.	$36.00-37.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	57.00-60.00
So. African, 48%	60.00-63.00
Indian, 49-50%	53.00-54.00
Brazilian, 46%	67.50
Cuban, 50-51%, duty free	

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 106, 107

Pittsburgh — Sheet mill operations are unchanged. Buying is heavy, with deliveries slightly behind schedule and delivery promises now nearly all in the third quarter. Galvanized operations are steady at 81 per cent.

Cleveland — Stainless and nickel steel sheets are uncertain because of shortage of nickel. Makers of stainless steel sheets are booking orders for 16 to 18 weeks' delivery, subject to nickel supply. One large maker of sheets and strips has imposed an embargo against orders from branch offices. The company is also apportioning 1941 tonnage on the basis of 1940 sales. Most companies are virtually sold through first half.

Chicago — All grades of sheets and strip are moving into more extended deliveries. Buyers are required to anticipate requirements farther ahead. Hot-rolled 18-gage and heavier sheets are offered for late August and 20-gage and lighter for late June. Strip mill size sheets have advanced from 9 to 11 weeks to 10 to 12 weeks. Hot and cold-rolled and galvanized, formerly 13 weeks, are now 14 to 15 weeks. Strip, 2½ inches and under, has moved from 14 to 16 weeks to 15 to 17 weeks. Enameling iron is in September delivery.

Boston—Lengthening deliveries on more finishes of hot strip, continued heavy forward buying and re-rolling schedules increasingly upset by defense tonnage scheduled ahead of original expectations, complicates problems of narrow cold strip producers. Rerollers are at capacity and sold out for first quarter in most cases; some are actually filling books for second quarter shipment at open prices. Considerable tonnage has also been taken for third quarter. The sold up condition is reflected in the dearth of tenders for 1025 tons of license tag stock for four New England states, mostly 24-gage hot-rolled, pickled and annealed stock. Massachusetts got no bids on 700 tons with deliveries extending in December. Rhode Island bought from the only bidder, 140 tons, deliveries into June at open prices, and New Hampshire placed 130 tons with a Boston distributor at $5 above the market, a midwest mill to supply the steel at prices prevailing at time of shipment in second and third quarter.

New York—Sheet sellers generally are now unable to book hot and cold-rolled sheets for delivery before third quarter and some have little capacity left before the middle of August. Galvanized sheet deliveries are almost as badly extended. With orders still coming in at a rate well

in excess of shipments, a still tighter schedule is in prospect.

Philadelphia — Near capacity operation of sheet mills is having no appreciable effect on backlogs as buyers seek additional third quarter protection and in some cases attempt to obtain fourth quarter coverage. Producers have little capacity open for second quarter, being completely sold on some grades. Stainless steel capacity is especially limited for several months, thereby restricting orders largely to orders for defense needs.

Buffalo — With sheet and strip bookings stretching through second quarter or early in third quarter, a tapering is noted in buying. Increased attention is shown priority orders, which are growing. Production is as close to capacity as steel supplies permit.

Cincinnati — Sheet orders have been in such volume recently that the leading interest has temporarily closed books for second quarter, to compile a tentative schedule and possibly allocate tonnage. On most items another mill is not promising delivery before May 1. A few regular customers are asking delivery position in third and fourth quarters.

St. Louis — Current orders for sheet and strip show little change from recent weeks. Mill backlogs have gained moderately since mid-January, and on some items deliveries are further extended. There has been a decided stiffening in galvanized sheets, due to strength and scarcity of zinc.

Birmingham, Ala.—Production of sheets is at virtual capacity. Manufacturers' sheets are in especially good demand, and deliveries are running behind schedule. Fair demand for roofing sheets also is reported. Strip production is increasing.

Toronto, Ont. — Sheet orders are pushing delivery date further back and orders now are for shipment in third quarter. Most new business is on war priority account, with heavy automotive buying.

Plates

Plate Prices, Page 106

Pittsburgh — Specifications for shipbuilding are flowing in at a better rate. No headway is being made against backlogs and production remains at peak. Priorities are imposed strictly on all business.

Cleveland—Universal plates can sometimes be furnished in five or six weeks by smaller companies, but sheared plates are difficult to place for any delivery. Most sales are for late second quarter or early third. Incoming business is better stabilized in volume but still exceeds shipments by a large margin.

Chicago — Heavy steel plates are the tightest of all steel products, mills having such heavy backlogs that only long deferred deliveries can be offered. Orders exceed production. Sheared plates, 30 to 84 inches, last week listed at 13 to 14 weeks delivery, are now 14 to 15 weeks, and 85 to 150-inch sizes, formerly second quarter, are now 5 to 6 months. Universal plates have advanced from 13 to 14 weeks to 14 to 15 weeks.

Boston—Inquiries for plates for construction of auxiliary navy ships, minelayers and sweepers, on contracts held by smaller New England yards are beginning to appear, close to 10,000 tons being estimated. Meanwhile specifications against shipbuilding already placed are heavy, with likelihood tonnage will mount during the next few months. In addition to ship needs, miscellaneous demand is strong, including light tanks, boiler shop specifications and defense part requirements. Practically no tonnage for first quarter delivery is available on any sizes, including universal.

New York—Plate deliveries now fall generally in second half, with some producers having little to offer before September. Ship work is being released in heavy volume and

before the close of this month 200,000 tons are likely to be awarded for the 200 cargo ships which the government is planning to have built. While it appears that structural fabricating shops will not be called upon to pre-fabricate much of this work, a fast schedule is nevertheless contemplated.

Philadelphia—Demand continues in excess of capacity with heavier requirements expected to develop, particularly from shipbuilders. The Pennsylvania railroad has closed on part of tonnage for its carbuilding program but no other major car work is pending for roads in this district. Some export inquiries are going begging since mills are able to take care only of regular foreign accounts. Sheared plate deliveries are at a minimum of 14 to 18 weeks with one small producer out of the market.

Birmingham, Ala.—Mills are hard pressed on plate deliveries. In addition to large current bookings, operations are steady on backlogs carried over into the new year. Orders are in excess of shipments and pressure for delivery is heavy.

Seattle—The two leading steel interests are busy with details of large orders for plates and shapes placed by shipbuilding plants in Washington and Oregon, total tonnages unstated. Fabricators report a steady flow of business in small lots.

Toronto, Ont. — Plate orders are increasing as releases are made against earlier specifications from shipbuilders, tankmakers and some branches of the automotive industry now engaged in heavy war vehicle construction. Ship plate and armor plate are receiving special attention as a result of the new program for construction of 20 merchant vessels for Great Britain in Canadian yards.

Plate Contracts Placed

3400 tons, 42-inch steel pipe line, 37,000 feet, toluol plant, Elwood, Ill., to Chicago Bridge & Iron Co., Chicago; Stone & Webster Inc., Boston, contractor.

1000 tons, 52 acid tanks, toluol plant, Elwood, Ill., to Graver Tank & Mfg. Co., East Chicago, Ind.; Stone & Webster Inc., Boston, contractor.

845 tons, oil storage tanks for new terminal, Wood River Refining Co., St. Paul, Minn., to Chicago Bridge & Iron Co., Chicago.

800 tons, oil storage tanks, Colonial Beacon Oil Co., Everett, Mass., to Chicago Bridge & Iron Co., Chicago.

750 tons, six water storage tanks, Elwood, Ill., to Chicago Bridge & Iron Co., Chicago; Stone & Webster Inc., Boston, contractor.

470 tons, toluol storage tanks, Elwood, Ill., to Chicago Bridge & Iron Co., Chicago; Stone & Webster Inc., Boston, contractor.

350 tons, oil storage tanks, Central Maine Power Co., Wiscasset, Me., to Chicago Bridge & Iron Co., Chicago.

340 tons, seven molasses tanks, American Molasses Co., Boston, to Chicago

Bridge & Iron Co., Chicago.

125 tons, oil storage plant, Colonial Beacon Oil Co., Burlington, Vt., to Chicago Bridge & Iron Co., Chicago.

100 tons, tanks, American Bitumuls Corp., East Providence, R. I., to Chicago Bridge & Iron Co., Chicago.

100 tons, fire prevention water tank, Todd-Bath Shipbuilding Co., South Portland, Me., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

400 tons, estimated, construction, hulls only, two welded steel terminal barges, Federal Barge lines, Inland Waterways Corp., New Orleans, Ingalls Shipbuilding Co., Birmingham, low, $271,-150; bids Feb. 4.

Unstated tonnage, two new or second-hand barges, 120 x 32 x 8 feet, 600-ton capacity, Panama, schedule 4807, bids Feb. 20.

Unstated tonnage, 14 oil storage tanks, interior dept., Bonneville power administration, Portland, Oreg., four 10,-000-gallon; four 5700-gallon and six 10,000-gallon, inv. 1714, bids Feb. 18.

Bars

Bar Prices, Page 106

Pittsburgh — Miscellaneous buying and releases from automotive producers are heavy. Although much current business is destined for the defense program ultimately, little carries actual priority and most current bar shipments are ostensibly for commercial production needs.

Cleveland—Producers are booking largely into third quarter. Some companies have asked branch offices to hold orders back from main offices to allow catching up with book-keeping. Alloy bar manufacture has been hindered by a shortage of nickel.

Chicago — Bar deliveries have moved into late second quarter and early third. Heavier flats are available for July shipment and lighter for August; rounds are in September; and bar mill shapes are in the May to August range, depending upon size. Chief demand is for alloy grades which are in a much tighter situation than carbon steel.

Boston—Demand for commercial steel bars, notably alloys, is heavy and, while buying is impressive, tonnage backed up behind machine straighteners, heat-treating and processing involves thousands of tons on which delivery is extended. Alloy stock for forging operations is also in heavy demand, for the aircraft industry especially. Hot-rolled carbon and cold-drawn bars are available in limited tonnages, depending on rolling schedules, from 14 to 16 weeks.

New York—Carbon bar deliveries now run to June and beyond, without much tonnage available even in June. Cold-drawn carbon bars are somewhat more extended, although some tonnage is available near the end of the half. Alloy bars are available in 20 to 30 weeks and where special treatment is involved schedules run much beyond. Demand continues heavy, with commercial consumers concerned over the outlook, because of expanding requirements for defense. Producers are making every effort to meet requirements of regular customers and defense work, but beyond that they are to all practical purposes out of the market.

Philadelphia—July is the earliest delivery available on most lots of merchant bars although some producers are able to fit in small tonnages of some sizes on earlier rollings. Third quarter bookings are accumulating as buyers continue to extend forward coverage. An increasing portion of orders is identified with defense work.

Birmingham, Ala.—Bar production is high, approximating capacity. Merchant bars are moving in good volume, and there is considerable business in concrete reinforcing.

Buffalo — Delivery is becoming more acute as forward buying continues. To further confuse mills, war industries call for increased tonnage in a priority class.

Toronto, Ont. — While pressure for merchant bars has lessened or-

ders continue in large volume with deliveries ranging from the end of March to July. Inquiries indicate heavier buying before the end of the month. Machine tool builders have difficulty in obtaining steel and operations in some plants have been delayed by lack of cutting tools.

Pipe

Pipe Prices, Page 107

Pittsburgh—Oil country business is beginning to gain considerable headway, with more advance buying than in recent years. This is probably due to a sympathetic buying wave induced by shortages in other products. Oil country tubular goods capacity is still adequate to current demand. Standard pipe production and orders continue high. Orders are slightly ahead of shipments.

Cleveland—Shortage of zinc prevents many producers of merchant pipe from filling orders. There is no let-up in demand and none is in sight. There are no large orders, most being for 50 to 100 tons. Line pipe, which was slow two months ago, has turned active. On cold-drawn seamless tubes delivery promises are 15 to 20 weeks, with a little less on hot-rolled.

Boston—Merchant pipe distributors have in some instances stocked consigned stocks of galvanized moderately heavier than usual. Large consigned and mill stocks are tending to maintain deliveries close to normal. Demand is better than usual for this period with prospects for an early improvement in demand promising for construction work. Nevertheless, resale prices are still soft in some sections.

New York — With spring approaching, sellers of merchant pipe look for increased buying. At present, schedules represent a good normal, with the exception of cold-drawn tubing, which has been in particularly heavy demand for months past, especially mechanical tubing.

Birmingham, Ala. — Pipe plants are booking a large aggregate volume of cast iron pipe. Most of the orders, as for months, are in moderate tonnage and largely in the smaller sizes.

Cast Pipe Placed

130 tons, 4 to 8-inch for Pasco, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

100 tons or more, army cantonment, Portland, Oreg., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

200 tons for Pendleton, Oreg.: bids in.

100 tons, including fittings, 4 to 8-inch; bids to Pullman, Wash., Feb. 18.

Unstated, South Adams street project, Tacoma, Wash.; Paine & Gallucci, Tacoma, general contractor.

Unstated, Marine drive water district, Bremerton, Wash.; bids Feb. 26; Berry & Casad, Bremerton, engineers.

Wire

Wire Prices, Page 107

Pittsburgh—Greatest difficulty in the wire markets is obtaining sufficient wire rods, particularly in alloy products. Although mills have been making adjustments and rearrangements of equipment in an effort to provide more semifinished material, the flow of wire rods in some quarters is still inadequate.

Cleveland—New wave of buying is noted following a calm January. Business is well diversified, with some emphasis on manufacturers' wire and nails. The only department lagging has been products for farm use but these have begun to increase seasonally.

Chicago — Wire mills continue to operate at capacity. Manufacturers' wire orders are heavy with specifications for merchant wire and products considerably lighter. Defense accounts for considerable wire and

these are expected to continue upward.

Boston—Volume of incoming wire tonnage continues heavy, forward buying holding orders above shipments with backlogs growing. Manufactures of electric cable for navy shops have tonnage on books for fourth quarter delivery and beyond. While manufacturers' wire buying is heavy, diversified demand for specialties is strong.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 107

Cleveland—Backlogs are increasing mildly and February business has shown some improvement over January. Producers here work two or three shifts in some departments. Makers are now turning out the largest navy order in years, divided among four or five producers. Labor supply is plentiful and raw materials fairly so, with the exception of alloy steels.

Rails, Cars

Track Material Prices, Page 107

Additional small lots of cars and locomotives are being placed and some roads are placing steel for their car repair programs. Inquiries are not heavy but a number of roads are said to be outlining requirements which are likely to bring considerable business into the open soon. Carbuilders find deliveries somewhat delayed on plates and light structurals, though no serious difficulty has been met.

Car Orders Placed

Bessemer & Lake Erie, five 90-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Canadian National, 300 forty-ton automobile cars to Pressed Steel Car Co., Pittsburgh; 200 seventy-ton gondolas to Magor Car Corp., Passaic, N. J.; 100 seventy-ton flat cars to Greenville Car Co., Greenville, Pa.; all for account Grand Trunk Western.

McKeesport Connecting Line, 100 seventy-ton low-side gondolas, to American Car & Foundry Co., New York.

New York, New Haven & Hartford, 1000 fifty-ton box cars, reported placed with Pressed Steel Car Co., Pittsburgh; 25 cabooses and five diners still pending.

Car Orders Pending

Chesapeake & Ohio, 25 seventy-ton flat cars, ten 125-ton flats and ten 125-ton well cars.

Chicago & North Western, 25 passenger cars; court permission granted for purchase.

Minneapolis & St. Louis, 75 double-sheathed auto box cars, 50 of 50 tons capacity and 25 of 40 tons; bids asked.

Minneapolis, St. Paul & Sault Ste. Marie has asked court permission to buy 100 flat cars from Pullman-Standard Car Mfg. Co., Chicago, and 50 ballast cars from American Car & Foundry Co., New York.

Locomotives Placed

Chesapeake & Ohio, eight L-2 passenger locomotives, to Baldwin Locomotive Works, Eddystone, Pa.; in addition to 12 recently placed with Lima Locomotive Works, Lima, O.

Northern Pacific, seven 1000-horsepower diesel-electric locomotives, three to Electro-Motive Corp., LaGrange, Ill., two to Baldwin Locomotive Works, Eddystone, Pa., and two to American Locomotive Co., New York.

Locomotives Pending

Canadian National, 25 steam locomotives; bids asked.

Chicago & North Western, five 2000-horsepower diesel-electric locomotives, court permission granted for purchase; also 25 passenger cars.

United States navy, one 50-ton diesel-electric locomotive for service at White Plains, Md., bids Feb. 18.

Shapes

Structural Shape Prices, Page 106

Pittsburgh — Inquiries for defense projects, many of which are further sections of work already under way, continue to make structural lists heavy. The proportion of current production going into non-defense projects is still declining.

Chicago — Orders for structural steel were light last week, but fab-

ricators are more than comfortably booked and struggling with the problem of getting material from mills. No new inquiries involving large tonnages have come out in the last few days.

Boston — Structural contracts approximate 5000 tons, most for expanding shipyard facilities, notably at South Boston, dry dock, and the Newport, R. I., torpedo station. More tonnage is going to smaller fabricating shops, most of which have substantial backlogs. Plain material deliveries range to eight weeks and beyond except in isolated instances.

Philadelphia — Pending structural business is somewhat smaller than 30 days ago but fabricators are heavily booked, with considerable work still in prospect. No improvement is noted in deliveries of plain material, shipments extending well through second quarter.

Toronto, Ont. — Orders for structural steel are heavy and fabricators have backlogs for most of this year. Among the more important lettings for the past week was one for about 8000 tons for a floating drydock to Dominion Bridge Co., Lachine, Que.; 1500 tons to Hamilton Bridge Co., for addition to Steel Co. of Canada Ltd. plant at Hamilton; 800 tons to Sarnia Bridge Co. Ltd., Sarnia.

Seattle—Pending business is small as placements have been heavy since Jan. 1 and no large projects are now up for figures. Shops are booked for 60 days. Isaacson Iron Works, Seattle, has the award to furnish materials for the new plant of Oregon Shipbuilding Co., Portland, Oreg., involving 500 tons or more.

Shape Contracts Placed

8800 tons, engine plant, Buick Motor Corp., Chicago, to Missisippi Valley Structural Steel Co., Decatur, Ill.

3500 tons, Brewster Aircraft Corp. plant, Hatboro, Pa., to Belmont Iron Works, Philadelphia.

2800 tons, turret and armor shop, Bethlehem Steel Co., shipbuilding division, Fore river yards, Quincy, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

750 tons, four fuse loading lines, Kingsbury ordnance plant, Union Center, Ind., Bates & Rogers Construction Corp., Laporte, Ind., contractor, to Gage Structural Steel Co., Chicago.

560 tons, hangars, Bangor, Me., and Manchester, N. H., to Belmont Iron Works, Eddystone, Pa.

550 tons, navy hangars, Gross Isle, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, plant, Oregon Shipbuilding Co., Portland, Oreg., to Isaacson Iron Works, Seattle.

450 tons, boiler house, Curtiss-Wright Corp., Columbus, O., to American Bridge Co., Pittsburgh.

450 tons, plant extension, Lukens Steel Co., Coatesville, Pa., to Belmont Iron Works, Philadelphia.

400 tons, navy hangars, Trenton, Mich., to Bethlehem Steel Co., Bethlehem, Pa.; bids Jan. 17.

374 tons, state highway bridge, South Amana, Iowa, to Clinton Bridge Works, Clinton, Iowa; bids Jan. 7.

255 tons, storage building, Fore river ship yard, Quincy, Mass., Bethlehem Steel Corp., to Bethlehem Steel Co., Bethlehem, Pa.

230 tons, bridge, Bradford county, Pennsylvania, to Phoenix Bridge Works, Phoenixville, Pa.

230 tons, airport hangar, Fort Smith, Ark., to Fort Smith Structural Steel Co., Fort Smith, Ark.

225 tons, state highway bridge, Kinsley, Kans., to Mississippi Valley Structural Steel Co., Decatur, Ill.

215 tons, 10 railroad bridges, Elwood ordnance plant, war department, Elwood, Ill. To Wisconsin Bridge Co., Milwaukee; Sanderson & Porter, Joliet, Ill., engineers.

200 tons, store building, W. T. Grant Co., Plainfield, N. J., to Savary & Glaeser Co., Plainfield, N. J.

150 tons, addition, Leeds & Northrup Co., Philadelphia, to Belmont Iron Works, Eddystone, Pa., Arnold Bowen, Brookline, Pa., contractor.

135 tons, housing project and store

Shape Awards Compared

	Tons
Week ended Feb. 15	21,129
Week ended Feb. 8	31,960
Week ended Feb. 1	24,081
This week, 1940	49,490
Weekly average, 1941	44,166
Weekly average, 1940	28,414
Weekly average, Jan.	51,215
Total to date, 1940	131,564
Total to date, 1941	309,162

Includes awards of 100 tons or more.

Behind the Scenes with STEEL

Groundhogs At Play

■ February 2 fell on Sunday this year but early the following Monday members of the Cincinnati Burrow of the Oriental Order of Groundhogs assembled in solemn conclave (at a nearby country club) to pay tribute to the prophet of spring. The OOG is actually a fun-making organization of machine tool men who for some unknown reason get all dolled up as Cassanovas of the pampas once a year, and after fining each member a buck if he forgot his membership button, proceed to put quaking candidates for admission through the sacred ritual. After that, defense contracts and the pressure of business are forgotten for the rest of the day and everyone has a big time. Top officers at present are R. J. Redmond, Buckeye Foundry Co., *colligere;* Ed Haunsfeld, Ohio Pattern Works & Foundry Co., *rumpere;* and George P. Gradolf, Cincinnati-Bickford Tool Co., *vice-rumpere.* Just what the titles mean is apparently a deep dark secret.

Irresistible

■ Our Chicago circulation representative, Harold Dunne, stopped in at the St. Louis telephone company the other day and found they were demonstrating the famous "voice mirror." You speak into a telephone for a few seconds and then hear your own voice as it sounds over the other end of the wire. Harold says he delivered a sales talk on STEEL and when he heard it come back, it was only with the greatest difficulty that he resisted the impulse to give himself a subscription!

Squawk

■ No sooner had Buick announced it would locate its new airplane engine plant in the Chicago area than the UAW-CIO union appeared before the Flint chamber of commerce and other civic organizations to deliver protests. They reasoned (?) that shortage of steel will soon force scaling down of automobile production and that vast numbers of auto workers are going to be parading the streets jobless this fall. Therefore, Buick should keep the plant in Flint so there would be work for these unemployed. With the nation's steel mills rolling out material at a clip of about 85,000,000 tons a year, there is small chance of any serious shortage of steel in the motor industry. By the same token, there is about as much chance of the airplane engine plant being brought back to Flint as there is of brother Hitler exchanging valentines with Winston Churchill.

Stealing Our Stuff

■ The Association of American Railroads has done a swell job in their big six page rotogravure broadside entitled (of all things) *Behind The Scenes.* If you haven't seen a copy, write for one at the Transportation Bldg., Washington, D. C.

Draft Dodger

■ From Detroit we hear of a fellow whose number came up in the draft and when he was finally accepted for a year's training, he immediately took his old Dodge car down to his dealer and traded it in on a new one. But the new one was not a 1941 model now on display. It was a 1943 model, which will be available, barring strikes, fires, floods, earthquakes and other events beyond control, along about September, 1942. This is the earliest record for advance ordering ever reported, but think what a lot of fun this fellow is going to have dreaming about what his 1943 Dodge is going to look like, while he's doing his "squads right" and "left shoulder arms."

Lost: One Reader

■ And, then there is the young engineer with Republic Steel, here in Cleveland, who must have been snatched up in the draft so fast he hardly had time to grab his tooth brush. From Ft. Shelby he writes: *Will you please discontinue my subscription to* STEEL, *and refund the amount to my mother?*

SHRDLU.

house, naval net depot, Melville, R. I., to J. E. Cox & Co., Fall River, Mass.; Platt Construction Co., Boston, contractor; Truscon Steel Co., South Boston, Mass., reinforcing steel.

130 tons, chemical engineering building, University of Pennsylvania, Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

125 tons, navy yard, to Isaacson Iron Works, Seattle.

100 tons, Seattle bank building addition to Pacific Car & Foundry Co., Seattle; H. S. Wright & Co., Seattle, general contractor.

Shape Contracts Pending

9000 tons, defense plant, Buick Motor division, General Motors Corp., Melrose Park, Ill.

7000 tons, 58 storage buildings, ordnance plant, Dayman, Iowa, for government.

4500 tons, ordnance plant, Childersburg, Ala., to be built by du Pont.

3300 tons, assembly plant, Johnsville, Pa., Brewster Aeronautical Corp.

3000 tons, pipe supports, ordnance works, Elwood, Ill., for government.

3000 tons, miscellaneous construction, Elwood ordnance plant, Elwood, Ill.

2600 tons, alterations and additions to building, runways and shipways, for Cramp Shipbuilding Co., Philadelphia.

2300 tons, bridge 5507, Delaware & Hudson railroad, Ft. Edward, N. Y.

1800 tons, two naval supply storehouses, Oakland, Calif., for navy.

1400 tons, Ninth street bridge, Washington; bids Feb. 18.

1000 tons, building, American Magnesium Co., Buffalo.

1000 tons, chemical laboratory, Cornell University, Ithaca, N. Y., John Lowry, New York, contractor.

900 tons, sheet piling, turning basin, Cuyahoga river straightening, Cleveland; bids readvertised.

800 tons, power plant extension unit 266, Philadelphia Electric Co., Chester, Pa.

600 tons, cofferdam and diversion tunnel, Neversink, N. Y., for New York city.

550 tons, sheet steel piling, bulkhead, Grasselli Chemical Co., Cleveland; Merritt, Chapman & Scott, contractor.

455 tons, plant addition, Vanadium Corporation of America, Niagara Falls, N. Y.

400 tons, boiler house, state hospital, Deer Park, N. Y.

375 tons, grade crossing elimination, Central Railroad of New Jersey, Sewaren, N. J.; bids Feb. 28, E. Donald Sterner, state highway commissioner, Trenton, N. J.; also 71 tons reinforcing steel.

350 tons, sheet copper rolling mill building, American Brass Co., Ansonia, Conn.

325 tons, A.C. warehouse, Patterson field, Dayton, O.; bids Feb. 13.

300 tons, sewage works structures, Stickney, Ill., for city of Chicago.

275 tons, storehouse, Kroger Grocery & Baking Co., Canton, O.

265 tons, automotive building, Fort Knox, Ky., for war department.

250 tons, building, Ohio Bell Telephone Co., Youngstown, O.

240 tons, state bridge, Licking river, Falmouth, Ky.

220 tons, platform extension, disposal plant, Brooklyn, N. Y.

210 tons, curbing, contract B-26, Third avenue, Brooklyn, N. Y., Triboro Bridge authority.

200 tons, addition to warehouse, "G" building, Westinghouse Electric & Mfg. Co., Mansfield, O.

190 tons, bridge, route 40, Middle River, Maryland, for state.

185 tons, factory extension, Midland Steel Products Co., Detroit.

175 tons, extension to bridge LR-169, Analomink, Pa., for state.

165 tons, addition to machine shop and engine house, North Green Bay, Wis., Chicago & North Western railway.

160 tons, beam spans, Diamond Bluff, Wis., Chicago, Burlington & Quincy railroad.

155 tons, framing, Citizens Gas & Coke Utility, Indianapolis.

150 tons, state bridge, Adrian, Mich.

150 tons, state highway bridge, Leverett, Mass.; Peter Salvucci, Waltham, Mass., low; bids Feb. 4, Boston.

145 tons, state bridge 739, Royalton, Wis.

140 tons, state bridges 229, 230 and 232, Sparta, Wis.

135 tons, state bridge, Dearborn, Mich.

120 tons, state bridge, Sebawaing, Mich.

115 tons, repairs to bridge 0.87, Boston, New York, New Haven & Hartford railroad.

110 tons, bear trap repair parts, Ohio river, army engineers.

100 tons, U.S. customs house, Niagara Falls, N. Y.

100 tons, factory addition, Worthington Pump & Machinery, Buffalo.

100 tons, steel rack castings, Panama, schedule 4805; also 12 tons steel bolts and accessories; bids Feb. 18.

100 tons, shapes and bars, Raccoon Creek bridge and approaches, Swedesboro, N. J.; bids Feb. 28, E. Donald Sterner, state highway commissioner, Trenton, N. J.

Reinforcing

Reinforcing Bar Prices, Page 107

Cleveland — Demand and sales have quieted, with the best prospects for ordnance plants, among which are the TNT plant at Sandusky, O., which will probably need several thousand tons.

Pittsburgh — Some additional changes in extras have been made in a list published last week by Carnegie-Illinois Steel Corp. dated Jan. 20, which included the revised quantity extras as reported previously. Increases were made in trucking extras at various points, making the charge uniformly 10 cents at all points, and revision of engineering extras and bending extras.

Chicago — Awards of reinforcing steel have been relatively light, but projects pending will require good tonnage. Suppliers experience some difficulty in obtaining steel. Prices are steady with new billet and rail steel bars on a par. Recently adopted higher extras are now generally effective.

Philadelphia—Demand for reinforcing bars is fairly active despite slowness with which plans for some work are materializing. Unfilled orders are heavy but pending tonnage has moderated somewhat. Deliveries are unimproved and prices are firm. A Chester, Pa, housing project taking 600 tons, is still pending.

Seattle — Following a month of heavy lettings, present inquiry for reinforcing is slow. Rolling mills are working steadily against a 60-day backlog. Mills are rolling sizable tonnages of merchant bars, which are in steady demand for immediate use to replenish stocks.

Concrete Bars Compared

	Tons
Week ended Feb. 15	6,238
Week ended Feb. 8	13,771
Week ended Feb. 1	6,976
This week, 1940	5,671
Weekly average, 1941	10,195
Weekly average, 1940	9,661
Weekly average, Jan.	10,272
Total to date, 1940	59,162
Total to date, 1941	71,368

Includes awards of 100 tons or more.

Reinforcing Steel Awards

1800 tons, housing units, project TX 5-3 and 4, Houston, Tex., to Ceco Steel Products Co., Houston; R. F. Ball Construction Co., Houston, contractor.

1650 tons, dry dock buildings, navy, South Boston, Mass., to American Bridge Co., Pittsburgh; Sawyer Construction Co., Boston, contractor.

621 tons, conveyor ramps, Elwood ordnance plant, Wilmington, Ill., Sanderson & Porter, Joliet, Ill., engineers, to

Ceco Steel Products Corp., Chicago; bids Jan. 31.

300 tons, ordnance plant, Westinghouse Electric & Mfg. Co., Canton, O., to Jones & Laughlin Steel Corp., Pittsburgh, through Rust Engineering Co., Pittsburgh.

250 tons, factory, Johnson Wax Co., Racine, Wis., to Inland Steel Co., Chicago; Johnson & Hendrickson, contractors.

248 tons, airplane engine parts plant, Studebaker Corp., Ft. Wayne, Ind., Charles R. Wermuth & Son, Ft. Wayne, Ind., contractor, to Ceco Steel Products Corp., Chicago.

200 tons, army cantonment, Aberdeen, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Irwin & Leighton, contractor.

177 tons, state highway bridge, Woodson county, Kansas, to Laclede Steel Co., St. Louis.

167 tons, 3-story addition, Veeder-Root Inc., Hartford, Conn., to Scherer Steel Co., Hartford; Buck & Buck Inc., Hartford, contractor.

160 tons, FWA invitation CR-10, Costa Rica, to Joseph T. Ryerson & Son Inc., Chicago.

136 tons, highway bridge 2091, Pitnamville, Ind., R. McCalman Inc., Danville, Ill., contractor, to American Steel & Wire Co., Chicago.

125 tons, dry dock buildings, navy, South Boston, Mass., to Concrete Steel Co., Boston; Sawyer Construction Co., Boston, contractor.

104 tons, state highway bridge, No. 2071, Levy, Ark., to Jones & Laughlin Steel Co., Pittsburgh, through Arkansas Foundry Co., Little Rock, Ark.

100 tons, naval ammunition depot, Portsmouth, Va., to Virginia Steel Co.

100 tons, addition, Seattle College, to Bethlehem Steel Co., Seattle; H. S. Wright & Co., Seattle, contractor.

100 tons, plant, Sinclair Refining Co., East Chicago, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Person Construction Co., contractor.

Reinforcing Steel Pending

4000 tons, ordnance plant, war department, Denver, Colo., Broderick & Gordon, Denver, Colo., contractor; bids Feb. 18.

3300 tons, bagging plant, Hercules Powder Co., Radford, Va.; Mason & Hangar, contractor.

2000 tons, also 200 tons wire mesh, naval powder plant, navy department, Burns City, Ind., Maxon Construction Co., Dayton O., contractor.

1900 tons, dam at Norfork, Ark.; bids Feb. 20.

800 tons, U. S. coast guard shipway and drydock, Baltimore; bids Feb. 19.

700 tons, navy yard receiving barracks, Brooklyn, N. Y.; White Construction Co., contractor.

700 tons, hotel, Statler Corp., Washington; J. W. Harris Associates, contractor.

405 tons, addition to factory, Kohler Co., Kohler, Wis.; bids Feb. 10.

400 tons, Chad Brown houses, project RI 1-1, Providence; D.M.W. Contracting Co., Brooklyn, N. Y. low; bids Feb. 10.

280 tons, viaduct, New York avenue, Pennsylvania railroad, Washington; bids Feb. 18.

150 tons, Atkinson Milling Co., Minneapolis.

145 tons, state highway project, Wethersfield-Hartford, Conn.; D. Arrigoni, Middletown, Conn., low $83,157.82; bids Feb. 3.

130 tons, Fort Wayne army post warehouse, Detroit.

130 tons, Yesler hill housing project, Seattle; J. C. Boespflug, Seattle, general contractor.

121 tons, municipal auditorium and armory, Sheboygan, Wis.; bids Feb. 7.

100 tons, boiler house and tunnel, Curtiss-Wright Corp., Columbus, O.; Darin & Armstrong, low.

Unstated, $1,000,000 laundry buildings, Fort Lewis, Wash.; bids to supply officer Feb. 21.

Unstated, 750 iglo-type concrete storage shelters for ammunition, near Hermiston, Oreg.; contract awarded by Army to J. A. Terteling & Son, Boise, Idaho, low at $7,457,661.

Pig Iron

Pig Iron Prices, Page 108

Pittsburgh — Merchant producers of pig iron virtually sold out, shipments exceeding production, and stock piles diminishing rapidly. Foundry demand is increasing, and the small proportion of blast furnace capacity now available for production of foundry iron is being pushed to the limit. Only five stacks are idle in the district, and of these only two are in condition for operation in the near future.

Cleveland—Buying is moderate, well stabilized in tonnage from week to week. Inventories at foundries range from 30 to 60 days, at current rate of consumption. One operator, with six widely scattered furnaces, is operating at 103 per cent of rated capacity, perhaps typical of the industry. No producers have opened books for second quarter and prices will depend largely on wage rates, negotiations on which are now proceeding.

Chicago — Nearly all pig iron sellers are booked solidly through first quarter. Principal complications are those which arise when foundries require special analyses to balance stocks. Steel and malleable foundries are at high operations and gray iron are increasingly busy. Shipments of southern iron are coming out into this territory in a volume which closely approaches normal. Increased demand for foundry coke reflects the higher melting rates of gray iron foundries. By-product ovens are working at capacity and shipments are maintained close to schedule.

Boston—Pig iron sellers continue to cover regular trade with prompt shipment when supplies are needed, but are scrutinizing larger and forward orders. Larger users of basic are fairly well stocked for the time being; also textile mill equipment builders as a rule. Foundry melt is maintained at a high rate, although the district pipe foundry has slackened slightly.

New York—Pig iron sellers continue to refuse to quote for second quarter even on the basis of prices ruling at time of delivery. This is

restricting buying considerably as few furnaces have anything for sale this quarter. Export inquiry is featured by 6000 to 10,000 tons of basic monthly for several months for the Monterrey Iron & Steel Works, Monterrey, Mexico, which plans to close its blast furnace for repairs. Some sellers believe the Mexican company will have difficulty obtaining the iron.

Philadelphia — Pig iron sellers are accepting some second quarter business but no prices are being quoted for that period and it is doubtful if there will be occasion for formal opening of books. Shipments are heavy and although behind schedule in some instances no interference with foundry or steelworks operations has developed yet. It is expected 6000 tons of pig iron will be salvaged from the British freighter which capsized Monday near the Delaware shore, when en route from Philadelphia to England.

Buffalo—Three pig iron producers have expansion underway which will mean a record output by late spring or early summer. Wickwire Spencer Steel Co. has announced overhauling of a blast furnace inactive since 1929. Hanna Furnace Corp. has begun repairs on a stack idle for ten years and Bethlehem Steel Co. is installing a new furnace at its Lackawanna plant. When all three are completed the area will have a total of fifteen stacks. Releases are heavy.

Cincinnati—Pig iron producers continue refusal to book for second quarter. Foundries have adequate supplies for current needs. Southern iron is moving in previous volume. The situation with some melters was eased when they found a limited tonnage on the open market.

St. Louis—While blast furnaces are able to furnish customers with all pig iron needed, the trend of the supply market is to tighten, and producers are not shipping more than enough for current use. A number of sellers will have no more iron to dispose of during first quarter. There has been a considerable volume of inquiry for third quarter, but due to uncertainties suppliers are not selling so far ahead.

Birmingham, Ala.—Pig iron production remains at capacity. Merchant melters have no iron for sale for this quarter.

Toronto, Ont. — Movement of merchant pig iron is gaining steadily, now approximately 6000 tons per week. Scarcity of cast scrap is stimulating pig iron sales. Producers are not permitting large inventories by melters, but are taking care of current needs only.

Study Scrap Relations

A meeting of scrap dealers and brokers was to have been held at Pittsburgh Saturday to discuss questions of differentials for scrap grades in relation to recently established prices on steelmaking grades.

Scrap

Scrap Prices, Page 110

Pittsburgh—For mots part, prices are unchanged. Brokers are having considerable difficulty filling mill orders under current prices, although mills are not crying too loudly, as they are satisfied with the reaction to government edict of lower prices. Rumors are current that offerings of railroads next month may be limited to lower prices than those of the current month. There have been some increases in other than open-hearth grades, notably among cast scrap grades.

Cleveland — Trading in scrap is dull with some movement of heavy grades. Supplies of some grades are short. In some cases shipments are restricted by mills. Prices here and in the Valley are unchanged.

Chicago — Iron and steel scrap market is quiet, partly due to lack of mill buying and low supplies in dealers' hands. No. 1 heavy melting steel carries the quotation of $19.50, basis of the last mill sale, and brokers are obliged to pay this price for material to fill contracts. Cold weather has interfered with collections and dealers' yards have low stocks. Foundry grades are in good demand and moving well as melts increase. Prices are slightly higher on some of the specialties.

Boston—Except on a few isolated grades which have lagged in the downward readjustment of prices, iron and steel scrap quotations are steadier and the decline is apparently halted for the time being. Slightly firmer prices on a few grades has been a reaction. No. 1 heavy melting steel has sold for delivery at Providence for domestic consumption at $17.25 and No. 2 at $15.75, the former being choice selection.

New York—Scrap brokers are endeavoring to keep prices stable in line with Washington policy, but are finding is increasigly difficult to obtain material. Indicative of underlying strength is a bid this week of $15.64 per gross ton on 1500 tons of No. 1 melting steel, half of which was unprepared, at the Brooklyn navy yard. Michael Flynn Inc., Brooklyn, was the successful bidder, with the next highest within 8 cents per ton. Stove plate and No. 2 cast are nominally 50 cents per ton higher for export. Brokers are now offering $15.50 and $17.50, respectively, docks.

Philadelphia — Scrap prices are

steady with quotations on some grades tending upward. Strength is shown especially in cast grades, supplies of which are low. Although bids on recent railroad lists are lower for heavy melting steel than a month ago some items showed no reduction. Railroad specialties are strong at $26 to $26.50 and on some other grades brokers are paying practically the equivalent of prices on latest consumer purchases.

Buffalo—A sale of approximately 10 000 tons of No. 2 heavy melting to a leading mill consumer at $18.50 to $19 a ton confirms recent nominal price reductions. It was the first deal of any note in weeks and appears to have put the market on a somewhat tangible basis. Readjustments have raised railroad malleable to $24 to $24.50 a ton.

Detroit—On the verge of the appearance of large mid-month lists from auto plants, prices are static for the first time in many months. Foundry material has not budged for a month. Tonnages are scarce, though a number of dealers have acquired above-normal supplies. One melter is using scrap structural steel in high-steel charges, because of inability to obtain short rails under $28 a ton.

Cincinnati—Iron and steel scrap is more settled than since the arbitrary price reductions. Prices are unchanged. Supplies are tight, yet sufficient tonnage is being received to fill immediate needs. Some interests are looking to steadily rising industrial operations for augmented scrap supplies.

St. Louis—The market for iron and steel scrap apparently has reached its proper levels, prices being unchanged, except for two or three adjustments on special grades, mainly steel specialties. Trading is along more normal lines than for several weeks. There is good inquiry for heavy melting steel, and some scattering transactions in small lots were reported. Deliveries are heavy.

Birmingham, Ala.—Scrap remains somewhat of a problem. No price changes are announced, but little stability is noted in the market. Demand continues unabated.

Seattle—Foundry operations have increased, resulting in a larger demand for scrap. Rolling mills continue to make the heaviest purchases, reporting supplies ample for their capacity operations. Dealers report short stocks of cast grades at tidewater but there is no scarcity of steel scrap.

Toronto, Ont. — Demand for scrap continues brisk, with interest largely centered on cast scrap, supply of which now falls far short of demand. Offerings are slow with most supplies coming from automobile wreckers, whose deliveries are still about 25 per cent below the former peak.

Warehouse

Warehouse Prices, Page 109

New York—Long terne sheets out of warehouse have been advanced 20 cents per 100 pounds, the increase representing an adjustment of a former price weakness, and forging rounds larger than 8 inches in diameter have been increased 85 cents, due to higher mill costs. The latter is now holding at $5.09 in the the metropolitan area and $4.65, FOB Buffalo, in country territory on SAE 1020 grade and $5.19 and $4.75, respectively, on SAE 1045. Long terne sheets are quotable at $5.80 in the metropolitan area and $5.34, FOB Pittsburgh, in country territory on lots under 1500 pounds per order and $5.65 and $5.19 respectively, on more than 1500 pounds.

Chicago — Warehouse inquiries are increasing moderately but sales are limited to available stocks. Situation is tightest in heavy plates and structurals, on which delivery is about 14 to 18 weeks. Aluminum is almost impossible for warehouses to get, and nickel is allotted on the basis of last year's orders. It is understood copper and brass products will go on the same basis within a few days.

Philadelphia — Distributors encounter occasional difficulty in keeping stocks sufficient to meet demand, which continues unusually heavy. Plate supplies are especially limited.

Cincinnati—Sales from warehouse have increased, giving promise of a larger tonnage than in January. Stocks are depleted in a few items. Structurals, bars and plates are moving vigorously. Prices are unchanged.

St. Louis—There has been no abatement in demand for steel from store, and requirements are described as the most diversified ever experienced. There is a particularly strong demand for alloys, tool steel and plates. Inventories are fairly satisfactory though assortments on a number of items are incomplete.

Seattle—Jobbers report a steady volume of orders, plates, shapes and sheets, being in strong demand. Shipyard activity and defense projects are responsible for heavy buying and machine shops and smaller industries have increased requirements.

Iron Ore

Iron Ore Prices, Page 110

Cleveland—Ford Motor Co. is reputed to have bought 300,000 gross tons or more of iron ore for 1941 delivery, the order divided among four or five companies, with smaller operators predominating. Prices are not divulged, though it is reliably reported they were not under 1940 levels. Some authorities hint that ore prices will not be established definitely until after vessel freight rates are established for the season, though experience has shown that these rates are usually determined after the first ore sales.

■ Commercial steel castings bookings in December totaled 115,343 net tons, 98.6 per cent of capacity, according to the bureau of the census. This compares with 94,929 tons in November and 64,143 tons in December, 1939. Production in December was 85,810 tons, in November, 81,192 tons and in December, 1939, 79,732 tons.

Tin Plate

Tin Plate Prices, Page 106

Pittsburgh — Specifications and buying continue heavy. Output is being increased wherever possible, although many mills are running at capacity. The rate is estimated at 65 per cent, of which the heaviest part is cold-rolled plate. Considerable current buying is going into stock in preparation for the canning season, although general line can demand has been good and is taking a large fraction of the current output.

Steel in Europe

Foreign Steel Prices, Page 109

London — (*By Cable*)—Consumption of all heavy and special steel products, excepting ordinary structurals, is increasing in Great Britain. Domestic production and imports serve to satisfy war requirements but ordinary commercial demand is severely restricted. The raw material situation provides adequate supplies. Exports of tin plate have been improved by release of licenses on stocked material but further concessions are considered unlikely. Black and galvanized sheet output has been entirely earmarked for war industries.

Nonferrous Metals

New York—Official priorities in major nonferrous metal markets are still a possibility, though the government is reluctant to inaugurate formal control. Priorities division, OPM, has urgently requested producers of magnesium to allocate their stocks to defense industries and has ordered that defense orders should be filled to the exclusion of all other demands for the next 90 days; has asked airplane companies to save scrap aluminum for return to the original source of supply; and has urged industrial users of aluminum in the non-defense field to give immediate attention to the use of substitutes, including plastics.

Copper — Consumption in this country rose to a new high of 119,736 tons during January while refined output totaled 93,327 tons, resulting in a reduction of 26,431 tons in stocks to only 116,341 tons. The committee appointed to allocate Metal Reserve Co.'s 200,000 tons of Latin American metal will start distribution of the first shipment late this month. Undertone of the market was firmer at 12.00c, Connecticut.

Lead—Supply of lead continues ample to satisfy all needs, although prices rose 15 points on Monday to the basis of 5.65c, New York, in order to attract additional supplies of foreign metal. Shipments of foreign and domestic lead are averaging about 65,000 tons, while sales are well above this level and domestic refinery output is around 60,000 tons per month.

Zinc—Division of priorities, OPM, has recommended that an effort be made at once through the co-operation of zinc producers to facilitate the prompt flow of zinc into brass

Nonferrous Metal Prices

Feb.	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
8	12.00	12.00	12.25	50.30	50.15	5.50	5.35	7.25	17.00	14.00	35.00
10	12.00	12.00	12.25	50.25	50.10	5.65	5.50	7.25	17.00	14.00	35.00
11	12.00	12.00	12.25	50.25	50.05	5.65	5.50	7.25	17.00	14.00	35.00
12	Holiday										
13	12.00	12.00	12.25	50.62½	50.50	5.65	5.50	7.25	17.00	14.00	35.00
14	12.00	12.00	12.25	51.00	50.87½	5.65	5.50	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	8.90
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	8.62½-8.87½
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	9.75-10.00
St. Louis	9.62½-9.75

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	8.00-8.25
Chicago	7.75-8.00
St. Louis	7.62½-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.87½-6.12½
St. Louis	5.00-5.25

Lead

New York	4.75-4.90
Cleveland	4.50
Chicago	4.50-5.00
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.)	17.00

used for the manufacture of cartridges. Industrial users of zinc, producing items not in the vital defense sphere, have been urged to co-operate voluntarily and economize on the use of this metal. Although supplies remain small, prices have held unchanged on the basis of 7.25c, East St. Louis, for prime western.

Tin—The Far Eastern crisis created new fears regarding a possible curtailment in shipments from the Far East. As a result prices advanced rather sharply to 51.00c, on Friday. This compared with 50.25c at the beginning of the week.

Metallurgical Coke

Coke Prices, Page 107

Boston — Three cargoes of British coke totaling about 15,000 tons, arrived here last week, supplementing fuel requirements of the district blast furnace, which are heavy in view of sustained production. Coming at the peak of strong demand for the heating season the shipments were timely. The report here is that Bethlehem Steel Co. has contracted for 100,000 tons of British coke.

Ferroalloys

Ferroalloy Prices, Page 108

New York—Ferroalloy consumers believe that prices will soon be named for second quarter. In general, they look for no change, at least insofar as contracts are concerned. Some would not be surprised to see higher spot prices on some products, but they admit there have been no definite indications as yet.

Meanwhile, they are specifying freely against contracts, taking in all, in fact, that they can get. There is a possibility that shipments this month may even exceed the movement in January, notwithstanding the fact that February is a shorter month.

Ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports; and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

Equipment

Seattle — Army officials at Fort Lewis are reported to have placed a large order for machinery and equipment for the 50,000-man capacity, twin-unit laundry to be erected at once. United States engineer, Bonneville, has called bids March 4 for a 16,000-kva transformer for the power house, Spec. 698-41-310. Tacoma has opened bids for 75 tons copper wire, ranging from $15.25 to $16.58 cwt. Bonneville project, Portland, Oreg., has called bids Feb. 18 for 250,000 feet guy strand, and opened figures Feb. 11 for eleven switchboard panels. Ellensburg, Wash., has received bids for three 1000-kva transformers. Demand is steady for heavy equipment required in ship yards and public works.

Canada's War Orders Aggregate $28,064,002

(*Concluded from Page* 51)

Co. Ltd., Waterloo, Que., $96,660; Accessories Mfrs. Ltd., Montreal, $33,663; Dominion Arsenals, Ottawa, $7,957,500; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., $193,320; T. W. Hand Fireworks Co. Ltd., Cooksville, Ont., $96,660.

Shipbuilding: Foundation Maritime Ltd., Halifax, N. S., $11,250; George T. Davie Shipyards, Lauzon-Levis, Que., $126,760; Montreal Dry Dock Ltd., Montreal, $68,415.

Dockyard Supplies: British admiralty, England, $22,145; Dominion Wire Rope & Cable Co. Ltd., Montreal, $6413; Donald Ropes & Wire Cloth Co., Hamilton, Ont., $7083; Eastern Steel Products Ltd., Preston, Ont., $9875.

Land transport: Dominion Wire Rope & Cable Co. Ltd., Montreal, $10,406; Laurentide Equipment Co. Ltd., Montreal, $12,733; Dominion Tire & Rubber Co. Ltd., Ottawa, $63,030; International Harvester Co. of Canada Ltd., Ottawa, $80,281; Dunlop Tire & Rubber Goods Ltd., Toronto, $154,680; Goodyear Tire & Rubber Co. of Canada Ltd., Toronto, $481,225; Metallic Roofing Co. of Canada Ltd., Toronto, $27,613; Dominion Chain Co. Ltd., Niagara Falls, Ont., $12,241; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $101,517; Bickle-Seagrave Ltd., Woodstock, Ont., $12,600.

Instruments: A. Sheppard, Ottawa, $11,608.

Electrical equipment: Air ministry, England, $15,264; Canadian Marconi Co., Montreal, $7855; Canadian General Electric Co. Ltd., Ottawa, $21,063; Northern Electric Co. Ltd., Ottawa, $26,287; Research Enterprises Ltd., Ottawa, $1,083,400; R. C. A. Victor Co. Ltd., Ottawa, $46,530; Renfrew Electric & Refrigerator Co., Renfrew, Ont., $63,430; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $15,301.

Machinery: Noorduyn Aviation Ltd., Montreal, $16,286; Rudel Machinery Co. Ltd., Montreal, $29,426; T. E. Ryder Machinery Co. Ltd., Montreal, $11,690; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $6426; International Harvester Co. of Canada Ltd., Ottawa, $23,707; Atlas Press Co., London, Ont., $26,863; Canadian Longyear Ltd., North Bay, Ont., $14,212.

Aircraft: Fairchild Aircraft Ltd., Longueuil, Que., $64,800; Aviation Electric Ltd., Montreal, $29,993; Canadian Vickers Ltd., Montreal, $32,683; Noorduyn Aviation Ltd., Montreal, $106,363; Irvin Air Chute Ltd., Ottawa, $11,484; Steel Co. of Canada Ltd., Hamilton, Ont., $36,496; Link Mfg. Co. Ltd., Gananoque, Ont., $662,643; Cordage Distributors Ltd., Toronto, $5482; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $107,946; Canadian Spark Plug Co. of Canada Ltd., Windsor, Ont., $76,707; Leeder's Ltd., Winnipeg, Man., $29,400; Aircraft Repair Ltd., Edmonton, Alta., $24,888.

Metals: Aluminum Co. of Canada Ltd., Montreal, $35,410; Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, $40,761.

Miscellaneous: Standard Chemical Co. Ltd., Montreal, $166,500; Victor X-Ray Corp. of Canada Ltd., Montreal, $6051; Colonial Optical Co., Toronto, $7500; Smith & Traverse Co. Ltd., Sudbury, Ont., $17,323; Canadian Johns-Manville Co. Ltd., Montreal, $16,400; LaFrance Fire Engine & Foamite Ltd., Toronto, $7201; New Idea Furnaces Ltd., Ingersoll, Ont., $6000; Empire Brass Mfg. Co. Ltd., Vancouver, B. C., $9776; Moncton Plumbing & Supply Co. Ltd., Moncton, N. B., $22,227; Canadian Comstock Co. Ltd., Toronto, $14,850; Waterman-Waterbury Mfg. Co. Ltd., Regina, Sask., $31,850; Singer Sewing Machine Co., Montreal, $14,000.

War construction projects: M. F. Schurman Co. Ltd., Summerside, P. E. I., $132,204; Ambrose Wheeler Ltd., Moncton, N. B., $139,508; The Tomlinson Construction Co. Ltd., Toronto, $259,000; Bird Construction Co. Ltd., Winnipeg, Man., $208,800; Barr & Anderson Ltd., Vancouver, B. C., $85,794.

Construction and Enterprise

Michigan

DETROIT—Sibley Rotary Pump Co., 706 Dime Bank building, has been incorporated with $30,000 capital to manufacture pumping equipment, by Calvin C. Jordan, 16281 Hamilton avenue.

DETROIT—Detroit Experimental Electrical Tool Co., 3430 East Fort street, has been incorporated with $25,000 capital to manufacture tools, dies and jigs, by Harry A. Marshall, 8355 East Outer drive.

DETROIT—Partlan Sheet Metal Works Inc. has been incorporated with $20,000 capital to conduct a general sheet metal business, by James F. Partlan, 14290 Goddard street, Detroit.

DETROIT—Die Tool Engineering Co., 2775 Penobscot building, has been incorporated with $50,000 capital to deal in dies, tools and machinery, by Francis D. Tait, 1712 Union Guardian building, Detroit.

DETROIT — Michigan Heat Treating Co. has been incorporated with $50,000 capital to process and treat iron and steel, by Merrill R. Mitchell, 2100 Fisher building, Detroit.

DETROIT—Kermath Mfg. Co., 5890 Commonwealth avenue, has plans by Wiedmaier & Gay, 112 Madison avenue, for a two-story factory addition to cost about $60,000.

DETROIT—American Brakeblok division of American Brake Shoe & Foundry Co., 4600 Merritt street, has let general contract to Austin Co., 529 Curtis building, for a four-story 95 x 175-foot plant for manufacture of machinery parts.

HIGHLAND PARK, MICH.—Highland Tool & Mfg. Co. has been incorporated with $50,000 capital to manufacture machines and tools, by Edward L. Chapman, 14015 Brush street, Highland Park.

JACKSON, MICH.—Frost Gear & Forge division of Clark Equipment Co., A. S. Bonner, executive president, will build a one-story factory costing $75,000.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 118 and Reinforcing Bars Pending on page 120 in this issue.

Connecticut

BRANFORD, CONN.—Atlantic Wire Co., 1 Church street, has let general contract to Frank P. Sullivan Inc., 110 Tyler street, East Haven, for a plant addition to cost about $100,000. (Noted Feb. 10.)

HARTFORD, CONN.—Hartford Electric Light Co., 36 Pearl street, S. Ferguson, president, has let general contract to Stone & Webster Engineering Co., 149 Federal street, Boston, for design and construction of a power plant addition, including a 45,000-kw turbine, additional boilers and auxiliary machinery, costing about $4,000,000.

SHELTON, CONN.—Mullite Refractories Co., Canal street, has let general contract to Smith Construction Co., 101 Water street, Derby, Conn., for a plant addition to cost about $50,000.

SOUTH NORWALK, CONN.—Norwalk Lock Co., Marshall street, has let general contract to Caulway Inc., 1841 Broadway, New York, for a steel cartridge case manufacturing addition costing $75,000.

Massachusetts

BOSTON—Wentworth Institute, 550 Huntington avenue, has plans by Kilham, Hopkins & Greeley, 126 Newberry street for two-story 50 x 70 and 23 x 54-foot machine shop additions to cost about $50,000. Cleverson, Varney & Pike, 46 Cornhill, are engineers.

LYNN, MASS.—General Electric Co., 920 Western avenue, will let contract soon for a one and two-story 50 x 200-foot manufacturing unit addition to building 42K, costing about $60,000.

New York

BROOKLYN, N. Y.—Bureau of yards and docks, navy department, Washington, will build two dry docks at Brooklyn yard, at cost of $20,000,000.

BUFFALO — American Magnesium Corp., subsidiary of Aluminum Co. of America, is having plans prepared to double capacity at estimated cost of $3,000,000, including building and equipment. Product will be sand castings of magnesium for aircraft and other defense purposes.

BUFFALO—Sterling Engine Co., 1270 Niagara street, has let general contract for an addition of 100,000 square feet, to cost about $500,000, to F. J. Williams, 260 Kingsley street. (Noted Feb. 3.)

NORTH TONAWANDA, N. Y.—Buffalo Bolt Co., East avenue, will alter plant and build an addition, to cost about $40,000, with equipment.

New Jersey

CAPE MAY, N. J.—Fourth naval district, navy yard, Philadelphia, is removing two elevated water tanks and constructing two underground tanks of 200,000 and 150,000 gallons capacity, with service equipment, at cost of about $75,500. G. R. Swinton, 930 Atlantic avenue, Atlantic City, N. J., is engineer.

HARRISON, N. J.—Hyatt Bearings division, General Motors Corp., 427 Middlesex street, is building a one-story 80 x 240-foot roller bearing manufacturing plant on Fourth street. General contract has been given to F. J. Brotherton Inc., 200 Main street, Hackensack, N. J.

HARRISON, N. J.—Worthington Pump & Machine Corp., 401 Worthington avenue, will build a one-story welding shop addition 35 x 80 feet, general contract to Wigton-Abbott Corp., Plainfield, N. J., at about $50,000.

TRENTON, N. J.—DeLaval Steam Turbine Co., 853 Nottingham way, will build a one-story machine shop 100 x 300 feet, general contract to J. W. Ferguson Co. Inc., 152 Market street, Paterson, N. J.

Ohio

BUCYRUS, O.—Plant of Kelley Mfg. Co., Veronica C. Kelley, general manager, Galion, O., will rebuild plant damaged by fire, at cost of about $100,000.

DOVER, O.—Harry W. Stucky, service director, has started preliminary survey toward doubling capacity of municipal electric light plant, William C. Kammerer & Associates, 1900 Euclid avenue, Cleveland, being retained as consulting engineers. Plans include additional boiler.

WILLARD, O.—Village, Ernest L. Wolff, mayor, C. C. Hessler, clerk, is having plans prepared and will ask bids soon on water-cooling tower for municipal power plant, to cost about $20,000. F. N. Strauss, 2613 Queenston road, Cleveland, is consulting engineer.

Pennsylvania

CORRY, PA.—Aero Supply Co., 611 West Main street, has let general contract to H. Platt Co., 922 Raspberry street, Erie, Pa., for a two-story 125 x 190-foot plant. (Noted Dec. 9.)

ELLWOOD CITY, PA.—City will ask WPA assistance in construction of sewage disposal plant, including treatment plant,

mechanical grit screen, sludge digestion tanks and sludge drying beds. L. W. Monroe, city manager, is in charge.

ERIE, PA.—General Electric Co. will build a one-story addition 150 x 200 feet, to cost about $100,000, including three rolling steel doors. H. L. R. Emmett is works engineer.

LANCASTER, PA.—F. N. Miller Foundry Co. is rebuilding its burned brass and aluminum foundry at a cost of about $40,000.

MUSE, PA.—National Mining Co., subsidiary of H. C. Frick Coal Co., S. J. Craighead, superintendent mine No. 3, will build a one-story coal cleaning plant, including a coal washery and cleaning equipment.

PITTSBURGH — Edwin E. Wiegand Heating Units, E. Wiegand, president, 7500 Thomas boulevard, will build a

two-story 87 x 110-foot plant addition, general contract to D. T. Riffle, 1006 Forbes street, at about $40,000. Prack & Prack, 617 Martin building, are architects.

RIDGWAY, PA.—Stackpole Carbon Co., St. Marys, Pa., is extending and improving the plant of the former Viking Metal Products Co. in West Ridgway for its subsidiary, Molded Materials Inc., to cost about $40,000, with equipment.

Illinois

BELLWOOD, ILL.—Chicago Rivet Machine Co., 1830 Fifty-fourth street, will build a one-story plant addition. General contract has been given E. L. Lonergan Construction Co., 203 North Wabash avenue, Chicago. Cost about $350,000, with equipment.

CHICAGO—Wisconsin Steel Co., 2700 East 106th street, will build a one-story foundry, general contract to W. J. Lynch Co., 208 South LaSalle street, Chicago, to cost about $200,000.

CHICAGO—Handy Button Machine Co., 540 North Western avenue, is taking bids for a one-story plant on Twenty-third street near Rockwell street, to cost about $125,000.

CHICAGO—Benjamin Wolff & Co., 2035 West fifty-eighth street, distributor of steel and tin plate, has bought entire block of frontage on which present plant is located and will build addition to double capacity, with 20,000 square feet added.

CRYSTAL LAKE, ILL.—Ero Mfg. Co., manufacturer of steel furniture, will build an addition 40 x 154 feet, to cost about $12,000. General contract has been given to Albert Construction Co., Chicago.

MELROSE PARK, ILL.—Buick Motor division of General Motors Corp., Detroit, will build a one-story aircraft engine plant. War department will finance construction.

Indiana

ANDERSON, IND.—Board of public works, H. R. Baldwin, chairman, city hall, will take bids soon on one-story 30 x 39-foot screen house, motor-driven screen wash pumps, etc., to cost about $50,000. Russell B. Moore & Co., 930 Indiana Pythian building, Indianapolis, are engineers.

INDIANAPOLIS — Light Metals Inc. has been formed to manufacture magnesium alloy castings, by Charles J. Gisler, president, C. & G. Foundry & Pattern Works. A plant with 7200 square feet floor space will be built at once.

Alabama

LISTER, ALA.—Reynolds Metals Co., Federal Reserve Bank building, Richmond, Va., through Reynolds Alloys Co., a subsidiary, will build a plant for production of strong aluminum structural shapes and sheets for shipment to airplane plants, for defense work.

Maryland

FAIRFIELD, MD.—National defense advisory commission has approved building of 13-way shipbuilding plant at Fairfield, to be built by government and operated by Bethlehem-Fairfield Shipyard Inc. under Bethlehem Steel Co., shipbuilding division.

Kentucky

COVINGTON, KY.—Liberty Cherry & Fruit Co., 227 West Southern avenue, has let general contract to Lehigh Construction Co., Newport, Ky., for one-story plant 90 x 245 feet, to cost over $40,000, with equipment. Carl J. Kiefer & Associates Inc., Schmidt building, Cincinnati, are architects.

HENDERSON, KY.—War department and Solvay Process Co., Hopewell, Va., will build anhydrous ammonia plant costing $11,000,000. Power will be from TVA. Company is subsidiary of Allied Chemical & Dye Co.

LOUISVILLE, KY.—Reynolds Metals Co., Richmond, Va., has $2,500,000 available for additional plant facilities for manufacture of aircraft and other military supplies. Will fabricate strong aluminum rods, shapes, tubes and other extruded products. Will also convert part of Richmond plant to production of strong alloy sheets for aircraft.

Tennessee

DUCKTOWN, TENN.—Tennessee Copper Co., Copper Hill, Tenn., plans additions and alterations to its plant, to cost about $1,000,000.

GREENEVILLE, TENN.—City will receive bids Feb. 20 on sewage disposal plant and accessories, to cost about $110,000. Wiedeman & Singleton, Candler building, Atlanta, Ga., are consulting engineers.

JELLICO, TENN.—City, J. H. Cantrell, mayor, will take bids soon on extensions and improvements to municipal electric light system, to cost about $35,000. A bond issue of $104,000 has been approved to finance improvements.

MURFREESBORO, TENN.—REA has allotted $183,000 to Middle Tennessee membership corporation for 183 miles rural electric line.

MEMPHIS, TENN.—Humko Co., cotton oil refiner, is making additions and improvements costing $100,000 to $200,000 to increase capacity.

West Virginia

FAIRMOUNT, W. VA.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will build plant for manufacture of fluorescent lamps on 90 acres just bought on Monongahela river. Plant cost to be about $3,000,000 and capacity 50,000 units per day.

Missouri

ANNAPOLIS, MO.—Black River electric co-operative, R. Brown, superintendent, has additional REA allotment of $203,000 for 224 miles of rural electric lines.

CHILLICOTHE, MO.—City, Murray Windle, mayor, has approved $125,000 bond issue to finance with WPA aid construction of sewage disposal plant and sewers at cost of about $300,000. J. W. Shikles, 708 New York Life building, Kansas City, Mo., is consulting engineer.

ST. LOUIS—Board of public service is having plans made for national guard hangar at Lambert-St. Louis municipal airport at Bridgeton, 100 x 130 feet.

ST. LOUIS—General Engineering & Mfg. Co., Tenth and Carroll streets, will let contract soon for a two-story 33 x 114-foot plant addition. J. Bungert, 617 Wainwright building, is architect.

Minnesota

CHATFIELD, MINN.—City, N. O. Fahlgren, clerk, will build sewage disposal plant and sewers to cost about $245,000. Toltz, King & Day, 1509 Pioneer building, St. Paul, is consulting engineer.

KASSON, MINN.—Village, N. H. Hemp-

sted, clerk, will build a sewage disposal plant and sewers, including plunger sludge pump, rotary sewage distributor and four centrifugal sewage pumps. Druar & Millnoski, 1411 Pioneer building, St. Paul, are consulting engineers.

Oklahoma

OKLAHOMA CITY, OKLA. — United States engineer office, Fifth and Cincinnati streets, will build sewage treatment plant about a mile south of municipal airport.

Wisconsin

NIAGARA, WIS.—Village, Olaf Hildahl, clerk, is taking bids to March 3 on construction of 100,000-gallon steel water tank on 100-foot steel tower, 250 gallons per minute pumps and distribution lines. Federal Engineering Co., Central Office building, Davenport, Iowa, is consulting engineer.

Texas

HOUSTON, TEX.—American Rolling Mill Co., Middletown, O., Charles R. Hook, president, forming subsidiary to operate plant to be built on ship canal for manufacture of steel, with capacity 200,000 tons ingots annually, principally from scrap.

SAN ANTONIO, TEX.—Cyclone Fence Co., 1308 East Lancaster avenue will build factory and warehouse plant 100 x 160 feet and an office building, total cost about $60,000.

Kansas

IOLA, KANS.—City has awarded contract to Babcock & Wilcox Boiler Co., 85 Liberty street, New York, for improvements to municipal light and power plant, including a boiler and auxiliaries. E. T. Archer & Co., New England building, Kansas City, Mo., are engineers.

STAFFORD, KANS.—City, H. P. Lowe, clerk, is preparing plans for improvement of municipal power plant, including 540-horsepower diesel engine and remodeling cooling system, at cost of about $60,000. Paulette & Wilson, 1006 Kansas avenue, Topeka, Kan., is consulting engineer.

WICHITA, KANS.—Kansas Gas & Electric Co., 201 North Market street, plans construction of transmission lines and a power substation at cost of about $400,000.

South Dakota

BRITTON, S. DAK.—Proposition is under discussion for construction of municipal light plant costing about $175,000. Roy Stiles, secretary, Britton Commercial club, is interested.

VERMILLION, S. DAK.—City, E. A. Lenhart, auditor, is having plans prepared for addition to water filtration plant, costing about $15,000. H. S. Nixon, 316 Grain Exchange building, Omaha, Nebr., is consulting engineer.

WATERTOWN, S. DAK.—City is considering plans for municipal light plant to cost $165,000, plans to be submitted to city council March 3, and bids about April 7. Ralph D. Thomas & Associates, 1200 Second avenue South, Minneapolis, are consulting engineers.

Nebraska

FALLS CITY, NEBR.—City, Russell Pollard, clerk, is taking bids to Feb. 25 on water softening plant to cost $19,000. E. H. Dunmire, 2774 South street, Lincoln, Nebr., is consulting engineer.

NORFOLK, NEBR.—City, A. O. Hazen, clerk, is considering construction of sewage disposal plant jointly with the state hospital.

OMAHA, NEBR.—Standard Oil Co., Standard Oil building, will build a gasoline pipeline from Omaha to Sioux Falls, S. Dak., and a bulk gasoline plant at Sioux City, Iowa.

Iowa

DAVENPORT, IOWA—REA has allotted $344,000 to Eastern Iowa light and power co-operative, S. N. Jordan, superintendent, to finance 421 miles of rural transmission lines, to serve 843 customers.

DELHI, IOWA—Village, Roy H. Smith, clerk, will hold special election Feb. 13 on $30,000 bond issue to finance light and power plant. A. S. Harrington, 501 Baum building, Omaha, Nebr., is consulting engineer.

GREENFIELD, IOWA—E. E. Stowell, city clerk, will receive bids until March 4 on improvements to municipal light and power plant, including diesel engine, exciter, exhaust silencer and accessories. Stanley Engineering Co., Muscatine, Iowa, is engineer.

MAQUOKETA, IOWA—J. G. Thorne, city manager, will receive new bids March 11 for proposed municipal electric light and power plant, estimated to cost $75,000. Former bids were rejected.

OSAGE, IOWA—City, F. J. Cromer, clerk, takes bids to Feb. 18 for power plant building, installation of three diesel engines with combined capacity of 1900 horsepower and electric apparatus. Hubbard Engineering Co., 415 North LaSalle street, Chicago, is consulting engineer.

SUMNER, IOWA—City, H. W. Bathke, clerk, will take new bids to Feb. 20 on enlargement of sewage disposal plant, to cost about $33,000. E. E. Schenk, 214 Waterloo building, Waterloo, Iowa, is consulting engineer.

Montana

BILLINGS, MONT.—City, O. W. Nickey, clerk, plans a city-county sewage disposal plant and has retained Black & Veatch, 4706 Broadway, Kansas City, Mo., as consulting engineer.

Idaho

POCATELLO, IDAHO—City has applied for PWA funds to aid proposed sewage disposal plant for which $82,000 bond issue has been voted by city.

California

LOS ANGELES—Mechanical Development Co. is building a new plant at 1000 North Orange drive, 70 x 100 feet, costing $9000.

LOS GATOS, CALIF. — Permanente Corp., represented by Henry Kaiser, 1522 Latham Square building, Oakland, Calif., will build magnesium ore reduction plant, including kiln for refining ore and plant for making castings.

LOS ANGELES—Cook Heat Treating Co., 3334 East Slauson avenue, will build a new shop building costing $4000.

SAN DIEGO, CALIF.—Standard Electric Corp., 1407 Columbia street, will build a warehouse at 131 West Ash street, 100 x 100 feet, costing $30,000.

VAN NUYS, CALIF.—Adel Precision Products Corp., will build a new factory building 41 x 121 feet, costing $6500, at 10737 Van Owen street.

VAN NUYS, CALIF.—Aircraft Components is building a shop 36 x 50 feet at 8000 Woodley avenue.

Washington

ABERDEEN, WASH.—Champion Friction Co., 419 East Heron street, has been incorporated with $25,000 capital to manufacture friction blocks and automotive braking devices, by W. H. Clubb and associates.

SEATTLE—Manganese Mining & Mfg. Co., 7329 East Marginal way, will build new boiler house and add to other facilities.

USED and REBUILT EQUIPMENT
MATERIALS

QUALITY AIR COMPRESSOR

676 CFM. Ingersoll-Rand 2-stage, Ser. No. 82991-2, type XRE, direct driven by 125 HP. Syn. Motor 3/60/440 V. 277 Rev., with exciter, panel and air receiver. Weight 18,000 lbs. Complete. Practically good as new. Immediate shipment, fob. Saginaw, Mich.

LATHE

36" x 20' Springfield Geared Head, driven by motor 220 volts DC. 400/1000 Rev., taking 12' centers. Fair condition—not rebuilt. Quick shipment. Fob. Pittsburgh.

BORING MILL
(Vert. Turret)

30" King Single Turret Head, self-contained jackshaft. Good condition.

MISCELLANEOUS

Drake, 8' x 12 ga. Chicago, belted.
Filing Machine, No. 2 Cochran-Bly, belt.
Grinder, No. 4 B. & S. Plain., M.D. 3/60.
Hack Saws, No. 4 Marvel, cap. 6 x 6", B.D.
Lathe, Turret, 2" x 24", P. & J. cut-off, B.D.
Lathe, Turret, 21" Gisholt, 3½" H.S., M.D.
Marking Mach., No. 3 Pannier, Hand.
Millers, Plain, No. 0 Covel M.D., 3½" Fox, B.D.
Pipe Machine, 8" Jarecki, quantity dies, B.D.
Pipe Machine, 6" Landis, Q.C.G., M.D., 3/60.
Pipe & Nipple Mach., 2" Landis Dbl. Head, B.D.
Shapers, 16", 20", 24" B.G. Crank.
Shapers, 17" Smith & Mills, Cullman M.D. 3/60.
Shear, Gate, 60" x ¼" L. & A., 6" gap.
Shear, Throatless, No. 10-M. Lennox, M. D.

MARR-GALBREATH MACHINERY CO.
53 Water St. Pittsburgh, Pa.

OPPORTUNITY TO SAVE MONEY

SPOT WELDERS

10 KW 440 volt National 12" Throat
12½ KW 440 volt Agnew 15" Throat

6,000 performance tested and guaranteed motors, generators, etc. in stock. Send inquiries.

THE MOTOR REPAIR & MFG. CO.
1558 HAMILTON AVE. • CLEVELAND, O.

FOR SALE

One "OT" 6 ton top charge LECTROMELT Furnace Mechanical Parts, being replaced by larger furnace. P. O. Box 654, Pittsburgh, Pa.

CRANES WANTED

5 Ton to 20 Ton DC or AC
Any Span

Address Box 421, STEEL
Penton Bldg. Cleveland, O.

—REBUILT—
BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers. Centrifugals for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans and roof ventilators.

GENERAL BLOWER CO.
404 North Peoria St. Chicago, Ill.

FOR SALE

No. 1 Standard Forging Hammer, 100 lbs.
No. 3 Williams, White Bulldozer
18" Canton Portable Alligator Shears
12" ram x 15' stroke Hydraulic Accumulator, 1500 lbs. pressure
500 Ton Bethlehem Steel Shell Presses
6x12" HPM Vertical Triplex Pump, 700 lbs. pressure, 200 GPM, NEW. Class JJJ Pump.

Address Box 365
STEEL, Penton Bldg., Cleveland

HORIZ. MILL, 3-3/8" bar Detrick-Harvey
POST MILL, 6-1/2" bar Niles, R.P.T. M.D.
DIE SINKERS, E-3 and E-4 Keller, M.D.
GEAR PLANERS, 54" Glenson, bevel, M.D. (2)
GEAR CUTTER, 84" Newark, M.D.
LEVELLER, Plate, 84" Bertsch, 7 Rolls, M. D.
PRESS, Stoll 79-D, Bed 72"x26", M.D.
PLATE SHEAR, 10' x 3/8" United, M.D.

LANG MACHINERY COMPANY
28th St. & A. V. R.R. Pittsburgh, Pa.

WE BUY

New or used high speed cutting tools, milling cutters, end mills, files, taps and saws. Send us your list.

HARRIS TOOL EXCHANGE
349 S. Central Ave. Chicago, Ill.

Rails—"1 Ton or 1000"

NEW RAILS—5000 tons—All Sections—All Sizes.
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money
Phone, Write, or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

STEEL
CAN HELP YOU SELL OR BUY

Surplus or used machinery and equipment. Send in copy instructions for an advertisement in this column. Your ad will reach the important men in the metal-producing and metalworking industry. Write today to STEEL, Penton Bldg., Cleveland.

CONTRACT WORK

MACHINED
GREY IRON CASTINGS
Up to 60,000 P. S. I. Tensile Strength

and kindred items effectively produced in small quantities—Individual parts to 2,000 pounds—Assemblies to 5,000 pounds.

BROWN & BROWN, INC. Lima, Ohio

Send your inquiries for
SPECIAL ENGINEERING WORK
to the
A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.
designers and builders of wire and ribbon stock forming machines.
We also solicit your bids for cam milling

KIRK & BLUM
WELDED MACHINE BASES, PEDESTALS and FRAMES
LATHE PANS
GEAR and BELT GUARDS
Pressed Steel Louver Panels and Cover Plates
THE KIRK & BLUM MFG. CO.
2822 Spring Grove Ave., Cincinnati, Ohio

PATTERN EQUIPMENT

WOOD or METAL
Made Right and Delivered When Promised.

Castings in magnesium, silicon aluminum and bronze alloys to government specification.

THE WELLMAN BRONZE & ALUMINUM COMPANY
6011 Superior Ave. Cleveland, Ohio

CLASSIFIED

Positions Wanted

EXECUTIVE: UNIVERSITY EDUCATION, 15 years manager purchases large manufacturer heavy machinery, disbursement several million dollars annually. Solicit interview. Address Box 419, STEEL, Penton Bldg., Cleveland.

EXPERIENCED STRUCTURAL AND Plate Shop Superintendent seeking position as Superintendent or General Foreman of a Plant Fabricating a general line of Structural or Welded Plate construction. Address Box 413, STEEL, Penton Bldg., Cleveland.

ESTIMATOR WITH BROAD DIVERSIfied experience in estimating, designing, engineering and sales in connection with structural steel of all kinds, plate work, refinery work, pressure vessels, reinforcing steel, industrial layout and miscellaneous and ornamental iron work of all kinds. Sixteen years' actual experience, age 35 years, good education, married, A1 references. Prefer South, Southwest or Southeast location. Employed at present. Address Box 424, STEEL, Penton Bldg., Cleveland.

FORMER MANAGER STEEL WAREHOUSE Detroit:—Desires one or more lines to sell in this trade area. Steel Plates and shapes and/or metalworking and industrial machinery. Address Box 425, STEEL, Penton Bldg., Cleveland.

POSITION WANTED

Attorney. Practical experience personnel, labor relations and compensation laws. Exclusive services available. Understanding labor relations essential in expanding industrial production. Pennsylvania area preferred. Highest references. Address Box 402, STEEL, Penton Bldg., Cleveland.

Help Wanted

WANTED

General Foreman or Superintendent Forge Plant. Write giving experience, references, age, salary expected. Location, East. Address Box 407, STEEL, Penton Bldg., Cleveland.

EXPERIENCED ENGINEER FOR DESIGNing, estimating, and detailing structural steel for buildings. State age, experience, salary requirements and give references. CLINTON BRIDGE WORKS, Clinton, Ia.

SALESMAN FOR DETROIT AREA, FAmiliar with finished steel lines. Must be experienced and highly recommended. State age, experience and salary expected. Will pay good salary to right man. All replies will be treated in strict confidence. Old established firm. Our salesmen know we are running this ad. Address Box 418, STEEL, Penton Bldg., Cleveland.

CORE ROOM FOREMAN. JOBBING MALleable foundry making various sizes of cores. Wants man to take charge of core room. Must have experience with core blowing machines. Write, state qualifications as to past experience, references, salary, etc. Address Box 416, STEEL, Penton Bldg., Cleveland.

REPRESENTATIVE WANTED BY MANUfacturer welded mechanical tubing, New York Territory, commission basis. Must be experienced and acquainted with mechanical tubing trade. All replies treated confidentially. Address Box 422, STEEL, Penton Bldg., Cleveland.

EXPERIENCED HEAVY FORGER AND blacksmith. Opening in large California Plant, best of climate and working conditions. Steady work. Good wages. Age under 45. Experience required in crankshaft, straight shaft and general light forgings, alloy and carbon steels. Address Box 389, STEEL, Penton Bldg., Cleveland.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals, leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Classified pages are 3 columns, each column 2¼ inches wide.

Forms close Wednesday preceding publication date.

Employment Service

SALARIED POSITIONS

$2,500 to $25,000

This thoroughly organized advertising service of 31 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

Opportunities

A BARGAIN

GREY IRON AND SEMI STEEL OR ALLOYS

Operating at present. Equipped with two 72" cupolas for castings to eight tons. Have pattern and machine facilities under our own roof. Located northern Indiana, good industrial city. Will sell at appraised value buildings and equipment. Address Box 408, STEEL, Penton Bldg., Cleveland.

Castings

PENNSYLVANIA

NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

OHIO

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1¼ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat

Accounts Wanted

LET ME REPRESENT YOU IN CHICAGO Territory B & S and small screw machine parts; 15 years' experience; commission basis. Address Box 423, STEEL, Penton Bldg., Cleveland.

MANUFACTURERS' AGENT FOR FIFteen years in Central New York is interested in contacting manufacturers in metal industry, desires additional line. Address Box 417, STEEL, Penton Bldg., Cleveland.

Do You Want to Sell
USED or SURPLUS
Machinery?...

- STEEL can help you contact prospects by placing your advertisement before 60,000 readers in the metalworking and metal-producing industries.
- Place your advertisement in the "Used and Rebuilt Machinery" section of STEEL.
- Rates are moderate. Send in your copy today. Write STEEL, Penton Building, Cleveland, Ohio.

ADVERTISING INDEX

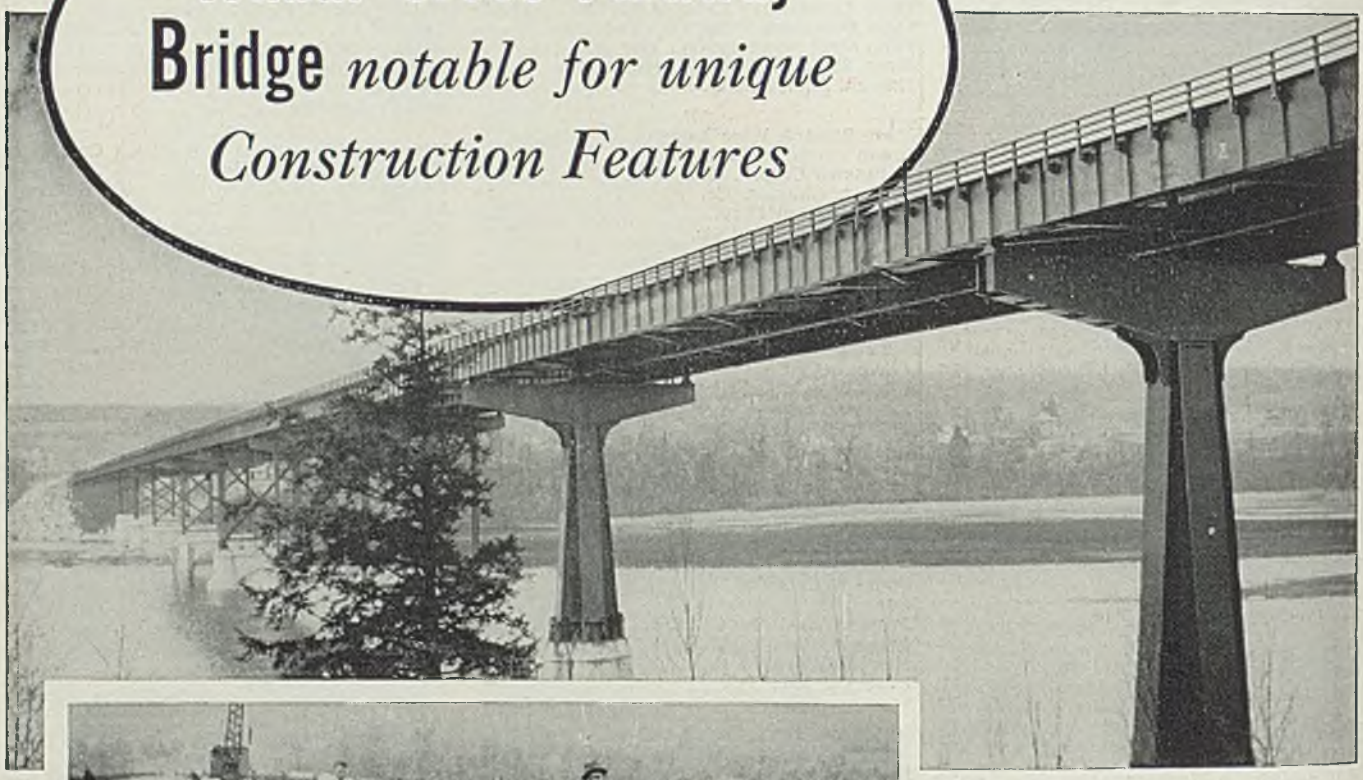
Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

Wilbur Cross Parkway Bridge *notable for unique Construction Features*

Built for the State of Connecticut, under the direction of the State Highway Department.



THREE CONTINUOUS PLATE GIRDER UNITS — *256, 384 and 640 feet long—combined with a 544-ft. cantilever unit, comprise the Wilbur Cross Parkway Bridge. The cantilever unit (at the right of photo) is supported by two T-type bents of cellular construction, the stems of which are rigidly anchored to single cylindrical piers. Bridge piers are founded on H Bearing Piles and reinforced with U·S·S Reinforcing Bars furnished by Carnegie-Illinois Steel Corporation.*

WELDING *Carnegie-Illinois 5-inch I-Beam-Lok open type flooring on south 26-ft. roadway; part of the north roadway is seen at the extreme left of photo. Three lines of longitudinal plate girders support the two roadways; outside girders are spaced 59 feet on centers. Exposed top flanges framed with bent side plates form the roadway curb.*

SPANNING the Housatonic River near Milford, the Wilbur Cross Parkway Bridge provides the connecting link between Connecticut's famous Merritt Parkway and the Boston Post Road.

Besides typifying the modern trend to continuous and cantilever plate girder design, this bridge has the further distinction of utilizing two unique T-type steel bents for supporting the cantilever superstructure.

Through the use of these ingeniously devised T-bents on single, centrally aligned, cylindrical piers, a minimum span length of 224 feet was sufficient to provide the 150 ft. navigation clearance specified for the 54-degree-skewed ship channel.

The 1284 foot length of this modern viaduct is composed of 12 plate girder spans varying in length from 128 to 224 feet. Nine rectangular, transversely braced steel bents of conventional design, in addition to the special channel bents, support the three lines of longitudinal girders that carry two 26-foot separated roadways of open type I-Beam-Lok construction. It is built on a 3 per cent grade and provides a 90-foot clearance above mean low water.

The entire superstructure, including the structural railings of beam and channel type, was fabricated and erected by American Bridge Co.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL