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STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 13 March 31, 1941

PRODUCTION • PROCESSING • DISTRIBUTION • USE

PROGRESSIVE VISION

Col. G.W. Goethals

Panama Canal

THE GATEWAY TO AMERICAN SAFETY

The Panama Canal, now drawn into the focus of a covetous world, was built for the purpose of expediting Pan-American trade and defense.

Credit for this great engineering achievement was given to Colonel Goethals. On his shoulders rested the responsibility of succeeding where others had failed.

Let us hope that the broad vision of those responsible for the panama Canal will prove to be a bulwark for our national defense.

THERMALLOY the "EYE" of QUALITY

THE ELECTRO ALLOYS COMPANY

CASTINGS FOR HEAT CORROSION

ELYRIA, OHIO

QUALITY CASTINGS SINCE 1919

HIGHLIGHTING
THIS ISSUE OF
STEEL

■ WITH strikes cutting more seriously into vitally important defense production, anger over the selfish attitude of many labor leaders is mounting steadily in powerful circles in Washington and it now appears likely (p. 23) that a stern governmental policy in reference to strikes shortly will take form. More than 1,000,000 man-days of work have been lost on army contracts since Jan. 1 because of strikes, the War Department reports (p. 24). Though the labor situation in the steel industry is tense, steel company executives feel better over the prospects than in a long time; this is because of rising indignation in government and among the general public over "racketeering" by labor leaders.

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Most important news last week again came from Washington. To expedite defense procurement the OPM's purchasing division (p. 29) has been organized into six major branches. . . . Five additional district managers have been appointed by the Defense Contract Service to stimulate subcontracting (p. 32). . . . A list of scrap iron and steel price differentials (p. 25) is expected to be made public soon. . . . Ferrotungsten, tungsten powder and tungsten compounds last week (p. 30) were placed under a general priorities system. . . . Price ceilings and priority control were extended to aluminum scrap and secondary aluminum (p. 40); encouraging feature is allowance of a margin for dealers' profits.

More Price Ceilings Fixed

• • •

Ice breakers now are hard at work clearing the way for ship movement on the Great Lakes (p. 47); two more lake ore carriers have been ordered. . . . March scored a new record in steel production and, as the month draws to a close, there still are no signs of a subsidence in domestic demands (p. 89). Though base prices are stable higher prices are being paid for steel because of stiffening extras. . . . Output of galvanized sheets dropped 11 points last week because of the tight zinc supply. . . . Steel output last week (p. 25) stood unchanged at the rate of 99½ per cent of ingot capacity. . . . The State Department authorizes exports of strategic materials and equipment (p. 32) to the Netherlands Indies.

Ice Breakers Hard at Work

• • •

"Don't Let Work Holding Devices Put Brakes on Production," is the theme on which Guy Hubbard, STEEL's machine tool editor, writes this week (p. 52). A high-speed machine tool, he points out, can be decidedly inefficient if the time it saves during the cutting cycle is wasted during the loading and unloading cycle. . . . After attending last week's Machine and Tool Progress Exposition, STEEL's editors (p. 21) feel that the question, "How can inspection keep pace with production?" is not going to plague defense manufacturers in 1941-42 as it did in 1917-18. What tool engineers learned on this occasion about improved manufacturing methods should result in increased production at many plants.

Inspection and Production

• • •

In this week's article in his series on high-explosive shells, Prof. Macconochie (p. 54) presents data covering all shell machining equipment; he also reveals details of a production time study of an approved setup. . . . R. G. LeTourneau's new home at Toccoa, Ga., is of welded steel. . . . Nat Pomeranz details a new method for making square holes (p. 76). . . . Tests indicate that tungsten lamp filaments (p. 84) may be produced from domestic wolframite. . . . Length of life of aluminum extruding dies may be increased by painting them with colloidal graphite. . . . Breeze Corps. Inc. (p. 69) uses a new process to hasten heat treatment of light armor plate. . . . John P. Walsted (p. 62) discusses metallurgical aspects of welding.

New Home of Welded Steel

IT'S STEEL that makes the big difference

● The transition from cars with wooden bodies to wind-splitting streamliners and modern automobiles is a story of the dramatic progress in steel. Inland has made many important contributions to this progress, among them being Inland Quality Sheets.

One of the reasons for Inland quality is that Inland was among the first to scrap old sheet-making equipment and install a wide continuous sheet and strip mill. Today, that 76-in. unit is teamed with a new 44-in. continuous mill. These mills are fully matched with equally modern steel making and finishing equipment.

Another reason is the Inland mills are operated by men of exceptional skill. They understand and use only the most advanced processing methods. They are men who are proud of the quality of Inland Sheets.

Still another reason for attainment of high quality and uniformity are the Inland Metallurgists. They contribute specialized knowledge to steel makers and steel users. They are ready to help with your steel problems—to show you how Inland Quality Sheets fabricate into finer products, in many cases at lower cost. Write, or phone, your nearest Inland office for full information.

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How To Speed Defense Output, Keynote At Detroit Tool Show; 70,000 Attend

Vast quantities of modern war implements quickly held country's greatest need . . . Their production will require improvisation of machine tools . . . Stiffer priorities probable soon

By GUY HUBBARD
Machine Tool Editor, Steel

DETROIT

■ KEYED throughout to the tooling needs of the national defense program, the third Machine and Tool Progress Exposition surpassed all expectations for attendance. Sponsored by the American Society of Tool Engineers, it was held in Detroit, March 24-29.

Thousands of tool engineers, toolmakers and production men crowded in, even from such distant points as the industrial centers of California, to study the more than 260 exhibits, to attend the technical sessions and to participate in the inspection trips to important industrial plants in the Detroit area. It is reported that total attendance was at least 70,000.

The show, which filled the Detroit convention hall and annex, primarily was concerned with those things which are used on or in connection with production equipment, either to make it productively most effective or to measure precisely and rapidly the size and surface quality of the work in process or under inspection. The fact that items of this kind are just as useful in improving and speeding up the output of older machine tools as they are in getting peak production from the latest model machines in part explains the extraordinary interest in this show.

With the American machine tool industry working night and day at an all time peak which still fails to come anywhere near meeting the demands for new machines for defense purposes, and with time the "essence" of this great armament manufacturing effort to which the United States now is committed, it is obvious that every available machine tool in reasonably good condition must be retooled and enlisted at once in active service. The importance of the Detroit show in that direction can hardly be over-estimated.

The immediacy and vast extent of the defense program as a tooling and production job was emphasized in many ways throughout the week, but probably no more forcibly than at the preview dinner on Monday evening, following the study of the show by a group of important industrialists and other invited guests.

Equipment Vital to Defense

Speaking on "What Is Needed for National Defense," Brig. Gen. G. M. Barnes, assistant chief of industrial service, ordnance department, United States Army, said: "We have learned that today nations which do not possess the proper military tools in sufficient quantities for the purpose of modern warfare are powerless to resist. We know now that Belgium, France and the British troops on the continent were not defeated through the use of 'secret weapons.' We know that Germany defeated France because Germany possessed overpowering quantities of modern tools of war."

"According to our studies," continued the general, "Germany—during a recent period of five years—spent the equivalent of $35,000,000,000 per year on her munitions efforts. Throughout this period Germany reversed her economic policies and rationed civilian needs in favor of munitions. Up to the present time, the United States has rationed national defense in favor of commercial activities—except in actual times of war."

General Barnes stated that in undertaking munitions production, American manufacturers tool up much more thoroughly than do those of any other countries. The end result is, however, that far greater production of better material is attained in this country than in Europe with a given number of men and machine tools.

He revealed that while defense plans originally called for equipment for an army of 750,000 men, a number of step-by-step additions have been approved so that the objective today is for the equipping in the modern manner of an army of approximately 1,800,000 men.

This, he predicted, is bound to bring into the defense production picture many existing companies and many new facilities which are going to require continuance of tool engineering efforts on a scale only faintly realized by most people.

Summing up the whole situation, General Barnes drove home the following points: First, *"Time* is the 'essence' in this program." Second, *"Production* means *quantity* production *now."* Third *"Machine tools* must be *improvised* in many cases." Fourth, *"Priorities* must soon be much *stiffer* than now."

Another speaker who revealed facts which have been commented upon nationally in the press and

over the radio was C. W. Van Ranst, chief aircraft engineer, Ford Motor Co. Mr. Van Ranst said that in addition to undertaking production of Pratt & Whitney engines, his company was engaged in the independent development of a new type of V-12 "in-line" liquid cooled aircraft engine. This engine, on which experimental work already is far advanced, embodies a new type of exhaust driven supercharger and solid injection of fuel. It will give ground level performance up to 32,000 feet altitude and promises to weigh less than one pound per horsepower.

Mr. Van Ranst stated that recent improvements in machine tools and tool engineering methods give such facilities for production that aircraft engineering ideas once considered impracticable physically now can be carried out with complete success on a manufacturing basis.

The technical program also dealt with "Naval Ordnance Production" and with "Industry's Need in Skilled Help." On "Navy Night," Joseph L. Davies, chief planner and estimator, Naval Gun Factory, Washington, D. C., explained how designs were developed, specifications drawn, budgets established and appropriations put through. He made clear that while the Navy insisted on having its engineering specifications followed to the letter, it did not dictate to outside manufacturers how materiel should be made as far as machining is concerned. In fact, he said, the Navy counts heavily on tool engineers and production experts outside the Navy to handle the production problems in the best possible ways.

Sabotage Control Discussed

The culmination of the meeting program came with the annual dinner and gathering at Book Cadillac hotel Friday evening, during which the new officers of the ASTE were installed and at which L. R. Pennington, administrative assistant to J. Edgar Hoover, director of Federal Bureau of Investigation, was the speaker. His subject was, "How To Prevent Sabotage to Our National Defense Program."

While not primarily a machine tool show, it is worthy of comment that a goodly number of highly interesting and significant machine tools were demonstrated under power at the show. Several of these were the products of companies relatively new in the machine tool field, whose ideas and technique therefore are fresh and unhindered by tradition. A good example of this was a line of high-speed cutting-off machines developed out of woodworking machines, and which by the use of high-speed fine-tooth circular saw blades and abrasive disks, cut off metals—including tough, thick steel bars—at rates ordinarily associated with woodworking practice. Equally striking developments in metalworking band saws were in evidence.

A number of other machines—including drill presses, lathes, milling machines and shapers—were shown by companies which at one time specialized on equipment for "home workshops," but which now very definitely have graduated into the field of light equipment for production shop use. These machines are particularly important now because they are immediately available and are capable of relieving the badly needed heavy-duty machine tools of a vast number of minor operations which ordinarily keep the heavy machines tied up altogether too much of the time.

In the field of gaging, considerable emphasis was placed on instruments which enable relatively unskilled people—including women inspectors—rapidly and accurately to gage parts such as munitions components. Some of these instruments are capable of the simultaneous gaging of a number of dimensions.

Green and red lights on an actual diagram of the part indicate "go" and "no go" conditions. The time-honored element of "feel" gaging on production work seems decidedly to be a thing of the past, and fine scale reading has been eliminated by shadow and projection methods which "blow up the reading" to very legible size.

Projection comparators have been improved and their usefulness extended throughout the shop. With these and many other comparable developments, the once puzzling question, "How can inspection keep pace with production?" is not going to rise to plague defense manufacturers in 1941-42 and as it did in 1917-18.

Summing the whole thing up, here is what those who attended the ASTE show and meetings gained generally:

(1) Realization of the serious responsibilities of tool engineering in the defense program.

(2) Realization of the tremendous scope of this program.

(3) Up-to-the-minute knowledge of devices, materials and methods which will make modern machine tools 100 per cent effective and which will add greatly to the effectiveness of older equipment which must be employed in this emergency.

(4) Knowledge of and appreciation of new types of low-cost light-duty machine tools on which immediate deliveries still are possible, and which can be depended upon to take the load of minor operations off the shoulders of large heavy-duty machine tools whose full time is vitally needed on the large heavy-duty operations which only they can perform.

(5) Knowledge of devices and methods by which the limited supply of skilled people can have their usefulness extended over broader fields by having the load of routine work transferred from their shoulders to new workmen of limited skill.

(6) Methods of training through which those of no skill can be translated into workers of limited and even high skill in short periods of intensive training.

(7) Realization that America has the materials and the power and the genius to turn the scales in favor of democracy in this world contest of mechanized forces—if we all wake up to the immediate gravity of the situation and all "get our shoulders to the production wheel" without further ado.

The society's next annual meeting will be held in March, 1942, in St. Louis. Its membership has increased 73 per cent since January, 1940, and now totals close to 7000. A new chapter is to be chartered in Hamilton, Ont. Members of the society called into service will have their dues remitted to them for time they are in service.

New Officers, American Society of Tool Engineers

President: Frank W. Curtis, chief engineer, milling machine division, Van Norman Machine Tool Co., Springfield, Mass.

First vice president: Otto W. Winter, factory manager, Columbus McKinnon Chain Co., Tonawanda, N. Y.

Second vice president: Ray H. Morris, vice president, Hardinge Bros. Inc., Elmira, N. Y., and president, Ray H. Morris Co., Hartford, Conn.

Secretary: Clyde L. Hause, Gorham Tool Co., Detroit.

Treasurer: Frank R. Crone, chief tool designer, Lincoln Motor Co., Detroit, re-elected.

First Machine Gun Made At GM Saginaw Factory

■ First 0.30 caliber Browning machine gun to come from the new assembly line of Saginaw Steering Gear division of General Motors, Saginaw, Mich., was fired by Governor Van Wagoner last week in ceremonies marking start of the manufacturing program.

The guns are being made in a new plant here, started last October and to be finished within a month, equipped by summer and volume production of 100 units a day reached sometime thereafter. Three thousand men eventually will be employed. Alva W. Phelps is plant manager.

Jurisdictional Issues Cause Leading Defense Strikes; Wages Secondary

■ CAUSES for many important defense strikes, now estimated to be retarding work on $1,500,000,000 armament orders, lies mostly in union organizational activities and not so much in dissatisfaction over wages and working conditions.

Jurisdictional disputes between the Congress for Industrial Organizations and the American Federation of Labor or between one of these major unions and a local independent or company union have been a primary cause for slowing down the preparedness program. Insistence by union leaders that nonunion workers or members of another union be excluded have caused several of the leading "strategic" strikes, stoppages whose effects are felt not only in the struck shop but in many other plants depending on the struck factory for essential parts.

Examine the basic issues in these leading disputes:

Allis-Chalmers Mfg. Co., Milwaukee, affecting 7000 employes and holding up work on $45,000,000 defense orders, including badly needed navy propulsion machinery. Strike started by CIO union when company refused to exclude AFL members.

Bethlehem Steel Co., largest holder of defense contracts. Strike attempted by Steel Workers Organizing Committee seeking recognition and the ousting of a local union, SWOC organizers declaimed as the strike was called: "This plant must not open until we have smashed the ERP (local union)." Settlement of a four-day strike at the Bethlehem, Pa., plant last Friday was partially offset by start of a walkout at the Cambria Works at Johnstown, Pa.

International Harvester Co., affecting 13,500 employes, caused by jurisdictional dispute between CIO and AFL unions, and insistence by CIO unions on exclusive recognition in all the company's plants.

Protested Nonunion Guards

Vanadium Corp. of America, which produces special alloys essential to armor plate for ships and tanks, to other defense materials and to tools needed in defense manufacture. Walkout, unauthorized by national CIO officials, started when company employed six nonunion guards.

Ray Day Piston Corp., Detroit, which manufactures aluminum castings and aluminum pistons for aircraft companies. Demand for recognition by United Automobile Workers is basic issue.

The list might be continued to show that in practically all current disputes union organizers are attempting to force personal advantages. In numerous cases, of course, demands for wage increases or vacations with pay have been coupled with other demands.

A rapidly rising tide of public impatience with this situation appeared last week in Congress, in the Office of Production Management, in some administration circles, and in the newspapers.

Secretary of Labor Frances Perkins certified four strikes to the National Defense Mediation Board as obstructing defense material production. The four disputes were: International Harvester Co. strikes in eight midwestern plants; Vanadium Corp. of America, Bridgeville, Pa.; Universal Cyclops Steel Corp., Bridgeville, Pa.; Condenser Corp. of America, North Plainfield, N. J.

William S. Knudsen, OPM director general, and Secretary of Navy Frank Knox wired Allis-Chalmers Mfg. Co. officials and union heads that the country could no longer wait for a settlement of that ten-week-old strike by ordinary methods. Resumption of operations immediately was ordered, with negotiations continuing while the men are at work.

Authority of Mr. Knudsen and Mr. Knox to demand settlement of the Allis-Chalmers strike was immediately challenged by Philip Murray, CIO president.

Wisconsin Employment Relations Board held that the strike vote held by the CIO union at Allis-Chalmers in January was improperly conducted and not valid. A new election was ordered by the state agency.

Demands that defense-hampering strikes be stopped were wildly cheered in the United States Senate and House of Representatives. Legislation to curb work stoppages and to clothe the new mediation board with greater authority was proposed. Friends of the labor

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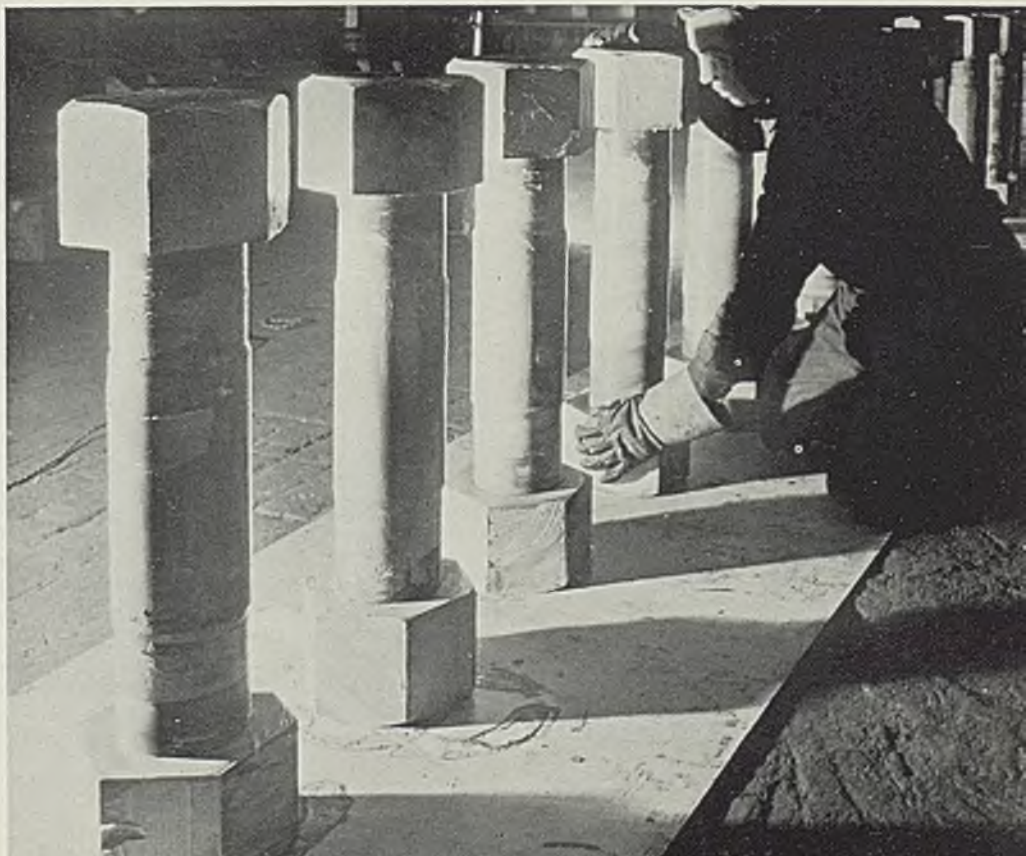
315-Pound Bolts To Join Generator Shaft Sections

■ These huge 315-pound stud bolts will join two sections of a steel shaft for a giant generator. A workman at the East Pittsburgh, Pa., works, Westinghouse Electric & Mfg. Co. has just finished coating the bolts with a protective compound. Bolts connecting the shaft of the 150,000-horsepower turbines to 108,000-kilowatt generators for the Grand Coulee dam weigh 130 pounds. (STEEL, March 24, p. 39). NEA photo



unions, who in times past have rushed to their defense, were silent.

In Texas, the state House of Representatives passed a bill to outlaw force and violence against anyone attempting to work at his lawful job by a 112 to 17 vote. Army officers had testified that strikes were hampering production of vitally needed military equipment.

Despite the rise of antistrike sentiment, union leaders continued to set the stage for possible further stoppages.

SWOC renewed demands on leading independent steel producers for union recognition in letters to Republic Steel Corp., Cleveland, Youngstown Sheet & Tube Co., Youngstown, O., and Inland Steel Co., Chicago. In addition to demands for exclusive bargaining rights on a company-wide basis, the union asked for a 10-cent hourly wage increase and made the usual other demands. The request for signed agreements came almost exactly four years after SWOC's first demands against these companies.

As predicted in STEEL, March 24, page 25, SWOC and United States Steel Corp. extended their current agreement from March 31 to April 8. Negotiations have been under way for several weeks on SWOC's demands for a 10-cent wage increase. The union refused to accept a compromise offer of 2½ cents.

It appears improbable SWOC will risk an open break with U. S. Steel, first large steel producer to grant a contract, while it is driving for signed agreements with the independent producers. Neither is it likely to accept immediately a small wage increase, which might establish the pattern for other contracts, as long as the matter can be continued in a state of more or less amiable suspension.

Dies Charges SWOC-Communists Seek Steel Industry Tie-Up

Charges that the Communist party working through the Steel Workers Organizing Committee is attempting a complete tie-up of the steel industry to sabotage the defense program were placed in the *Congressional Record* last week by Chairman Martin Dies of the committee on un-American activities.

Congressman Dies told the House of Representatives that he had a record of active Communists who had penetrated the steel industry through SWOC.

"Our committee is in possession of indisputable evidence that the Communist party, through its members and organizers in SWOC is working toward a complete tie-up in the steel industry, an industry that has billions of dollars in defense contracts . . .

"Our committee is in possession of evidence that shows that hundreds of employes in steel mills have recently signed the Communist party's election petitions . . .

"It is an indictment of this labor organization that it ever allowed so many Communists of public record to infiltrate into its organizing work."

The congressman said present and threatened strikes in the steel industry involved the issue of "Communist operations for the sole purpose of obstructing the progress of the national defense program . . . From its very inception SWOC showed a strong disposition to place on its payrolls scores of organizers who had records of Communist party membership."

Strikes Cost Army 1,000,000 Man-Days Jan. 1 to March 21

More than 1,000,000 man-days of work have been lost since Jan. 1 on army contracts, according to a study made by the War Department. The ratio of idleness attributable to strikes or jurisdictional disputes has been rising steadily since the first of the year.

The estimate is a conservative one, according to War Department officials, and was prepared on the basis of a five-day week and does not include time lost on Saturdays and Sundays.

Mesta Machine Increases Pay Rates, To Vary with Efficiency

Mesta Machine Co., Pittsburgh, steel mill equipment producer and holder of large defense contracts, last week increased employes' pay checks by 6 per cent. Attached to the checks was a note reading:

"You will note the figure 6 on the corner of your check. This means the amount of the check has been increased by 6 per cent. We will aim to have this figure appear on your future pay checks.

"This figure will be determined by the management each month and will vary with the efficiency in comparison to our experience in the past."

Deadlock Continues Between Coal Operators and Miners

Deadlock between bituminous coal operators and the United Mine Workers over demands for a $1 a day wage increase continued at week's end. Present contract expires March 31.

Although both miners and operators professed optimism over prospect for an agreement, there were no signs such agreement was in sight. Many industrial observers fear a suspension of work when the deadline falls.

UMW has proposed to Alabama coal mine operators that production continue after April 1 with the understanding all advantageous arrangements of the Appalachian contract be adopted and made retroactive to April 1. Operators proposed the present contract be continued until a new one could be worked out, but were unwilling to agree to the Appalachian terms.

Coal Mine Ruling Would Raise Wages 10 Per Cent

Four companies in the Birmingham district last week petitioned the wages and hours division, Department of Labor, to postpone the effective date of a ruling that the work day starts "when miner reports for duty as required at or near collar of mine, and ends when he reaches collar at end of shift."

The ruling was scheduled to become effective April 1, but the companies asked Philip E. Fleming, administrator, for time to readjust bookkeeping and management practices. Petitions were filed by Tennessee Coal, Iron & Railroad Co., Woodward Iron Co., Sloss-Sheffield Steel & Iron Co., Republic Steel Corp., Colorado Fuel & Mining Co. They made formal request for reconsideration of the ruling which is expected to raise miners' wages about 10 per cent.

OPM Advisory Group Seeks Metals Substitutes

■ With appointment of an enlarged advisory committee on metals and minerals in National Academy of Sciences, Office of Production Management last week launched a series of investigations aimed at developing substitutes and conservation methods in defense metal production.

The advisory group will conduct the studies and make recommendations to OPM. Chairman is Dr. Zay Jeffries, General Electric Co., Cleveland. W. H. Eisenman, American Society for Metals, is secretary, and members are:

R. S. Archer, Republic Steel Corp.; E. W. Bennett, Dow Chemical Co.; A. L. Boegehold, General Motors Corp.; S. K. Colby, Aluminum Co. of America; Dr. H. W. Gillett, Battelle Memorial Institute; W. C. Hamilton, American Steel Foundries; Charles H. Herty, Bethlehem Steel Co.; Jerome Strauss, Vanadium Corp. of America; Dr. John Johnston, United States Steel Corp.; A. B. Kinzel, Union Carbide & Carbon Co.; Dr. R. F. Mehl, Carnegie Institute of Technology; P. D. Merica, International Nickel Co. Inc.; W. N. Peirce, New Jersey Zinc Co.; A. J. Phillips, American Smelting and Refining Co.; W. B. Price, Scoville Mfg. Co.; H. S. Rawden, United States Bureau of Standards; W. C. Smith, Cerro de Pasco Copper Co.; W. P. Woodside, Climax Molybdenum Co.

Expect Early Action on Scrap Differentials

WASHINGTON

■ Scrap buyers from leading steel mills were in Washington last Thursday for an all day conference, which went far into the night, with officials of the price stabilization division of National Defense Advisory Commission to make recommendations on scrap differentials.

This action was in line with the conference a week previously with scrap dealers. The question of differentials is now before the legal division and the list may be made public at any time.

It also is expected that the special committee which is looking into the supply of scrap will make a report soon to the Office of Production Management.

The committee, which was appointed by R. C. Allen, of the procurement division, OPM, includes the following: Carl A. Ilgenfritz, Republic Steel Corp., representing steel industry; Edward A. France, representing the price stabilization division; E. C. Barringer, executive secretary, Institute of Scrap Iron and Steel, representing the scrap industry; William J. Hoff, OPM legal division; and Robert H. Ridgeway, representing the OPM.

Maintenance of present price levels was urged last week by Louis J. Borinstein, president, Institute of Scrap Iron and Steel.

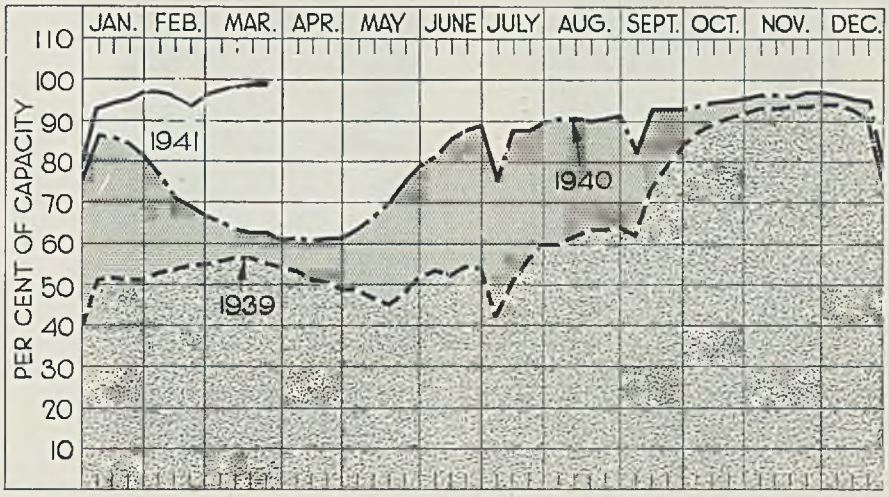
Mr. Borinstein coupled his suggestions with a denial that there is a shortage of iron and steel scrap and urged, that in anticipation of a still higher rate of consumption next fall and winter, plans be matured immediately to move 5,000,000 tons of scrap from remote areas without expense to the government.

"The present price of scrap is the lowest in history considering that steel mill operations are at the highest," he said. "Government-fixed prices during the first World war were one-third higher."

Technical Articles in "Bolts, Nuts and Screws"

■ *"Bolts, Nuts and Screws"* is the title of a booklet containing reprints of 14 recently published technical articles, all thoroughly illustrated, covering screw threads, cold forging, fatigue strength, effects of methods of manufacture and other factors involved in the production of bolts, nuts and cap screws.

The booklet has been issued by the Lamson & Session Co.. Cleveland, and contains material that originally appeared in *Metal Progress, The Iron Age, The Tool Engineer, Hardware Age, Product Engineering,* and STEEL.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week continued at 99½ per cent or slightly on the up side. Four districts made small gains, one declined and seven were unchanged. A year ago the rate was 61 per cent; two years ago, 54½.

Chicago—Unchanged at 101½ per cent, four of six plants being at 100 per cent or higher.

Detroit—Rose 6 points to 95 per cent as repaired furnaces were lighted. One furnace had been down a full week, the other for four days.

St. Louis—Maintained the all-time peak of 99 per cent for the second week.

Cincinnati—Advanced 4 points to 97½ per cent, some producers having all open hearths in production.

Birmingham, Ala.—Continued at 90 per cent for the fourth consecutive week.

Pittsburgh—Further advance of 1½ points carried the rate to 103 per cent.

Wheeling—Held at 88 per cent for the sixth consecutive week.

New England—Lost 15 points to 85 per cent as two plants took off open hearths for repair. Some recovery is expected this week.

Buffalo — Although the rate reached 95½ at one period last week the average was unchanged at 93 per cent.

Central eastern seaboard — Despite some labor interruption production last week was unchanged at 96 per cent. Bethlehem Steel Co. reports steelmaking is on normal basis.

Cleveland—Gained 1½ points to 99½ per cent, two producers being at capacity.

Youngstown, O. — Steady at 97 per cent for the fifth week, with 75 open hearths and three bessemers active. Carnegie-Illinois Steel Corp. added one furnace and Youngstown Sheet & Tube Co. dropped one.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 29	Change	Same week 1940	Same week 1939
Pittsburgh	103	+ 1.5	57.5	49
Chicago	101.5	None	56.5	53.5
Eastern Pa.	96	None	59	40
Youngstown	97	None	43	50
Wheeling	88	None	71	66
Cleveland	99.5	+ 1.5	69	52.5
Buffalo	93	None	44	42
Birmingham	90	None	78	62
New England	85	—15	65	50
Cincinnati	97.5	+ 4	45.5	51
St. Louis	99	None	39	43
Detroit	95	+ 6	79	74
Average	99.5	None	61	54.5

Copperweld Increasing Electric Steel Capacity

■ Copperweld Steel Co., Warren, O., announces that upon completion about May 1 of four additional electric melting furnaces the Warren plant will have a monthly ingot capacity of approximately 20,000 tons, one of the country's largest producers of electric furnace steels.

Two electric furnaces now are producing 40-ton heats. One electric furnace will be producing 50-ton heats about April 10; one electric furnace, 14 tons, about April 25; and two electric furnaces 10 tons each, one about April 5, the second about May 1.

Work is progressing rapidly on the new 12-inch mill at Warren, scheduled for completion about May 1. Additional heat-treating furnaces will be ready about May 1 and will increase the plant's heat-treating capacity to approximately 3000 tons per month.

MEN of

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George B. Beitzel

R. L. Hamilton

■ **L. A. ESTES,** heretofore executive vice president, has been elected president, South Chester Tube Co., Chester, Pa. He succeeds the late Gustavus W. Cook. **John W. Lawton,** continuing as secretary, has also been elected treasurer, succeeding **Francis J. Tucker,** who is joining the sales department as special representative.

♦

Lee H. Hill has been appointed assistant manager, electrical department, Allis-Chalmers Mfg. Co., Milwaukee. He has been head of the company's transformer department since 1936, and will assume, among other duties, general supervision of the electrical department's sales promotional activities.

♦

Harry E. Orr, the past seven years chief metallurgist, Burnside Steel Foundry Co., Chicago, has been appointed to the sales staff of Vanadium Corp. of America, New York, as sales engineer with headquarters at the corporation's Chicago office.

♦

George B. Beitzel, manager of sales, Pennsylvania Salt Mfg. Co., Philadelphia, maker of numerous products used in the metals industries, has been elected president, Sales Managers' Association of Philadelphia, and will assume his duties at the fall meeting of the association.

♦

A. E. Russert has been transferred from the Detroit office of Sharon Steel Corp., Sharon, Pa., to the Cleveland office, the change being made due to transfer of **James K. Owen** from Cleveland to Indianapolis.

♦

R. L. Hamilton has been elected vice president, Dumore Co., Racine, Wis. Associated with Dumore since graduation from the University of Notre Dame in 1934, he was advertising manager from 1935 to 1937 and a year later became sales manager. Mr. Hamilton is also president, Milwaukee Association of Industrial Advertisers; a member, board of controls, Electric Tool Institute, and chairman of the membership committee, American Supply and Machinery Manufacturers Association.

♦

B. F. Bower, who resigned as chief engineer, Howell Co., St. Charles, Ill., March 1, is organizing a company which will shortly begin production on tube fabricating machines.

♦

A. M. Herrmann has been appointed general factory superintendent, Brillion Iron Works Inc., Brillion, Wis. The past 17 years Mr. Hermann had been associated with Belle City Malleable Foundry, Racine, Wis.

♦

Percy Jenkins has resumed all duties which he previously held as New England district sales manager, Wickwire Spencer Steel Co., New York. He is located at the company's Worcester, Mass., offices, 80 Webster street.

♦

Andrew Hutton has been appointed works manager, Robins Conveying Belt Co., Passaic, N. J., in charge of all manufacturing operations, buildings and equipment. Mr. Hutton was recently chief engineer, Davis Engineering Corp., Elizabeth, N. J.

♦

Harry A. Cassler will retire April 1 as purchasing agent, Roller-Smith Co., Bethlehem, Pa. Associated with the company since 1911, he served as purchasing agent the past 20 years. Mr. Cassler will be succeeded by **Paul Helms,** assistant purchasing agent since 1939.

♦

Leon S. Howe has been elected a vice president, The Stanley Works, New Britain, Conn. He formerly was general manager of Stanley Steel Strapping Division. Mr. Howe joined the company

INDUSTRY

S. H. Hammond

M. F. Becker

about 25 years ago to organize the steel strapping division.

♦

William W. Britton has been made special representative for the Pacific coast territory, including California, Oregon and Washington, by Jessop Steel Co., Washington, Pa. His headquarters are in the Chamber of Commerce building, Los Angeles. Mr. Britton has been a member of Jessop's sales staff many years and before his transfer to the Pacific coast represented the company in the southern territory, with headquarters in Dayton, O.

♦

George A. Blackmore, George C. Burgwin Jr., J. B. L. Hornberger, C. McK. Lynch and **J. D. A. Morrow** were re-elected directors at the annual stockholders meeting of Pittsburgh Coal Co., Pittsburgh, March 26. **L. F. Rains,** president, A. M. Byers Co., was elected a director to fill vacancy created by death of **William G. Warden.**

All officers were re-elected for the ensuing year.

♦

Charles F. Northup, in charge of the Syracuse, N. Y., office of Brown & Sharpe Mfg. Co., Providence, R. I., the past 29 years, will retire March 31. Mr. Northup joined Brown Sharpe as an apprentice in 1880.

Until further notice the Syracuse office will be under direction of **Charles J. Vevera,** assistant to Mr. Northup the past 15 years.

♦

Harvey T. Harrison, general sales manager, Duraloy Co., Scottdale, Pa., since 1937, has been elected vice president in charge of sales. He joined the New York office of Duraloy in 1928 and two years later became district manager at Cleveland where he remained until 1937.

Charles H. Hoefer has been made general superintendent of Duraloy. He formerly was superintendent, alloy division, Lebanon Steel Foundry, Lebanon, Pa., and also superintendent, Forging & Casting Corp., division of Allegheny Ludlum Steel Corp., Ferndale, Mich., and Empire Steel Castings Inc., Reading, Pa.

♦

S. H. Hammond, until recently manager, appliance division, Whiting Corp., Harvey, Ill., is now in charge of all Whiting branch offices and sales representatives, with the title of director of the field force. Mr. Hammond has been associated with Whiting 15 years.

M. F. Becker, vice president, has been promoted to co-manager, equipment division. He has been identified with the company over 20 years and formerly served as field force director.

The following have been elected new directors: Mr. Hammond, **R. A. Pascoe,** controller, and **W. L. Badger,** who has been associated with the Swenson division of the company many years, having charge of all development and research activity pertaining to the process industries.

♦

E. W. Henrich, former division export manager for Caterpillar Tractor Co. and Yale & Towne Mfg. Co., has been named division export manager, Buda Co., Harvey, Ill. He will have charge of export business in the area from Mexico to the equator, while **George H. Koons,** division export manager of Buda many years, will take over the territory in South America below the equator, with headquarters at Rio de Janeiro and later at Buenos Aires.

♦

W. Homer Hartz, president, Morden Frog & Crossing Works, Chicago, and chairman of the board and immediate past president, Illinois Manufacturers' Association, has been named co-ordinator of defense contracts in the Seventh Federal Reserve district, Chicago. **Thomas S. McEwan,** consulting management engineer, has been named district manager, and **A. L. Olson,** assistant vice president of the Federal Reserve bank, defense contract officer. **C. S. Young,** president of the bank, heads the service.

♦

R. C. Markle has been elected comptroller and assistant secretary, Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds **William Donald,** who has been made assistant to vice president in charge of finances.

Mr. Donald has been associated with subsidiaries of United States Steel Corp. since April, 1905, when he joined the former Carnegie Steel Co. as clerk and bookkeeper.

Mr. Markle entered employ of United States Steel Corp. subsidiaries at the Braddock, Pa., plant of American Steel & Wire Co. in 1901. He was appointed assistant comptroller of Carnegie-Illinois in 1936 and became general superintendent of methods and procedure in 1938.

♦

Howard E. Emigh has been appointed superintendent of Reynolds Metals Co.'s new aluminum alloy rolling mill at Lister, Ala. For a number of years he was associated with the Ford Motor Co. as a consultant and plant supervisor, and before that was engaged in engineering work with Wheeling Steel Corp. and Weirton Steel Co. Recently he was employed as consultant on rolling mill operations for United Engineering & Foundry Co., Pittsburgh, and also served as general consultant for the Office of Production Management.

Commander Harry J. Heuster, Arlington, Va., has been designated to serve as special Reynolds representative in co-ordination of defense production for the aviation industry. From 1918 to 1927 he was engaged in metallurgical research at the naval aircraft factory, Philadelphia, and since that time has been associated with the Bureau of Aeronautics of the Navy Department.

Activities of Steel Users, Makers

■ SHAREHOLDERS in Basic Dolomite Inc., Cleveland, last week approved a recommendation to change the company's name to Basic Refractories Inc. to better reflect its widened scope of activities. Directors re-elected include: Dan P. Eells, Milwaukee; Howard P. Eells Jr., Cleveland; Samuel Eells, Cleveland; John W. Garrett II, New York; Richard Inglis, Cleveland; John P. McWilliams, Cleveland; Douglass Van Dyke, Milwaukee.

♦

Clark Controller Co., New York, has moved its offices to new quarters at 60 East Forty-second street.

♦

Silver & Co, Chicago, iron and steel scrap broker, has opened an office in the Board of Trade building. Morris J. Silver heads the company.

♦

Gisholt Machine Co., Madison, Wis., has appointed Mine & Smelter Supply Co., Denver, exclusive sales agent in the Rocky Mountain region.

♦

Crucible Steel Co. of America has leased additional space in the Chrysler building, New York, comprising about a quarter of the tenth floor of that building.

♦

Davis Tool & Engineering Co. and Davis Stamping Co., Detroit, have moved into a new plant at 19250 Plymouth road, providing 20,000 square feet for the tool and die division, now operating two shifts daily, and 8000 square feet in the jobbing stamping division.

♦

Continental Can Co. Inc. sales to March 10 were approximately 18 per cent above those for the comparable period in 1940, Carle C. Conway, chairman, announced at the company's stockholders' meeting in Millbrook, N. Y., March 25.

♦

Iowa Transmission Co., Waterloo, Iowa, has been incorporated as a subsidiary of Deere & Co. to manufacture transmissions for army tanks. Company has an $18,000,000 contract from the War Department. Subcontracts will be placed with Deere Tractor Works, Waterloo, and other companies.

♦

American Car & Foundry Co., New York, has combined its Madison and St. Louis car plants under one management. Thomas A. Dooley has been named district manager in charge of both plants, with Norman H. Shipley acting as assistant district manager of the Madison plant. Stephen S. Eagle, at his own request, has retired as district manager.

♦

Stearns Magnetic Mfg. Co., Milwaukee, has expanded its laboratory to provide more complete facilities for testing materials and for research and development in perfecting separation processes and improving its magnetic equipment.

♦

Employes of Walter Kidde & Co., Bloomfield, N. J., builder of fire equipment, and company officials have donated two rolling kitchens to feed homeless Britons. Employes at first planned to build a fire engine for Britain on their own time but were informed rolling kitchens were more in need.

♦

Globe-Wernicke Co., Cincinnati, has been awarded an order to supply approximately 40 carloads of steel office equipment for the new plant of the Wright Aeronautical Corp., Cincinnati. Included are more than 1000 modern steel desks, nearly 1500 steel office chairs, and miscellaneous office accessories.

♦

Jenks, Knipschild & MacCowan Inc. has been organized, with offices at 75 East Wacker drive, Chicago, to provide industrial design service for manufacturers that includes both styling of products and their promotion by advertising. Roy W. Knipschild is president; Al Jenks, vice president; Hervey L. MacCowan, treasurer; and Henry Olczak, secretary.

♦

Hagan Corp., Buromin Co., and Calgon Inc., combustion and chemical engineers, Pittsburgh, have established a branch office in Detroit, at 2512 Book building. Arthur R. Borden will be in charge of Hagan, Hall Service and Buromin activities, while Robert Graf will handle business of Calgon Inc. They will be assisted by J. B. Monaghan and W. H. Weitzel.

♦

Met-Alloys Inc., Chicago, recently organized, with executive offices at 332 South Michigan avenue, is equipping its plant at 425-495 West Chicago avenue, East Chicago, Ind., to produce nickel and copper alloys in shot form, as well as phosphor copper and other metals. George Birkenstein is president; Harvey C. Chaden, vice president and plant superintendent, and Charles K. Bell, treasurer. All purchases and sales will be handled by George Birkenstein Corp., Chicago. The company will purchase monel and nickel scrap of various grades, as well as some copper, brass and other nonferrous scrap.

♦

Sprague Specialties Co and Sprague Products Co., North Adams, Mass., have solved the problem of executing defense orders promptly and at the same time maintaining its regular radio business by devoting a second factory to defense orders. This plant, near the original building, was acquired several years ago and since the start of the defense program has been equipped with modern machinery and staffed with trained technicians.

DIED:

■ **Addis E. McKinstry,** 71, president, International Harvester Co., Chicago, from December, 1933, to April, 1935, at his home in Hinsdale, Ill., March 21. Since his resignation he had served as chairman of the executive committee and as a member of the board of directors. Mr. McKinstry was active many years in the Farm Equipment Institute, serving as president in 1929-1930.

♦

Cecil Swan, 60, vice president in charge of sales, Detroit Lubricator Co., Detroit, March 23, in that city.

♦

J. Adam Schweitzer, 55, president, Diamond Expansion Bolt Co. Inc., Garwood, N. J., March 11, in New York.

♦

Martin Pearlman, 62, president, Superior Zinc Corp., Bristol, Pa., and one of the leading eastern secondary zinc producers, March 11.

♦

Charles R. Putnam, 78, superintendent in various mills of American Steel & Wire Co., Cleveland, for 50 years until his retirement in 1932, March 14, in that city.

♦

James H. VanPelt, 58, founder and owner, Owosso Bronze Bearing Co., March 16. He was at one time superintendent of Buick No. 1 plant in Flint, Mich. He went to Owosso in 1918 and organized the bronze bearing company.

♦

William J. Fleming, 73, formerly sales manager for Bourne-Fuller Co., Cleveland, and more recently associated with the sales department of Republic Steel Corp., Cleveland, March 26. He was associated with Bourne-Fuller 38 years before it became part of Republic.

Purchasing Division Reorganized

To Expedite Defense Procurement

■ OFFICE of Production Management's purchasing division has been organized into six major branches to expedite defense procurement program.

Close co-operation between the purchasing division and the military services also was strengthened by appointment to the division of two high-ranking officers as liaison men.

These officers are Rear Admiral Charles Conard, former paymaster general and head of the Navy's bureau of supplies and accounts, and Brig. Gen. R. H. Jordan, former assistant quartermaster general of the Army.

Thoroughly familiar with the services' buying procedures and problems, these retired officers were recalled to active duty by Secretaries Knox and Stimson after Donald M. Nelson, director of purchases, had requested the assignment to his division of the most experienced service experts available.

Working with Mr. Nelson and the deputy director of the purchasing division, Douglas C. MacKeachie, as consultants, are A. D. Whiteside, president of Dun and Bradstreet, and Prof. Charles I. Gragg and Prof. Howard T. Lewis, both of Harvard University's School of Business Administration.

Executive officer of the division is A. C. C. Hill Jr., former deputy director of the division of priorities.

Six principal branches of the division, each staffed by a corps of experts, are as follows:

Coniract clearance. Here is centered the responsibility for clearing all major Army and Navy contracts before awards are made. Chief of this branch is Col. Hiram S. Brown, United States Army, retired.

Industrial and strategic materials. This branch assists in the procurement of strategic or essential items in which purchasing problems are involved, including, for example, fuel, and medical supplies. Chief of the branch is John Sanger, Chicago, on leave from the vice presidency of the United States Gypsum Co.

Subsistence. In this branch are grouped experts from all fields of the food trade, to help the Army quartermaster corps in the procurement of foodstuffs. Chief of the branch is Howard Cunningham, on leave from his position as director of purchases for the National Biscuit Co.

An important subsidiary section of the subsistence branch is the perishable foods section, headed by John A. Martin, who is bringing in experts to advise the Army on the procurement of fresh fruits, vegetables, poultry, eggs and the like.

Equipment and supplies. All problems relating to the procurement of such important items as lumber and building materials, electrical supplies, paints, laundry equipment and miscellaneous materials come to this branch. Chief of the branch is Donald G. Clark, who has taken leave from his post as director of purchases for the Gulf Oil Corp., Pittsburgh.

Clothing and equipage. This group works with the Army quartermaster corps on the procurement of shoes, uniforms, blankets, tents and items of personal equipment for the soldier. It is being headed by Walter P. Becker, on leave as buyer for the J. C. Penney Co.

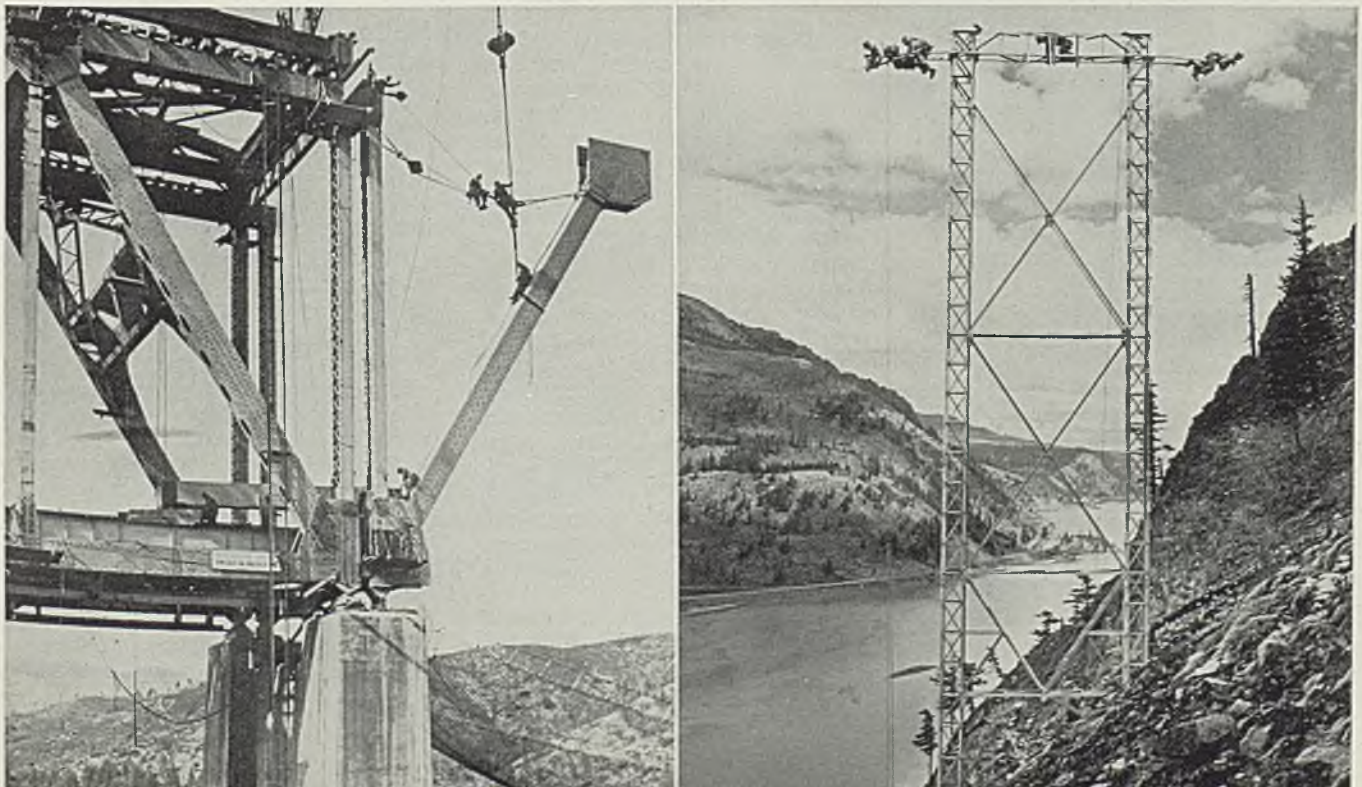
Planning and cost estimating. In this branch prices will be studied with especial reference to the cost of production of articles in demand under the defense program. Chief is Eric Camman, partner in the firm of Peat, Marwick, Mitchell & Co., accountants and auditors, New York.

Appointments to the division of purchases which have not previously been announced include the following:

In the subsistence branch: J. H. Hamilton, assistant sales manager, American Can Co., Chicago, special advisor on inspection problems; J. P. Johnston, president, Dairy Sealed Inc., New York, special advisor on fluid milk procurement; A. K. MacKey, secretary, Texas Sheep and Goat Raisers Association, special advisor on meats in the perishable

(*Please turn to Page* 107)

■ **Workmen perched precariously on the steel cables at left below indicate size of steel girder going into the double-deck Pit River bridge, upstream from Shasta dam, California. The Central valley project will require 17,110 tons of structurals. Lower right, steel towers such as this are being erected around Shell Rock mountain, hundreds of feet above the Columbia river, as part of the Bonneville power project. NEA and Department of Interior photos**



Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Tungsten placed under general priorities system giving domestic and British defense orders first rating . . . Preference ruling expands, strengthens control over magnesium consumption . . . New OPM unit established to direct conservation of strategic metals, seek substitutes . . . TNEC monograph on steel basing point system issued

WASHINGTON

■ PRODUCERS of ferrotungsten, tungsten metal powder and tungsten compounds last week were placed under a general priorities system similar to that previously imposed upon aluminum and magnesium.

E. R. Stettinius Jr., director of priorities, Office of Production Management, said the action was taken after submission of a finding by Ernest M. Hopkins, chairman of the minerals and metals group, stating a shortage of these types of tungsten exists.

In accordance with the order, producers of ferrotungsten, tungsten metal powder and tungsten compounds are required to give all defense orders, including British defense orders, a rating of A-10, unless superior ratings are specifically assigned. The A-10 rating places all defense requirements ahead of civilian needs, except as priorities division may provide.

Supplementary order which accompanies the general preference ruling sets forth a schedule of preference ratings. It stipulates that preference ratings from A-1 to A-10, inclusive, be given defense orders and any other orders for which class A ratings may be assigned by the director of priorities.

Preference rating of B-1 is assigned to "customers' orders whose products currently are used in connection with the manufacture of defense orders, directly or indirectly, in substantial quantity although not bearing a specific preference rating."

General preference order stipulates no deliveries be made by producers under any contracts or orders, other than defense orders, except by release in accordance with the assignment of preference ratings or by other specific order.

For the time being, however, producers are given permission to fill nondefense orders on a temporary basis after orders in the A and B-1 classes have been filled.

To conserve tungsten for defense and vital civilian purposes, producers are urged to encourage customers to use substitutes whenever possible.

Preference Order Expands Magnesium Priorities Control

Action designed to make 200 tons of American magnesium available at once to Great Britain was announced last week by E. R. Stettinius Jr., director of priorities, OPM. Mr. Stettinius said Dow Chemical Co. had been ordered to deliver that amount of magnesium to Great Britain during March.

Simultaneously, Mr. Stettinius declared a general preference order has been issued to expand and strengthen priority control imposed on magnesium March 3. It was stipulated defense orders for Great Britain are to receive the same priority treatment as United States' defense needs.

Order directing distribution of magnesium, and the supplementary order directing release of magnesium for Great Britain, followed a memorandum from Dr. E. M. Hopkins, chairman, minerals and metals group of the priorities division. Memorandum formally declared a shortage of magnesium now exists.

General preference order governing distribution of magnesium declares deliveries by producers shall be made only in accordance with preference ratings and specific directions.

All defense orders for magnesium will automatically receive a preference rating of A-10, but ratings higher than this may be assigned by the priorities division or the Army and Navy Munitions Board.

Primary effect of the automatic A-10 rating is to put all defense needs ahead of any civilian needs. However, the director of priorities may assign preference ratings to orders for magnesium for nondefense and civilian purposes, and these ratings may be either high or low, depending upon circumstances.

Preference order stipulates no deliveries be made under any contracts or orders other than defense orders, except by specific release in accordance with the assignment of prefence ratings or by some other specific order.

McConnell Heads OPM Unit for Strategic Metals Conservation

Unit of conservation in the materials branch of the production division, OPM, has been established to direct conservation, reclamation and substitution of strategic metals and materials essential for defense.

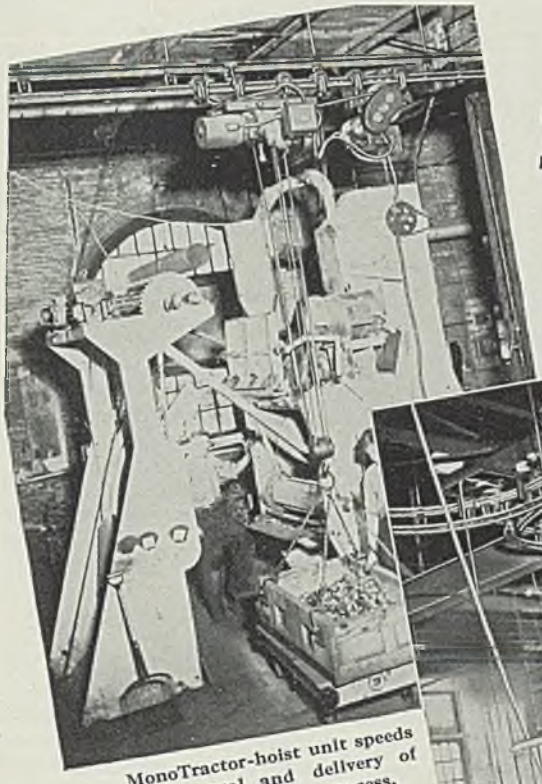
Robert E. McConnell, engineer of mines and former president and director of various research, investment and development companies, heads the new unit.

Mr. McConnell will encourage and direct private industry and others to carry on research in this field and to apply lessons already learned by England and various agencies of this government. Planning ahead for requirements of the defense program, he will study the effect suggested substitutes would have on the raw materials situation.

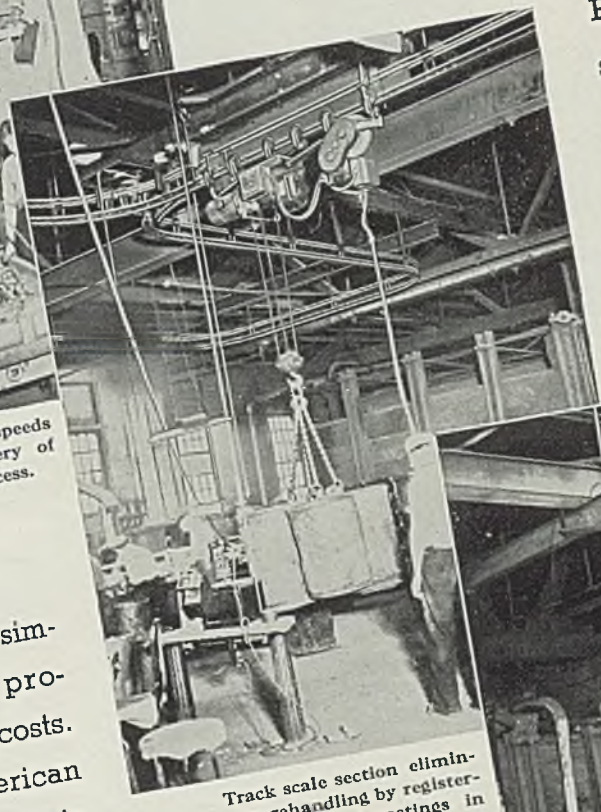
Problem of keeping reclaimed strategic metals flowing smoothly

MECHANIZE your simple jobs!

Power operation will speed up your production and cut down handling costs.



MonoTractor-hoist unit speeds up removal and delivery of castings to cleaning process.



Track scale section eliminates rehandling by registering weight of castings in transit.

Heavy loads are easily and quickly moved by power operated equipment.

It's the time-consuming, simple jobs that tie up production and pile up costs. Hence, when an American MonoTractor with electric hoist takes over the handling operations, bottlenecks disappear, materials move smoothly between process and costs inevitably fall.

With their specialized experience, American MonoRail engineers are often able to discover hidden possibilities for the application of simple handling systems that bring an immediate return from a small investment. This service is available from district offices located in every industrial center.

How Problems are Solved!

Write for copy of this "Blue Book" containing hundreds of illustrations showing solutions to a wide variety of handling problems.

THE AMERICAN MONORAIL CO.

13102 ATHENS AVENUE, CLEVELAND, OHIO

into consumption by defense industries will also be handled by Mr. McConnell.

Effort will be made to hold to a minimum economic dislocations which may result from adoption of substitutes.

Many private companies are making voluntary substitutions and savings of strategic materials. For instance, the telephone industry has developed means of conserving aluminum, nickel and zinc and, to some extent, magnesium. Steel instead of aluminum dial wheels are being used on new telephones, and phones equipped with less nickel and zinc are being tried.

Rubber and tin, vital defense materials, synthetic rubber and copper are being studied as substitutes for such uses as refrigerator ice trays.

Aircraft builders are making tests to see how and where plastic materials may be used in place of metals, such as aluminum, in cowl covers, engine baffles and flooring. Possibilities of plastics are also being explored by automobile manufacturers and by makers of refrigerators, washing machines, vacuum cleaners and other household equipment.

Defense Contract Service Names District Managers

Appointment of five additional district managers to supervise field offices of the Defense Contract Service at Atlanta, Ga., Philadelphia, Detroit, Dallas, Tex., and Kansas City, Mo., was announced last week by the OPM.

The five, each of whom will have headquarters at the Federal Reserve Bank or branch in the city indicated are:

W. C. Cram Jr., at Atlanta, Ga. For the last several years Mr. Cram has been a consulting engineer to manufacturers and construction companies.

Frederick W. Hankins at Philadelphia. Mr. Hankins is on leave from the Pennsylvania railroad, where he has been vice president in charge of motive power.

Warren H. Clarke at Detroit. Mr. Clarke formerly was engaged in management reorganization and surveys of manufacturing plants. He is both a mechanical and electrical engineer, and formerly was with the Hyatt Roller Bearing division, General Motors Corp.

A. J. Langford at Dallas, Tex. Mr. Langford was manager and district supervisor of the Ford Motor Co. for 21 years.

R. W. Webb at Kansas City, Mo. Mr. Webb formerly was with Montgomery, Ward & Co. and Sears Roebuck in managerial capacities. He also was formerly vice president, Witte Engine Works, Kansas City.

Additional district managers will be appointed soon to supervise field offices of the Defense Contract Service at other Federal Reserve Banks and branches. Appointment of Herman H. Lind as Cleveland district manager was announced several weeks ago (STEEL, March 17, p. 35).

District managers, under the direction of district co-ordinators at the main Federal Reserve Banks, are in charge of technical and other staff members at the regional offices.

Regional offices of the Defense Contract Service are located at each of the 12 Federal Reserve Banks and 24 branch banks. Although technical staffs have not yet been completed for all of these offices, Federal Reserve Bank officers are available at all of them to advise present and prospective defense contractors on contracting and financing problems.

Frank G. Steinebach

■ Frank G. Steinebach, editor, *The Foundry*, Cleveland, has been appointed chief of the foundry equipment and supplies unit of the Tools Section, Aircraft, Ordnance and Tools Branch, Products Division, Office of Production Management.

Boyer Named Chief of OPM Aircraft Manufacturing Unit

H. R. Boyer, president, Allen Corp., Detroit, last week was appointed chief of the manufacturing unit, aircraft section, OPM. He formerly was works manager, Pontiac division of General Motors and Fisher Body Corp. He replaces A. J. Brandt who has resigned to return to private industry.

Restrictions on Exports to Netherlands Indies Eased

State department has issued to the Netherlands Purchasing Commission unlimited licenses authorizing exportation to The Netherlands Indies of a wide range of iron and steel products, brass, bronze, nickel, and certain tools.

Upon application to the Netherlands Purchasing Commission, 10 Rockefeller Plaza, New York, approved exporters will be furnished number of the appropriate unlimited license. Approved applicants will receive a numbered certificate bearing all essential data concerning the particular shipment.

Applicants who do not wish to make use of the unlimited license may secure an individual license.

Present Demand for Nickel "Extraordinary," Will Subside

Present extraordinary demand for nickel is temporary and "insofar as it is due to inflation of inventories and building up of process inventories should within a few months subside." This conclusion was drawn by the advisory committee on metals and minerals of the National Academy of Sciences in a report to OPM.

Committee was doubtful that a few simple conservation formulas could be applied, because of the number of hands through which nickel passes from refinery to user.

United States and British defense requirements do not adequately account for current demand, which is almost triple that of 1937, largest year prior to 1939, the committee reported.

TNEC Issues Monograph on Steel Basing Point System

Monograph No. 42, dealing with the basing point problem, was issued last week by TNEC. It consists entirely of various documents which were submitted at the steel hearings in January, 1940, by the United States Steel Corp., and various exhibits and documents dealing with the basing point question filed with the committee by the Federal Trade Commission.

Accompanying it is a covering letter written by Willis J. Ballinger, director of TNEC committee studies for the Federal Trade Commission.

Lower Railroad Rates for Gulf Area Opposed by Examiner

Examiner Andrew C. Wilkins recommended the Interstate Commerce Commission deny an application of the railroads for relief from the long and short haul clause of the ICC act in connection with a proposal to establish reduced rates on iron and steel articles in carloads from points in official and southern territories and certain points in western territory to Gulf ports.

Application had as its primary purpose the establishment of reduced rates from the Birmingham district to New Orleans and Mobile to permit the railroads to share in iron and steel traffic now going by rail from producing points to Birmingport, Ala., and thence by water in privately owned barges.

Machinery Being Rapidly Installed At Chrysler's New Tank Arsenal

DETROIT

■ THE TERM "25-ton medium tank" has an innocuous sound and conveys an impression of perhaps a fair-size commercial truck. But a glimpse inside the new Chrysler tank arsenal where five of these vehicles will be lumbering from assembly lines daily early this fall, quickly erases any preconceived ideas of size and weight.

Manufacturing operations are housed in a brand new plant five city blocks long and two city blocks wide, encased almost entirely by glass—80,246 panes in walls and roof monitors.

Every piece of machinery in the plant will be new and over half of the 1000 machines required have been shipped and unloaded. Radial drills, batteries of milling machines, turret lathes, grinders, multiple drilling machines and other types of machine tools are rapidly being lined up in the proper production sequence and anchored to the concrete floor. As fast as the machines go in, operators are being trained to handle them.

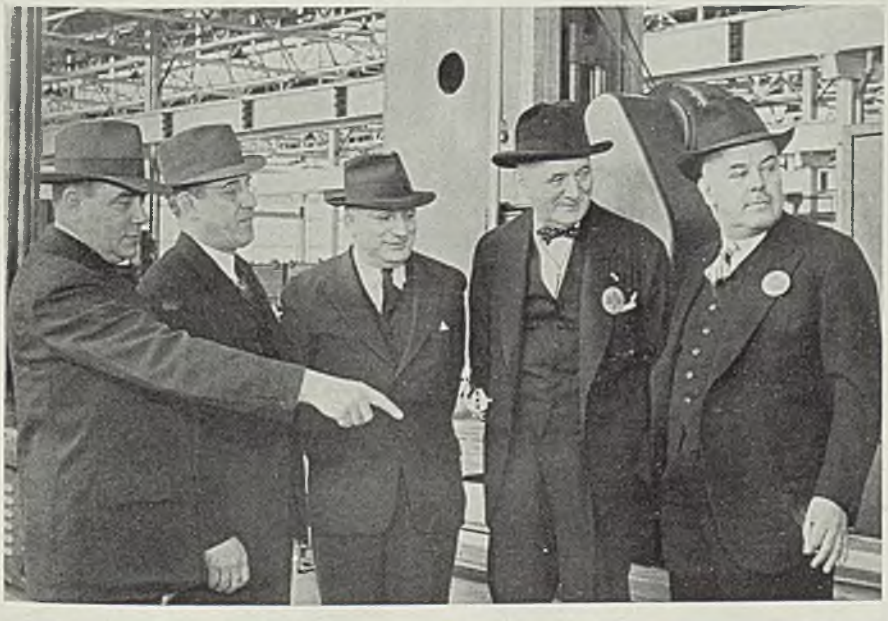
Meanwhile in a large canvas-sheathed center section of the arsenal nearly 50 engineers labor over 10-foot high routing boards on which every single piece going into the tank is listed, together with the machines, fixtures, gages and material required for its shaping into final form. There are thousands of these parts, steel stampings, steel castings, machined steel, rolled armor plate, cast armor plate, brass, bronze and all the other materials going into this formidable attack weapon.

The tank itself is essentially a riveted armor plate housing, mounting several cannon, machine guns, and a 75-millimeter gun, powered by a 400-horsepower radial motor positioned in the rear, driving two large sprockets on either side in front which in turn drive the rubber crawler tread. A maximum speed of 25 miles an hour is possible. Transmission is a massive, complicated affair, reportedly with five speeds forward and one in reverse. Braking is hydraulic through large brake drums.

Plant Quickly Equipped

The speed with which E. J. Hunt, plant manager and his staff have organized and integrated equipment and materials for the project is little short of amazing.

As a manufacturing plant, representing an investment of $20,000,000, the setup is excellent. Ample room for machine lines, wide aisles for movement of material, high bays, served by an assortment of cranes, an unbelievable amount of light pouring in through walls and monitors, the structure presents optimum working conditions. Eventually 5000 will be employed.



■ Recent visitor to the Chrysler tank arsenal in Detroit was W. S. Knudsen, OPM chief from Washington. Here, left to right, are E. J. Hunt, operating manager of the arsenal; H. L. Weckler, vice president and general manager of Chrysler; Lieut. Col. H. W. Rehm, commanding officer of the arsenal for the army; Mr. Knudsen, and B. E. Hutchinson, chairman of the finance committee of Chrysler. Arsenal building is about 85 per cent completed, two thirds of the main machining and assembly division already being heated.

Scrap Consumption Sets New Daily Average Record

■ Domestic consumption of iron and steel scrap in February, estimated at 4,172,000 gross tons by the Institute of Scrap Iron and Steel Inc., set a new all-time high record on a daily average basis.

Annual consumption on the January-February level, is now at the rate of 50,400,000 gross tons. The previous record year was 1940, when 41,687,000 tons was melted by steel mills and foundries.

Notwithstanding, prices remain comparatively low, the institute points out. The current price level of approximately $21, Pittsburgh, for No. 1 steel scrap compares with a World war fixed price of $30, with consumption now almost double the first World war level.

Exports dwindled to 43,667 gross tons in January, of which 38,976 tons went to the United Kingdom, and 2888 tons to Canada. A year ago exports were at the monthly rate of 185,000 tons.

February River Traffic Reduced at Pittsburgh

■ Unfavorable weather, including complete freeze-overs at some points, reduced the freight tonnage hauled on the three rivers at Pittsburgh during February. Total shipments on the Monongahela declined from 2,809,000 net tons in January to 2,532,000 tons in February. Steel shipments totaled 135,000 tons in February, compared with the record 160,000 tons in January.

Total shipments on the Allegheny dropped from 214,500 tons in January to 187,300 tons; steel shipments declined to 4900 from 9200. On the Ohio, total shipments fell from 1,581,300 to 1,424,100 tons; steel shipments were off from 227,000 to 193,500 tons.

Forecast 23.8% Gain in Great Lakes Carloadings

■ Second quarter carloadings in the Great Lakes area of 541,129 cars, a gain of 23.8 per cent from actual loadings in the second quarter of 1940, are forecast by the Great Lakes Advisory Board, Buffalo. Increases forecast for individual commodities are: Iron ore, 43 per cent; automobiles, trucks and parts 24.1 per cent; iron and steel, 32.8 per cent. In grain shipments, a decline of 10½ per cent is indicated.

Operating savings obtained from high steam temperatures and pressures would justify using expensive steels to avoid steam line trouble. Fortunately, an inexpensive Carbon-Molybdenum (0.50% Mo) steel does the job.

Its creep strength up to 1000° F, plus its easy weldability, make for light, leak-proof lines. The use of thinner sections sometimes reduces the already small cost differential over unalloyed steels.

Write for technical book, "Molybdenum in Steel".

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • CALCIUM MOLYBDATE

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MOLY

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Materials shortages likely to necessitate some curtailment of 1941 model production and considerable retrenching on 1942 cars. Car builders turn attention to finding substitutes for critical metals . . . "It's just a part of the job, an everyday problem that can be licked" . . . Automakers not greatly worried over labor shortage, except for technical and supervisory talent

DETROIT

■ FURTHER confirmation of the effects which materials shortages, present and prospective, are exerting on automobile production (STEEL, March 24, p. 21) was given last week in observations of a top-ranking executive of one of the leading motor companies. Some changes already have reached the production stage, more are being planned and a great many more are in prospect for 1942 models. It appears highly probable that shortages of essential materials will produce some curtailment of 1941 model production, and will necessitate appreciable retrenching in 1942 assemblies this summer.

Heading the list of critical materials and approximately in order as to the degree of "criticality" are aluminum, zinc, nickel, synthetic rubber and magnesium. The last two can be disregarded because increased production of synthetic rubber will take care of all needs by the end of the year, and relatively small amounts of the material are needed by the motor industry. Magnesium use in automobiles is virtually infinitesimal.

Aluminum appears the most critical item and, as pointed out in this department previously, steps are being taken to change aluminum pistons to cast iron as quickly as possible. It is the belief of automobile officials that there is an ample supply of aluminum in the country for piston needs, but no factual data are available as to where it is and how much is being stocked. Establishment of formal priorities and price ceilings on secondary aluminum by Washington last week, together with inventory surveys now in process, may throw some light on these questions, but in the meantime the motor companies can do nothing but prepare for a change to iron.

Use of zinc, principally in die castings, already has been trimmed. Some radiator grilles have been changed to stamped steel. Where possible, "metal savers" are being inserted in die casting dies for such parts as handles for the purpose of coring out hidden areas and thus saving metal. This practice permits an estimated saving of 10-15 per cent.

In new models, present plans call for a further sharp reduction in zinc. It is even being recommended that die cast carburetors be changed back to cast iron, in spite of the fact that machining problems are increased greatly. Die cast trim and ornaments probably will be stripped off altogether or replaced with steel stampings.

Nickel finds its chief outlets in nickel alloy steels and in plating. The former are replaceable to a certain extent by other alloy steels such as chrome-molybdenum or heat treated carbon steels. Chevrolet, for example, is planning to change from S.A.E. 3140 to 4140 for rear axle shafts. In plating, nickel is the intermediate material usually between copper and chromium. It can be reduced in thickness by increasing the layer of copper and buffing the copper; some platers claim that nickel can be dispensed with altogether by a high buff on the thick copper base plate and then increasing the thickness of chromium beyond the usual flash amount.

In addition to these five materials, motor people have drawn up lists of potentially critical materials and are giving all of them intense study. They include chromium, copper, high-silicon pig iron, foundry coke, small tools and, of course, steel. Despite the optimistic tone of the Gano Dunn report on steel capacity, automakers consider it entirely likely shortages may occur in steel, particularly the electric furnace varieties such as stainless, although there is even the possibility that difficulties may be encountered in obtaining carbon steels like sheet, strip and bars. Current floats of steel have been depleted severely and protracted deliveries on all grades of steel now are naturally not consoling to car builders.

Materials Shortages Could Have Been Alleviated by Studies

Apropos the matter of materials, Paul G. Hoffman, president of Studebaker Corp., South Bend, Ind., declares, "As long as we have steel, we'll have automobiles. Defense needs are going to make new demands, are going to make engineers work harder. We'll have to make changes in designs, production machinery and the cars themselves. These things will not be simple to accomplish, but they are not too difficult. Engineers have been faced with similar 'crises' for years; it's just a part of the job, an everyday problem that can be licked."

Studied opinion is that materials shortages might have been avoided or at least alleviated if there had been a more concerted effort toward studying actual needs for materials, as well as rates of usage and dates of usage. Consider, for example,

the incongruity of a new airplane plant in the middle west with structural steel for the building still stacked on the site awaiting erection, while deliveries of sheet aluminum already have started.

It is not too late for some work to be done along this line. Charts might be prepared showing the rate of need for defense use and the rate of need for nondefense use for a given material, plotting these figures for some distance into the future alongside total production. Then, assuming a system of uniform distribution could be developed, a material would not be in the critical class until the rates of use for both defense and nondefense needs crossed the total production line.

No such planning has been done up to now. Buyers of materials have plucked figures out of the air and given them as their immediate needs and orders have been entered accordingly, with the result that when such advance buying is piled on top of hoarding and speculative buying a material arrives in the critical class long before any such condition need have developed.

Carmakers Not Greatly Worried By Labor Scarcity Forecasts

On the subject of labor, the auto industry is not greatly worried over supplies of either skilled or nonskilled help, all other reports notwithstanding. It is expected that even before the demands of new defense plants become important, a considerable volume of automobile labor will have to be released because of materials shortages. A burdensome task is in prospect with regard to taking up and redistributing this slack which looks to be unavoidable now. It is true, of course, that training programs are being pushed vigorously throughout the industry, mainly for building up technical and supervisory forces in both motor and defense plants. A really serious problem exists in this field.

Seldom has the opportunity presented itself for young men with technical training and with qualities of leadership to advance so rapidly into important positions in the motor car industry.

Many Emergency-Enforced Changes Will Be Permanent

So, the vice presidents in charge of engineering have now come to be known as vice presidents in charge of substitutes, to borrow a phrase from L. C. Hill of the Murray Corp. of America, speaking here at the tool engineers' banquet last Monday. They realize that enforced changes in material may result in 1942 models which will suffer a little from the standpoint of durability when compared with their 1941 brethren; that new models likely will suffer to some extent in respect to appearance; that changes will not affect costs too greatly. Engineers in automobile plants still must be guided by the dollar sign, and any specification change must be tuned to getting equivalent value at equivalent cost or even lower cost.

In the changes now being engineered will be many which probably will prove to be permanent and which may even be productive of lower costs. Substitutes in general are not considered as stopgaps. Die castings might be an exception, in the opinion of some observers. As yet, nothing has appeared which can beat the zinc die casting when you lump together factors of appearance, ease of machining, utility and cost. And even though it may not be possible to use many die castings on 1942 models, their eventual readoption seems reasonably certain.

Principal drain on zinc seems to be the brass industry, now loaded with enormous orders for all types of brass. As yet, the demand for cartridge brass has not assumed war time proportions, but when and if the country "starts shooting" the demand certainly will soar, thus making the zinc situation still more critical. It is difficult to conceive how the brass producers can be loaded up much more. Already some are asking a 50 per cent cash payment to accompany advance orders, and are asking buyers for guarantees that 50 per cent of material purchased be returned in scrap form on screw machine work, and 20-30 per cent on forging work. Such scrap is bought in at a stated price, the arrangement being made to prevent hoarding and speculation.

Automobile Production

Passenger Cars and Trucks—United States and Canada
By Department of Commerce

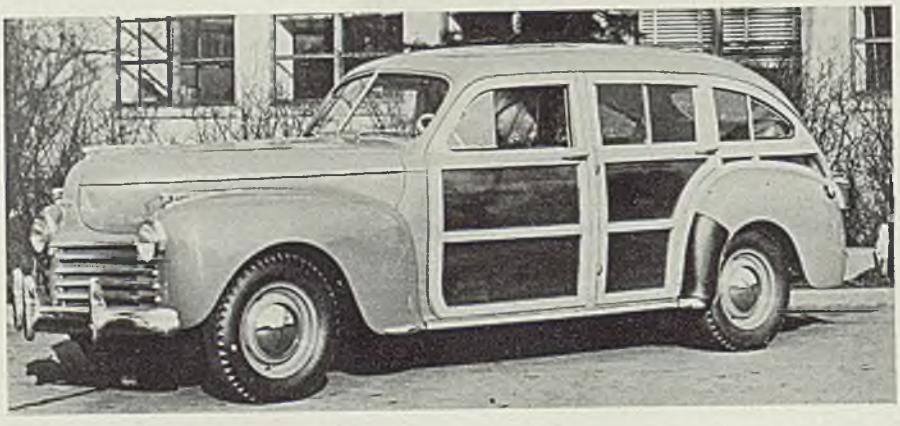
	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	509,233
2 mos.	674,482	871,717	1,033,359
March	389,499	440,232	.....
April	354,266	452,433	.....
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
March 1	126,550	100,855
March 8	125,915	103,560
March 15	131,620	105,720
March 22	124,805	103,395
March 29	124,405	103,370

†Comparable week.

Chrysler Introduces "Town and Country" Car



■ Something new in station wagons is this "town and country" car introduced by Chrysler featuring a solid steel top and streamlined body of white ash and Honduras mahogany

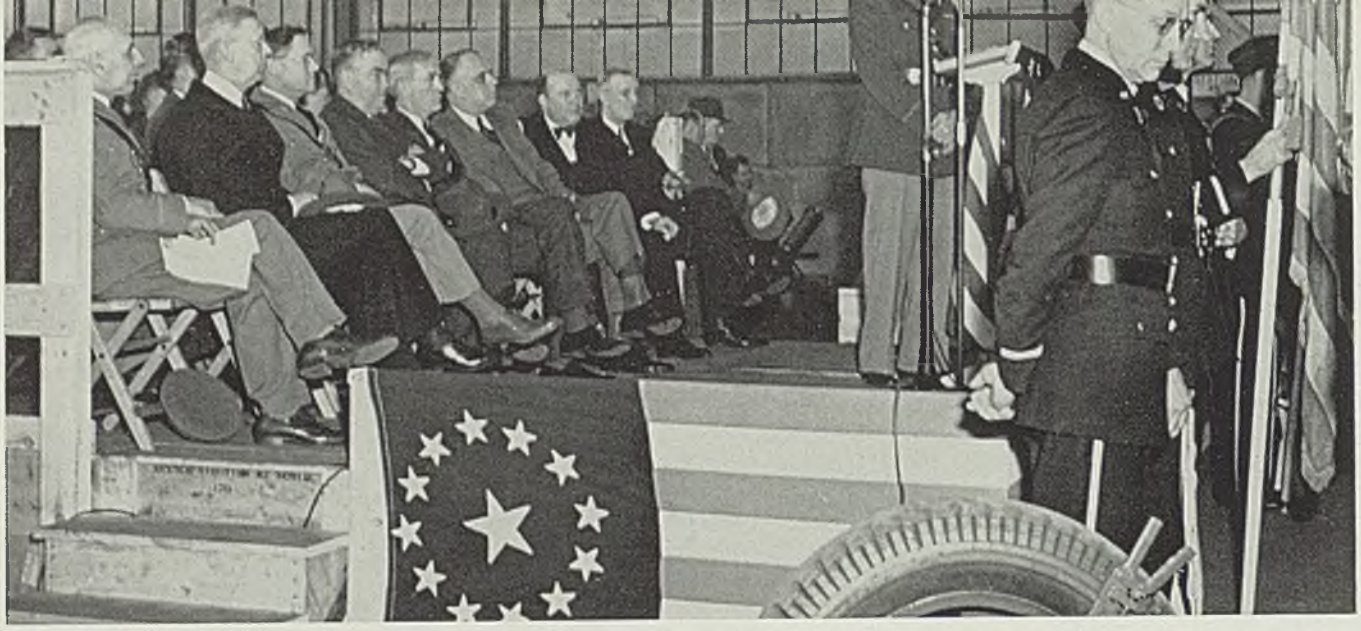
Ford-Trained Chinese Help Re-establish Homeland

A hundred young Chinese students who received technical training a few years ago in plants of the Ford Motor Co. today are using this training to help put China back on her industrial feet. The men now are first lieutenants to Rewi Alley, the New Zealander who started establishing "vest pocket" or "guerrilla" industries to revive the country, demoralized by military invasion. The Ford-trained men were here at intervals between 1922 and 1930 and number over 100. Within the past three years Alley and his men have organized 3000 small industrial units and have set a goal of 28,000, with potential capacity for a million jobs.

IN DEFENSE *of the* SPRING BOARD

Now that we're *all* in the swim and virtually up to ou necks in armament and affiliated production, technica detail continues to harass the industry . . . One of th smallest units to enter into defense construction is th spring mechanism of the more intricate pieces—an unquestionably, one of the first to default should specif cations be neglected . . . While we haven't heard of suc a thing, it might simplify matters to set up a *Sprin Board* along with the other *boards* that govern adheren and priorities—although here at LEE the Science Spring Design plus the Technique of Spring Buildin has been instituted since 1914, producing a product long-life and trouble-free performance known as th Lee Built "SCIENTECH" Spring.

LEE SPRING COMPANY, I
30 MAIN STREET BROOKLYN, N.

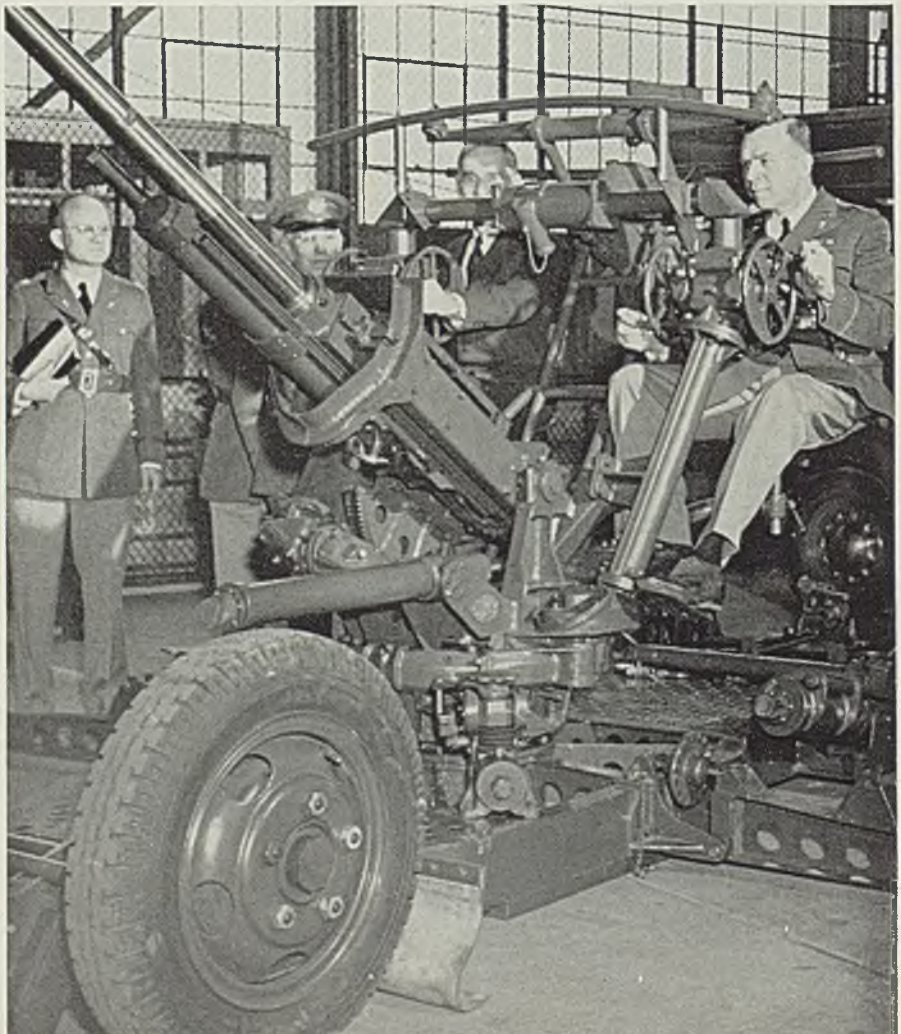


■ Lieut. Col. Hugh C. Minton, executive officer of ordnance department, United States Army, pleads for extension of subcontracting during ceremonies at which the army received the first antiaircraft gun carriage manufactured by Aetna-Standard Engineering Co. at Ellwood City, Pa. Seated on the platform, from left to right: Lieut. Col. W. W. Golden, manager of ordnance division, Aetna-Standard; C. G. Ohlson, vice president, Aetna-Standard; Lieut. Col. Guion, executive assistant, Pittsburgh ordnance district; George C. Brainard, president, General Fireproofing Co., Youngstown, O., and co-ordinator for the Office of Production Management for the fourth Federal Reserve district; Frank Bell, chief of Pittsburgh ordnance district; E. E. Swartswelter, president, Aetna-Standard; Judge C. F. Smith, director, Aetna-Standard; Robert Johnson, superintendent, Aetna-Standard's Ellwood City plant

Many Suppliers for Gun Carriage

ELLWOOD CITY, PA.

■ FIRST gun carriage to be made for the United States Army by a private contractor during the present emergency, a carriage for a 37-millimeter antiaircraft piece, was formally turned over to the ordnance department March 22 at the new assembly plant of Aetna-Standard Engineering Co. here. Two thousand persons, including high-ranking Army officers, industrialists, Aetna-Standard workmen and townspeople witnessed the ceremonies.

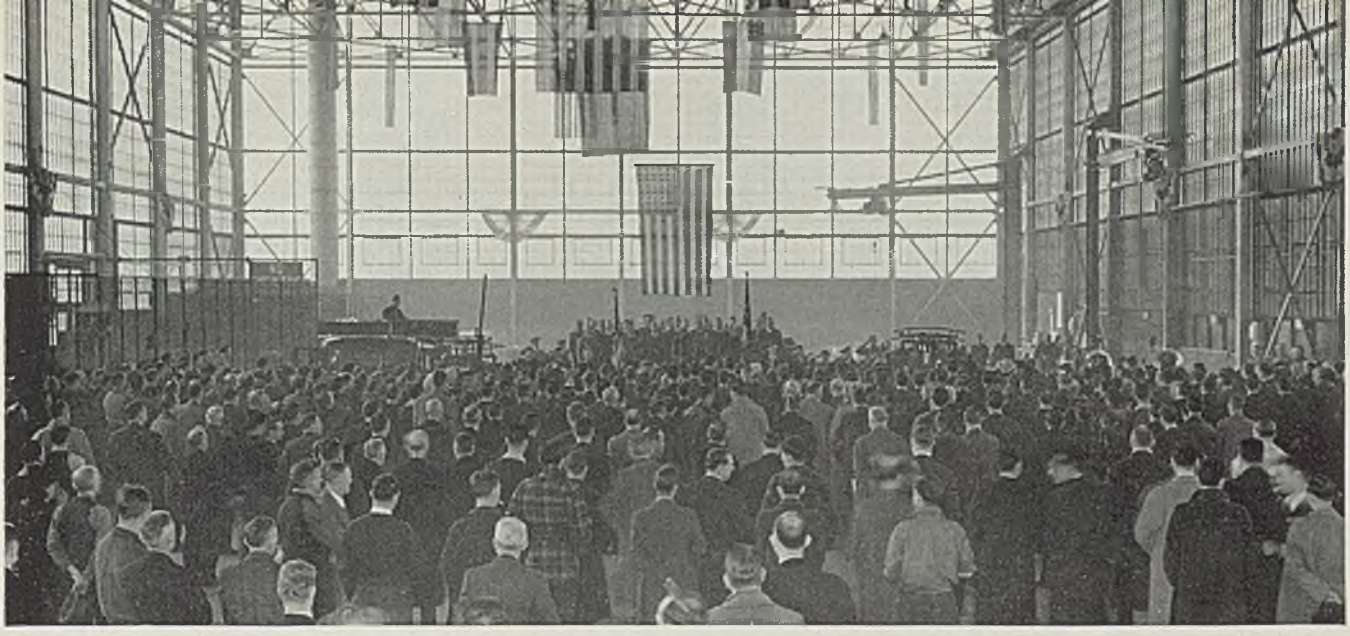


■ Pneumatic tires and sturdy construction permit this gun carriage to be towed over rough terrain at speeds up to 70 miles an hour

The affair was significant for several reasons. Deliveries on the carriages started more than a month ahead of schedule. It represented effective use of subcontracting in building defense materials, about 225 having contributed to the finished carriage. It signalized defense production is "beginning to roll."

Aetna-Standard received its first contracts last July, and soon afterward let contracts for a $500,000 addition. A new 100 x 400-foot assembly plant now is complete and equipped, employs 500 machinists, soon will be producing 20 gun carriages monthly. Eight thousand man-hours are required to produce each carriage. Between 600 and 700 have been ordered from the company, costing $5,000,000.

A striking feature of these antiaircraft pieces is their mobility. One



■ Group at ceremonies in Ellwood City, Pa., when Aetna-Standard Engineering Co. turned over the first 37-millimeter anti-aircraft gun carriage to the army, more than a month ahead of schedule

can leave Ellwood City in the morning and be ready for action on the Atlantic seaboard by evening. They are designed to be towed behind fast army trucks, up to speeds of 70 miles an hour.

Carriages are mounted on pneumatic tires. When firing, the wheels are raised, lowering the chassis to the ground for a solid foundation.

Construction is structural steel and plate, combined with steel forgings and castings, fabricated by welding.

Ernest E. Swartswelter, president, Aetna-Standard, formally turned the carriage over to Lieut. Col. Hugh C. Minton, executive officer of the ordnance department, who represented Maj. Gen. W. C. Wesson, chief of army ordnance. In accepting the carriage, Colonel Minton said: "At long last, industry, management, labor and the people as a whole are becoming cognizant of the tremendous implications of the armament program on which we have embarked."

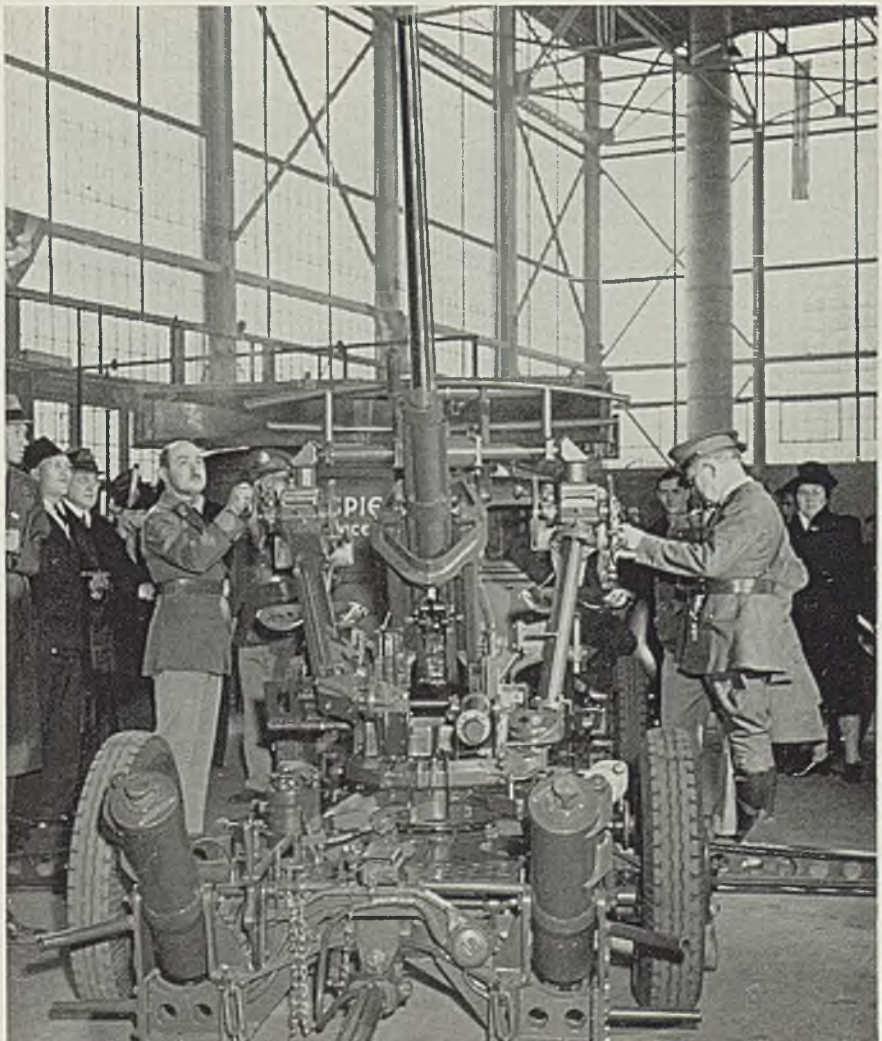
He referred to the defense program as "an all-American program, a border-to-border, coast-to-coast, ocean-to-ocean program . . . which calls for the ingenuity, the co-operation and understanding of every man, woman and child in the United States."

Colonel Minton emphasized the necessity of subcontracting. "We must get the work into the hands of small companies. We must take the work where the tools are. In other words, our prime contractors should subcontract whenever and wherever possible."

Frank B. Bell, chief of the Pittsburgh ordnance district, praised Aetna-Standard and said the fact 225 subcontractors participated in the job "ought to prove conclusively that people in the democratic nations, once aroused, can and will work together to battle their enemies."

He emphasized the gun carriages are only one of 36,000 items to be made for the defense program.

After the ceremonies, the carriage was towed through flag-decorated streets of Ellwood, and then taken to Pittsburgh for display. Later it was towed by army truck to Philadelphia and then to Aberdeen, Md., proving grounds for final tests.



■ Army officers give the new gun carriage a critical examination at Aetna-Standard Engineering Co.'s shop. This is the first gun carriage to be made by a private contractor during the present emergency

Price Ceilings, Priority Control Extended to Secondary Aluminum

■ PRICE ceilings for aluminum scrap and secondary aluminum, pegged to current prices for virgin aluminum, last week followed closely on the heels of an overall formula for the allocation of aluminum for both defense and nondefense purposes.

The price ceiling order, promulgated by Leon Henderson, director of the price stabilization division, National Defense Advisory Commission, sets forth maximum prices for scrap sold by the maker and sold by the dealer, and for secondary ingots. These prices are shown in the accompanying tables, appendix A and appendix B.

The allocation formula, issued by Priorities Director E. R. Stettinius Jr., Office of Production Management, strengthens the priority control imposed on aluminum Feb. 24, and expands it to include the secondary smelters as well as other producers and fabricators.

In establishing the price ceilings, Mr. Henderson said aluminum scrap and secondary aluminum recently have been subjected to serious inflationary pressures. This has been caused, he said, both by the failure of the sources of virgin aluminum to meet current demand—especially the demand for fabricators making items for civilian needs—and by the recent issuance of a priorities order restricting the use of virgin aluminum to defense purposes.

Under normal conditions, he continued, prices for secondary aluminum do not exceed prices for virgin aluminum. Recently, however, the price stabilization division has received reports of sales of aluminum scrap reaching prices as high as 32 cents a pound, almost double the price of the virgin metal.

Caused by Speculation

"Such prices are not required to draw out aluminum scrap," Mr. Henderson declared. "They are merely the results of a speculative demand which has built up inflationary prices. There are supplies of scrap, and these supplies will be tapped at reasonable prices, once it is understood the government will not tolerate prices above a fair maximum."

The price schedule will be fully enforced, he warned. "The powers of the government to place compulsory orders, to condemn or requisition properties, to issue priorities and to use other powers to carry out the defense program will be exerted to the utmost against any person whom we find to be disregarding these maximum prices."

The new price schedule establishes two ceiling prices for aluminum scrap. The lower ceiling applies to the first sale of aluminum scrap from the maker to any other person. The higher ceiling applies to any sale of aluminum scrap thereafter by any dealer or other person to any smelter, foundryman, fabricator, or other dealer. The two ceilings are fixed f.o.b., point of shipment, and will allow the dealer a margin of 1½ cents per pound on clippings, borings and turnings, and 1 cent per pound on other types of aluminum scrap.

Maximum prices for secondary aluminum ingot are applicable to any sale or purchase of secondary aluminum ingot by any person. Like the scrap schedules, these prices are made f.o.b., point of shipment. They leave a spread of 3 to 4 cents per pound for the processors' costs and profits.

"These ceiling prices," Mr. Henderson stated, "will give ample allowance for reasonable profit to both dealers and smelters. However, recent demand for secondary aluminum indicates that there may be some effort on the part of manufacturers and fabricators to purchase scrap direct from dealers, thus circumventing the smelter. To forestall this movement, the schedule requires dealers to report any sales which they make to any person other than a smelter."

The new schedule will become effective immediately in a market of already inflated prices. Consequently, a method is provided by which smelters and dealers who have acquired inventories at prices above the new maximum prices to meet previously arranged firm commitments for sales above ceiling prices may secure an exception from the price schedules in order to carry out these firm commitments on the original terms. However, it should be noted that this exception will not be permitted beyond the amount of inventories already acquired either by the smelter or his dealer to carry out the commitment. With this one exception, the maximum prices set forth in the new schedule become immediately and absolutely effective regardless of any pre-existing contracts.

This schedule is the second to be issued by the price stabilization division. The first schedule, issued Feb. 17, established ceiling prices for second-hand machine tools (Steel, Feb. 24, p. 32).

The priority order issued by Mr. Stettinius includes, in addition to the usual grades of aluminum, alloys of which aluminum constitutes the major part.

Subject to the assignment of superior ratings, all defense orders

Rubber Company Fabricates Light Metals for Aircraft

■ Goodyear Tire & Rubber Co. workers assemble control surfaces for military aircraft for which the Glenn L. Martin Co., Baltimore, is the prime contractor. Goodyear has several hundred workers experienced in the fabrication of light metals for aircraft and is one of the many subcontractors making special parts for fighting planes

for aluminum are assigned an automatic preference rating of A-10, in place of the A-2 rating assigned in the Feb. 24 instructions. Defense orders for Great Britain will receive the same preference rating accorded Army and Navy and other defense orders.

Producers, fabricators and secondary smelters of aluminum are to make deliveries until further notice according to a schedule established by the priorities division. The producers are required to fit their deliveries into this schedule and to make reports to the priorities division.

To cover the scrap field the order declares no producer shall enter into a contract for toll-rolling or other fabrication of aluminum scrap by toll agreement unless authorization first has been obtained from the priorities director.

Provides for Reserve Pool

Mr. Stettinius emphasized the division is considering the need for keeping workers employed as steadily as possible and will give special attention to any evidence of dislocation of labor.

Producers of aluminum (not including fabricators) are required to set up a reserve pool of the metal by setting aside 1 per cent of production each month. From this reserve the priorities division can make allocations to meet emergencies, and such orders will take a rating of B-1, thus being placed lower than any orders in class A.

Orders for repair or replacement parts for existing apparatus which is needed to preserve essential services and to maintain maximum production will take a rating of B-2.

A rating of B-3 will be applied to orders for products essential to the protection of public health and safety.

A rating of B-4 will apply to orders for standard apparatus which cannot be redesigned to use substitutes for aluminum without serious disruptions and for which there is substantial use in defense channels.

Consumers requiring less than a total of 1000 pounds of aluminum a month will temporarily receive a rating of B-5 on their orders.

Customers for aluminum who produce articles in which the metal does not exceed 2 pounds per $100 of final sales value of the article will get a B-6 rating. This rating is applied in an effort to keep a relatively large number of workers employed through the use of relatively little aluminum.

A rating of B-7 will apply to products in which no reasonably satisfactory substitute is available.

Lowest rating given, B-8, will apply to products in which a reasonably satisfactory substitute for aluminum is available, or can be made available.

Order provides users of aluminum with preference ratings from B-2 to B-8 inclusive shall, for the time being, receive no more than stipulated percentages of the average 1940 shipments which they obtained from the same producer for corresponding purposes. These range from 80 to 10 per cent.

Producers affected by the order will be required, as in the past, to submit their orders to the priorities division once each month. This requirement now extends to the secondary smelters.

APPENDIX A

Maximum Prices for Aluminum Scrap (f.o.b. point of shipment)

	Maximum Price (cents per pound) Column I Sale by Maker	Column II Sale by Dealer
Pure clips and cable	13.00	14.50
Segregated alloy sheet clips	12.00	13.50
Old sheet and utensils	12.00	13.50
Mixed sheet clips	11.00	12.50
Cast scrap and forged scrap, old and new	11.00	12.00
Borings and turnings, other than No. 12	10.00	11.50
No. 12 type borings and turnings	9.50	11.00
Pistons free of struts	11.50	12.50
Pistons with struts	9.50	10.50

APPENDIX B

Maximum Prices for Secondary Aluminum Ingot (f.o.b. point of shipment)

	Maximum Price (cents per pound)
98 per cent pure aluminum ingot	17.00
Silicon alloys	17.00
Deoxidizing aluminum:	
Notch bar, granulated ingot or shot (2.00c extra allowed for special shapes)	16.50
Piston alloys	16.50
No. 12 aluminum	16.00

Pamphlet Explains Steel Industry's Defense Role

■ *Answers to Questions About Steel in Defense,* a pamphlet published by the American Iron and Steel Institute, explains in layman's language the steel industry's part in the rearmament program, its capacity, expansion plans, peak consumption and other facts.

Containing 54 questions and answers, the pamphlet tells how chief executives of close to 30 steel companies are organizing themselves as an Iron and Steel Industry Defense Committee, at request of the Office of Production Management. Another committee of expert metallurgists is working with government agencies in preparing and revising specifications for steel products, and also advises with steel consumers on specification problems.

Army Experimenting with Mobile Steel Bridges

■ Portable, experimental steel girder bridges, often with five center and two end sections, for throwing over small rivers, are being constructed for the army engineers' corps, Ft. Belvoir, Va. The sections are equipped with wheels at ends for mobility. These bridges are more elaborate than one-piece ramps for spanning ditches. Photo, U. S. Army Signal Corps

Week's Defense Contracts $103,506,105; Largest Awards for Plant Expansions

■ DEFENSE awards last week reported by the War and Navy departments totaled $103,506,105, higher than aggregate in recent weeks. Most contracts reported were small, with the army's ordnance department purchases numerically heavy. Largest contracts were for defense plant facilities' construction and expansion.

War department reported award of a $7,255,000 contract to the Munitions Mfg. Corp., Poughkeepsie, N. Y., a subsidiary of International Business Machines Corp., for aircraft cannon. Of the total, $4,000,000 is for purchase, in government's name, of machinery and equipment required. Equipment will be available to Munitions Mfg. Corp. on a rental basis.

Chase Brass & Copper Co. Inc., Waterbury, Conn., received from the War department a $16,000,000 award for expansion of ammunition brass and cartridge case manufacturing facilities at Cleveland.

Letters of intent, the War department reports, have been accepted by Fisher Body division of General Motors Corp., Detroit, and Ford Motor Co., Detroit. Former, accepting letter of intent totaling $6,875,000, will expand its Memphis, Tenn., plant for manufacture of bombing plane parts for the government airplane plant at Kansas City. Ford Motor Co.'s letter of intent, for $10,988,692, provides for an emergency facilities type plant at the airplane parts plant, Ypsilanti, Mich. Parts for the Consolidated B-240 heavy bomber will be fabricated, to be assembled at Consolidated's Ft. Worth, Tex., plant.

Vultee Receives Aircraft Award

Vultee Aircraft Inc., Nashville, Tenn., received from the War department a $3,735,890 award for airplanes, to be powered with Lycoming engines.

J. A. Jones Construction Co., Charlotte, N. C., contracted to construct a 1000-man reception center and additional housing and hospital facilities for the army at Camp Shelby, Mississippi. Estimated cost, $1,431,853.

Perilliat-Rickey Construction Co. Inc., New Orleans; Barber Bros. Contracting Co. Inc., and Barber Bros. Co., both of Baton Rouge, La., received a $1,441,340 contract from the War department for construction of a temporary air corps cantonment at East Baton Rouge parish airport, Louisiana.

Navy department entered into contracts for plant expansion with the following: Hudson Motor Car Co., Detroit, construction, equipment and organization for operation of a plant for manufacture of ordnance equipment at estimated cost not to exceed $20,000,000;

Leland-Gifford Co., Worcester, Mass., acquisition, construction and installation of additional plant facilities and equipment at the company's plant at Worcester at estimated cost of $1,362,618;

Willys-Overland Motors Inc., Toledo, O., acquisition and installation of special additional equipment and facilities for production of ordnance equipment at estimated cost not to exceed $427,900.

Fairbanks, Morse & Co., Chicago, was awarded a $4,565,000 contract by the Navy department for propelling machinery for 11 submarine chasers. Unit price was set at $415,000.

War department last week reported the following:

Corps of Engineers Awards

Albert & Davidson Pipe Corp., Brooklyn, N. Y., drive pipes, $7719.75.

Albina Engine & Machine Works Inc., Portland, Oreg., repairing U. S. dredge PACIFIC, $10,337.

Allmetals Welding & Mfg. Co., Baltimore, metal stools, $1213.12.

American Chain & Cable Co. Inc., York, Pa., washers, $553.

Barrett-Cravens Co., Chicago, electric elevator, $1189.75.

Bianchi, Carlo, & Co. Inc., Framingham, Mass., water supply and sewerage systems for air corps cantonment, Bangor airport, Maine, $199,643.

Black & Decker Mfg. Co., Towson, Md., tools, $846.30.

Blackhawk Mfg. Co., Milwaukee, hydraulic ram, $656.70.

Blakeslee, G. S., & Co., Chicago, dishwashing machines, $7360.45.

Bonnie Forge & Tool Works, Allentown, Pa., tool sets, $897.50.

Bruning, Charles, Co. Inc., New York, drafting supplies, $1828.60.

Buda Co., Harvey, Ill., earth augers, $89,896.80.

Buesching Bros. Construction Co., Ft. Wayne, Ind., sewage treatment plant, Scott field, Illinois, $141,795.

Caterpillar Tractor Co., Peoria, Ill., generating sets, $5835.40.

Central Construction Co., Lawrence, Mass., water supply and sewerage systems, air corps cantonment, Manchester airport, Manchester, N. H., $135,351.50.

Cleveland Drill Co., Cleveland, drills, $542.64

Cleveland Trencher Co., Cleveland, trench diggers, $5475.

Climax Engineering Co., Chicago, furnishing gasoline-electric standby unit, Youghiogheny dam, Confluence, Pa., $4147.

Coffing Hoist Co., Danville, Ill., chain hoist, $1625.40.

Consolidated Steel Warehouse Co., Philadelphia, steel, $4119.35.

Coupe, A. L., Construction Co., Louisville, Ky., air corps hangar and boiler house, Bowman field, Kentucky, $88,250.

Danes-Dancker Lane Inc., New York, office chairs and desks, $11,787.

Dickie Construction Co., St. Louis, temporary housing and other buildings, Scott field, Belleville, Ill., $117,181.

Dorfman, Charles J., Los Angeles, liquefied petroleum gas plant and appurtenant facilities, Muroc Lake, California, $7089; construction of sewer, water and gas systems and appurtenant facilities, Tucson airport, Tucson, Ariz., $178,034.30.

Eisenberg, Harry, Inc., Collingswood, N. J., airport, Dover, Del., $174,879.15.

Ellicott Machine Corp., Baltimore, furnishing dredge pumps and templates and repairing patterns for the U. S. dredge CHINOOK, $24,020.

Foote Co. Inc., Nunda, N. Y., paver, Elmendorf field, Anchorage, Alaska, $9480.

General Electric Co., Schenectady, N. Y., set power plant equipment, transformers, electrical equipment, $35,203.85.

General Electric Supply Corp., Washington, cables and lamps, electric hot plates, $8089.60.

General Motors Sales Corp., Delco Appliance division, New York, delco conditionair units, $9864.

Gulf Coast Well & Pump Co., Mobile, Ala., deep-well pump, Brookley field, Mobile, Ala., $1050.

Hardman, Dwight H., Alton, Kans., construction of air navigation facilities, La Junta airport, La Junta, Col., $58,919.

Harris Seybold Potter Co., Cleveland, lithographic presses, $80,600.

Heafey-Moore Co. and Fredrickson & Watson Construction Co., Oakland, Calif., removal of existing Ft. Scott torpedo wharf and boathouse and construction of reinforced concrete abutment and wharf, Ft. Scott, California, $107,685.40.

Homelite Corp., Port Chester, N. Y., portable generators, $1944.

Hussman-Ligonier Co., St. Louis, refrigerators, $6949.

Ingersoll-Rand Co., Painted Post, N. Y., air compressor spare parts, $1460.

Johnson Motors, Waukegan, Ill., outboard motors and spare parts, $52,656.33.

Klaine, F. A., Co., Cincinnati, ranges, $2846.72.

Labs, Bart, Belleville, N. J., mirror molds, $26,400.

Lake Union Dry Dock & Machine Works, Seattle, repairing U. S. survey ship J. B. CAVANAUGH, $8618.50.

Lanston Monotype Machine Co., Philadelphia, machine, $1405.

Leeds & Northrup Co., Philadelphia, automatic frequency and load control equipment for Bonneville powerhouse, Bonneville dam, Oregon,, $10,625.

Lighting Fixture & Electric Supply Co. Inc., New Orleans, electric cable for Brookley field, Mobile, Ala., $6105.13.

Link Belt Co., Philadelphia, biofiltration plant and equipment for sewage disposal plant, Drew field, Tampa, Fla., $12,810.

Marra & Son Construction Co., Bryan, O., water mains, U. S. Army air corps cantonment, Ft. Wayne airport, Ft. Wayne, Ind., $21,110.

Meli-Blumberg Corp., New Holstein, Wis., trailers, $27,920.

Moeschl-Edwards Corrugating Co., Covington, Ky., steel door and bronze grille, $603.

Paving Supply & Equipment Co., Washington, rail driving machines, $8977.

Robbins & Myers Inc., Springfield, O., propeller fans, $1020.

Rogers Bros. Corp., Albion, Pa., trailers, $5525.

Standard Pressed Steel Co., Jenkintown, Pa., benches, $720.20.

Utah Construction Co., Ogden, Utah, and Morrison-Knudsen Co. Inc., Boise, Idaho, Norfork dam, North Fork river, near Norfork, Ark., $10,778,726.

Vallas, Lionel, Chicago, metal doors, $3893.07.

Wallace & Tiernan Co. Inc., Newark, N. J., chlorinator for sewage disposal plant, Drew field, Tampa, Fla., $2160.

Wattson, R. A., Co., Los Angeles, elec-

trical distribution system and appurtenant facilities, Muroc bombing range, Muroc Lake, California, $23,188.56.
Westinghouse Electric & Mfg. Co., Portland, Oreg., lightning arrestors, Bonneville powerhouse, Bonneville, Oreg., $7245.
White, David, Co. Inc., Milwaukee, furnishing transits, $2310.
Williams, J. H., & Co., New York, clamps, $688.32.
Worthington Pump & Machinery Corp., Holyoke, Mass., air compressor, $2029.
Yeomans Bros. Co., Chicago, pumping units, etc., for sewage treatment plant, MacDill field, Tampa, Fla., $4982.
Zara Contracting Co. Inc., Hewlett, L. I., N. Y., construction of airport extension, Tri-Cities airport, Endicott, N. Y., $81,650.

Medical Corps Awards

Aluminum Co. of America, Pittsburgh, aluminum sheets, $5480.20.
Cahn, A. L., & Sons Inc., New York, tray service trucks, $5775.
Doehler Metal Furniture Co. Inc., New York, steel dressers, tables and chairs, $52,690.
Lansing Co. of Delaware, New York, trailers, $22,970.
Parkell Engineering Co., New York, motor generator sets, $11,361.50
Service Caster & Truck Co., Albion, Mich., trailer trucks, $16,701.
Southern Equipment Co., St. Louis, tray service trucks, $48,235.
Superior Sleeprite Corp., Chicago, hospital beds, $79,918.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., electric refrigerators, X-ray equipment, $119,748.26.
X-Ray Mfg. Corp. of America, New York, dental X-ray machines, $35,100.
Yale & Towne Mfg. Co., Philadelphia, tractors and platform trucks, $21,-262.99.

Air Corps Awards

Aluminum Co., of America, Pittsburgh, aluminum, $283,970.81.
Chicago Pneumatic Tool Co., Detroit, riveters, $107,220.
Crouse-Hinds Co., Syracuse, N. Y., lamp assemblies, $37,186.80.
Curtiss-Wright Corp., Curtiss Aeroplane division, Buffalo, airplane maintenance parts, $462,382.45.
Dietzgen, Eugene, Co., Chicago, compasses, $105,125.
Keuffel & Esser Co., Hoboken, N. J., computer assemblies, $64,206.
Kidde, Walter, & Co. Inc., New York, fire extinguishers, $35,921.34.
King-Seeley Corp., Ann Arbor, Mich., air vapor eliminators and valves, $101,660.
Longines Wittnauer Watch Co. Inc., New York, clock assemblies, $44,994.95.
Machinery & Specialties Inc., Dayton, O., power hack saws, $24,140.
North American Aviation Inc., Inglewood, Calif., maintenance parts for airplanes, $152,615.
Racine Tool & Machine Co., Racine, Wis., power hack saws, $28,842.
Republic Aviation Corp., Farmingdale, L. I., N. Y., maintenance parts for airplanes, $625,288.50.
Universal Building Products Corp., Dallas, Tex., field maintenance shelters, $727,650.
Wright Aeronautical Corp., Paterson, N. J., maintenance parts for engines, $402.125.80.

Signal Corps Awards

American Automatic Electric Sales Co., Chicago, equipment $1336.70.
Boehme, H. O., Inc., New York, miscellaneous equipment, $777.56.
Cardwell, Allen D., Mfg. Corp., Brooklyn, N. Y., antenna, $725.
Cornelius, H. M., Co., New York, pipe strap, bridle rings, etc., $1610.50.
Federal Stamping & Engineering Corp., Brooklyn, N. Y., plugs, $2750.
Graybar Electric Co., Chicago, wire, $1357.25.
Joslyn Co., New York, augers, rings, $5807.50.
Neale Mfg. Co., Topeka, Kans., cable lashing machines and wire lashing coils, $1042.50.
Radio Recepter Co. Inc., New York, thermostats, $4930.20.
R.C.A. Mfg. Co. Inc., Camden, N. J., rheostats, $875.
Rolins Co., New York, bars, $1338.40.
United Transformer Corp., New York, coils, $17,000.
Weller, Edward W., New York, pipe bend, $3248.
Weinstein, S., Supply Co., New York, wrenches, $886.29.

Quartermaster Corps Awards

Anderson & Rowe, San Francisco, construction of two concrete storage reservoirs and water distribution system, Fts. Baker, Barry, and Cronkhite, California, $90,742.
Ann Arbor Construction Co., Ann Arbor, Mich., at Ft. Custer, Michigan, construction of a theatre and the alteration of a theatre, $59,900.
Equitable Equipment Co. Inc., New Orleans, all welded steel tug, $296,000.
Excelsior Hardware Co., Stamford, Conn., repair parts for trunk lockers, $7500.
Fargo Motor Co., Detroit, chassis, $710.81.
Griswold Mfg. Co., Erie, Pa., meat and food choppers, $560.
Haines & Haines, Dowagiac, Mich., at Ft. Custer, Michigan, (Kellogg airport) construction and completion of sewage pumping stations, force mains and gravity lines, $11,290.
Indian Motorcycle Co., Springfield, Mass., solo motorcycles, $86,422.38.
Manning Maxwell & Moore Inc., Jersey City, N. J., component parts for manufacture of trunk lockers, $1130.07.
Marsh, James P., Corp., Chicago, gages, $2740.
Presto Gas Mfg. Co., Chicago, component parts, equipment, accessories and utensils for ranges, $38,020.20.
Shepard Niles Crane & Hoist Corp., Philadelphia, jib cranes, $107,492.
Watson Automotive Co., Washington, semi-trailers, $216,133.68.

Ordnance Department Awards

Abel, Robert, Inc. Boston, cranes, hoists, $12,977.
Advance Pressure Castings Inc., Brooklyn, N. Y., artillery ammunition, $8880.
Aerial Machine & Tool Corp., New York, seamless steel tubing, trigger motor units, $32,066.
Allegheny-Ludlum Steel Corp., Watervliet, N. Y., steel rods, $225,595.08.
Alton Iron Works Inc., Pittsburgh, steel, $1526.72.
Aluminum Co. of America, Pittsburgh, aluminum alloy ingots and rods, aluminum and strip, $107,197.24.
American Air Filter Co. Inc., Louisville, Ky., dynamic precipitator, $1058.
American Brass Co., Kenosha, Wis., brass rod, $3842.
American Emery Wheel Works, Providence, R. I., wheels, $1166.77.
American Locomotive Co., Schenectady, N. Y., steel forgings, $1394.
American Machine & Metals Inc., Richl division, East Moline, Ill., stress-strain recorder, $1496.
American Monorail Co., Philadelphia, tractors, $1980.
American Steel & Wire Co. of N. J., Boston, steel, $34,675.26.
Ampco Twist Drill Co., Jackson, Mich., drills, $1016.82.
Apex Tool & Cutter Co. Inc., Shelton, Conn., face milling cutter arbors, cutters, steel bits and blades, $10,690.
Arrow Tool & Reamer Co., Detroit, steel, $1787.50.
Atlas-Ansonia Co., New Haven, Conn., metal parts for fuses, $59,400.
Automatic Die & Products Co., Cleveland, fixtures, $3287.
B. G. Corp., New York, spark plugs, $17,227.
Baird Machine Co., Stratford, Conn., tumblers and equipment, $3381.
Baldwin Locomotive Works, Baldwin-Southwark division, Philadelphia, pumps, $1065.
Barber-Colman Co., Machine & Small Tool division, Rockford, Ill., hobs, form cutters, reamers, $5331.56.
Barbour Stockwell Co., Cambridge, Mass., tachometers, automotive equipment, $4581.54.
Barker Tool, Die & Gauge Co., Detroit, gages, $1120.
Barwood & Co., Philadelphia, gages, $1470.
Bausch & Lomb Optical Co., Rochester, N. Y., fire control equipment, $11,147.50.
Bendix Aviation Corp., Scintilla Magneto division, Sidney, N. Y., parts for light tanks, $3635.33.
Bendix Westinghouse Automotive Air Brake Co., Pittsburgh, valves, $42,-355.50.
Bethlehem Steel Co., Bethlehem, Pa., rails and splice bars for railroad tracks, steel, artillery materiel, carbon steel, $43,417.48.
Bishop, J., & Co., Malvern, Pa., steel tubing, $1794.58.
Blakeslee, G. S., & Co., Cicero, Ill., washing machines, $15,825.
Bliss & Laughlin Inc., Harvey, Ill., manganese steel, $6522.10.
Braeburn Alloy Steel Corp., Braeburn, Pa., steel, $1272.34.
Bridgeport Brass Co., Bridgeport, Conn., artillery ammunition and materiel, $53,812.50
Brown & Sharpe Mfg. Co., Providence, R. I., mills, grinders, pumps, milling machine, $15,898.
Budd Wheel Co., Detroit, brake drums and assemblies, $3212.80.
Bullard Co. Inc., Bridgeport, Conn., parts for machine, $1980.
Bunting Brass & Bronze Co., Toledo, O., bushings, $1531.20.
Cape Ann Tool Co., Pigeon Cove, Mass., steel drop forgings, $1260.
Carnegie-Illinois Steel Corp., Chicago, steel bars, chrome steel, $12,738.13.
Carpenter Steel Co., Reading, Pa., steel rods, $60,110.94.
Chase Brass & Copper Co. Inc., Waterbury, Conn., artillery materiel, brass rod, retainers, $90,929.32.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y., portable hoists, $1212.37.
Cleveland Automatic Machine Co., Cleveland, tools, $1016.
Cleveland Container Co., Philadelphia, artillery ammunition, $80,118.38.
Cleveland Twist Drill Co., Cleveland, drills, tools, $7376.20.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., artillery materiel, $2,734,-998.46.
Concrete Steel Co., New York, small arms materiel, $6759.37.
Continental Machines Inc., Minneapolis, machines, $1350.
Continental Motors Corp., Muskegon, Mich., automotive parts, $46,592.78.
County Supply Co., Plainfield, N. J., hardware, $8197.09.
Crafts, Arthur A., Co. Inc., Boston, gages, $1250.
Crucible Steel Co. of America, New York, alloy steel tube forgings, steel, $15,-693.13.
Culbert Pipe & Fittings Co., Reading, Pa., gate valves, $2104.12.
Cummings Machine Works, Boston, fixtures, $35,700.
Dana Tool-D Nast Machine Co., Philadelphia, reamers, $1090.32.
Denman & Davis, North Bergen, N. J., steel bars, $1272.28.
Detroit Broach Co. Inc., Detroit, broaches, $3268.50.
Deveau, C. O., Machine Tool Co., Charlestown, Mass., gages, $3034.
Doehler Die Casting Co., Pottstown, Pa., artillery ammunition, $7189.60.
Du Mont, Allen B., Laboratories Inc., Passaic, N. J., timers, $2800.
Duro Metal Product Co., Chicago, hardware-extensions, $8560.11.
Eastern Tool & Mfg. Co., Bloomfield, N. J., wires, $1909.05.
Electric Products Co., Cleveland, battery

charger, $1456.50.
Elliott-Lewis Electrical Co. Inc., Philadelphia, lighting fixtures, $756.08.
Elwell, H. E., Iron Works, Springfield, Mass., structural steel, $9407.
Emeis Electrical Service, Davenport, Iowa, shafts, gears, $1621.80.
Englewood Plumbing Supply Co. Inc., Chicago, ells, tees, $4100.
Ex-Cell-O Corp., Detroit, tools, $11,423.75.
Federal Products Corp., Providence, R. I., gages, $1090.
Federal Tool Corp., Chicago, gages, $2413.
Fischer, Charles, Spring Co., Brooklyn, N. Y., tachometer parts, $1092.75.
Fox Munitions Corp., Philadelphia, gages, $25,494.90.
Froehlich, S., Co. Inc., New York, fire control equipment, $2656.76.
G. M. Mfg. Co., New York, thermometers, $1460.
Gale, B. R., Co., Boston, exhaust system, $2760.
General Electric Co., Schenectady, N. Y., equipment for motor feeders, voltmeters, $8941.
Gilbert & Barker Mfg. Co., Springfield, Mass., small arms materiel, $96,271.04.
Goepfert & Buck, New York, hardware, $1717.47.
Gould-Mersereau Co. Inc., New York, brass bolts, $10,600.
Grainger-Rush Co., Boston, cable, $1751.52.
Graton & Knight Co., Worcester, Mass., fire control equipment, $1872.
Graybar Electric Co., New York, ammeters, conduit, $5119.48.
Greene-Wolf Co. Inc., Chester, Pa., steel welding pipe, $13,282.11.
Haarmann Steel Co., Holyoke, Mass., structural steel, $17,995.
Hadley Special Tool Co. Inc., Boston, shaving tools, $8945.53.
Hanson-Whitney Machine Co., Hartford, Conn., cutters, $1211.
Hanssen's, Louis, Sons, Davenport, Iowa, hardware, $30,499.40.
Heppenstall Co., Bridgeport, Conn., steel, $2112.
Herbach & Rademan Inc., Philadelphia, fire control equipment, $9305.71.
Hill Acme Co., Acme Machinery division, Cleveland, tools, $2340.
Hole Engineering Service, Detroit, drilling machines, reaming machines, $8814.
Hunter Pressed Steel Co., Lansdale, Pa., springs, $1318.68.
Illinois Gage Co., Chicago, gages, $1425.
Industrial Engineering Equipment Co., Davenport, Iowa, equipment, $1725.
Ingersoll Milling Machine Co., Rockford, Ill., cutters, $1848.
Interior Steel Equipment Co., Washington, steel lockers, $1788.
International Engineering Works Inc., Framingham, Mass., artillery materiel, $9750.
International Harvester Co. Inc., Davenport, Iowa, spare parts for tractors, $15,869.90.
Interstate Mechanical Laboratories, New York, dies, $8640.
Johnson, Claffin Corp., Marlboro, Mass., gages, $1045.45.
Jones & Lamson Machine Co., Springfield, Vt., parts for lathes, tools, $2237.20.
Jones & Laughlin Steel Corp., Pittsburgh, steel, $4318.15.
Judd, H. L., Co., New York, brass thumb nuts, $19,500.
Kent Machine Co., Grand Rapids, Mich., extracting machines, $68,614.45.
Knesby, Alfred S., Agent, Upper Darby, Pa., machines, $4000.
Krueger, H. R., & Co., Detroit, broaching and drilling machines, $21,767.
Lapham-Hickey Co., Chicago, carbon steel, $2125.10.
Latrobe Electric Steel Co., New York, tool steel, $1064.80.
Laurence, Foster H., Springfield, Mass., steel windows, $1128.
LeBlond, R. K., Machine Tool Co., Cincinnati, lathes, $1254.
Lee, K. O., & Son Co., Aberdeen, S. D., grinders, $2289.
Lewis-Shepard Sales Corp., Watertown,

(*Please turn to Page* 45)

PURCHASES UNDER

(Week Ended March 15)

Commodity	Amount
Iron and Steel Products	
Air Associates Inc., Bendix, N. J.	
American Chain & Cable Co. Inc., York, Pa.	
American Steel & Wire Co., Cleveland	
Babcock & Wilcox Co., San Francisco	
Baldt Anchor Chain & Forge Corp., Chester, Pa.	
Bethlehem Steel Co., Bethlehem, Pa.	
Blickman, S., Inc., Weehawken, N. J.	
Brown, Emil, & Co., Los Angeles	
Carnegie-Illinois Steel Corp., Pittsburgh	
Consolidated Supply Co., Portland, Oreg.	
Continental Can Co. Inc., New York	
Crane Co., Chicago	
Crucible Steel Co. of America, New York	
Dana Tool D Nast Machinery Co., Philadelphia	
Duplex Mfg. Corp., Sherman, N. Y.	
Edwards Mfg. Co., Cincinnati	
Fairmount Tool & Forging Co., Cleveland	
Federal Screw Works, Detroit	
Flagg, Stanley G., & Co. Inc., Philadelphia	
Graybar Electric Co., Knoxville, Tenn.	
Hamilton Metal Products Co., Hamilton, O.	
Hanssen's, Louis, Sons, Davenport, Iowa	
Kilgore Mfg. Co., Westerville, O.	
Kuljian, H. A., & Co., Philadelphia	
McKay Co., Pittsburgh	
Marshall-Newell Supply Co., San Francisco	
Merrell, O. W., Supply Co., Columbus, O.	
Midvale Co., Philadelphia	
Noland Co. Inc., Washington	
Norwalk Lock Co., South Norwalk, Conn.	
Oliver Iron & Steel Corp., Philadelphia	
Parker Appliance Co., Cleveland	
Patent Scaffolding Co. Inc., Philadelphia	
Patterson Tool & Supply Co., Dayton, O.	
Pittsburgh Screw & Bolt Corp., Pittsburgh	
Poole & McGonigle, Portland, Oreg.	
Reeves Steel & Mfg. Co., Dover, O.	
Republic Steel Corp., Cleveland	
Roebling's, John A., Sons Co., Trenton, N. J.	
Rustless Iron & Steel Corp., Baltimore	
Seattle Hardware Co., Seattle	
Sunray Stove Co., Delaware, O.	
Superior Metal Products Co., St. Paul	
Thermador Electric Mfg. Co., Los Angeles	
Timken Roller Bearing Co., Canton, O.	
Union Metal Mfg. Co., Canton, O.	
Union Steel Chest Corp., Le Roy, N. Y.	
United Iron & Bronze Works Inc., Brooklyn, N. Y.	
Wall, P., Mfg. Supply Co., Pittsburgh	
Wheeling Corrugating Co., Wheeling, W. Va.	
Youngstown Sheet & Tube Co., Youngstown, O.	
Nuts	$18,638.97
Shackles	49,840.60
Ropes, jackstays, pendants	238,300.98
Parts for boilers	103,573.48
Chains, fittings	71,740.00
Structural steel, steel	33,840.44
Straddle stands	35,800.00
Steam tables, cabinets	17,803.50
Steel	35,689.89
Steel sleeves	12,015.00
Canister parts	47,260.00
Valves	111,989.90
Steel	35,748.72
Vises	19,650.00
Steel chests	54,821.25
Practice bombs	12,300.00
Motor maintenance equipment	23,956.00
Plate screws, pins	10,717.68
Crosses, elbows, tube fittings	109,438.41
Steel conduit	11,994.30
Tool kits	28,750.00
Hardware	28,746.50
Hand grenade fuses	267,376.20
Boiler, accessories	162,901.00
Chains, fittings	279,859.30
Nails	14,282.25
Fabricated steel	11,344.45
Forgings	22,456.07
Iron pipe fittings	51,967.00
Fuse bodies, plungers	30,454.50
Nuts	32,956.00
Aircraft fittings	10,299.55
Portable steel bents	17,909.17
Screw drivers	11,370.00
Anchor bolts	126,295.50
Structural steel	17,250.00
Buckets, cans	12,616.00
Nuts, pipe	147,409.96
Wire rope	17,050.30
Steel bars	10,144.89
Chain hoists	40,499.17
Gas ranges	231,000.00
Practice bombs	54,360.00
Practice bombs	119,700.00
Steel, steel tubing	25,110.75
Practice bombs	57,350.00
Steel chests	76,367.16
Iron picket fence	21,657.50
Practice bombs	286,960.00
Corrugated cans	44,855.00
Sheet steel	17,309.44
Nonferrous Metals and Alloys	
Aluminum Co. of America, Pittsburgh	
American Brass Co., Waterbury, Conn.	
Chase Brass & Copper Co. Inc., New York	
Elgin National Watch Co., Elgin, Ill.	
Fyr-Fyter Co., Dayton, O.	
International Nickel Co. Inc., New York	
Jelliff, C. O., Mfg. Corp., Southport, Conn.	
Magna Mfg. Co. Inc., New York	
Niagara Searchlight Co., Niagara Falls, N. Y.	
Titeflex Metal Hose Co., Newark, N. J.	
Rivets, ingot aluminum alloy	$170,997.81
Copper alloy sheets	25,542.65
Brass tubing	*26,048.90
Watches	148,149.54
Fire extinguishers	12,492.00
Nickel-copper alloy, sheets	*1,537,297.81
Copper wire cloth	21,070.50
Magnesium	224,623.50
Flashlights	39,014.98
Flexible tubing	10,263.66
Machinery and Other Equipment	
Advance Pressure Castings Inc., Brooklyn, N. Y.	
Air Associates Inc., Bendix, N. J.	
Aircraft Accessories Corp., Siebenthaler division, Kansas City, Mo.	
Anchor Post Fence Co., Baltimore	
AutoCar Co., Ardmore, Pa.	
Axelson Mfg. Co., Los Angeles	
Baldwin Locomotive Works, Standard Steel Works division, Philadelphia	
Bay City Shovels Inc., Bay City, Mich.	
Bendix Aviation Corp., Eclipse Machinery division, Elmira, N. Y.	
Bendix Westinghouse Automotive Air Brake Co., Pittsburgh	
Booster cups	$10,925.00
Testing equipment	22,050.00
Test equipment	117,845.00
Furnaces	13,990.60
Tractor-trucks	1,256,340.16
Lathes	10,692.16
Propeller shafts	59,594.90
Crane, power shovels	27,342.86
Shot, starters	132,240.00
Emergency relay valves	43,355.50

WALSH-HEALEY ACT

Machinery and Other Equipment	Commodity	Amount
Berkley Machine Works & Foundry Co. Inc., Norfolk, Va.	Tubes	$57,752.50
Bishop, G. H., Co., Chicago	Laundry equipment	16,332.05
Blakeslee, G. S., & Co., Cicero, Ill.	Machines for cleaning threads	16,560.00
Buda Co., Harvey, Ill.	Earth augers, parts for diesel engines	111,463.80
Bullard Co., Bridgeport, Conn.	Turret lathes	39,498.45
Canister Co., Phillipsburg, N. J.	Loading machines	34,000.00
Chandler-Evans Corp., South Meriden, Conn.	Fuel pumps	36,030.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	62,015.40
Clark Equipment Co., Clark Tructractor division, Jersey City, N. J.	Tructractors	16,160.62
Cleveland Twist Drill Co., Cleveland	Drills	11,302.80
Colton, Arthur, Co., Detroit	Tablet machines	120,617.00
Consolidated Machine Tool Co., Rochester, N. Y.	Planers	113,685.00
Continental Motors Corp., Muskegon, Mich.	Parts for tanks	46,592.68
County Supply Co., Plainfield, N. J.	Drills	14,512.25
Cummings Machine Works, Boston	Leveling fixtures	17,893.35
Cummins Engine Co., Columbus, Ind.	Diesel generator	14,074.00
Cuno Engineering Corp., New York	Diesel engine parts	13,440.00
Dayton Type Inc., Dayton, O.	Drilling machines	10,550.00
Dodge Mfg. Corp., Mishawaka, Ind.	Dolly assemblies	53,154.92
Dravo Corp., Neville Island branch, Pittsburgh	Gantry cranes	232,000.00
Duro Co., Dayton, O.	Mount assemblies	48,725.00
Ellicott Machine Corp., Baltimore	Dredge pumps	24,020.00
Federal Electric Co., Chicago	Gas alarms, electric horns	105,147.69
Gisholt Machine Co., Madison, Wis.	Turret lathes	62,055.00
Good Roads Machinery Corp., Kennett Square, Pa.	Rock crushers	26,532.00
Graybar Electric Co. Inc., Norfolk, Va.	Ventilating sets	16,997.40
Henrici Laundry Machinery Co., Boston	Washing machines	12,880.00
High Pressure Pump Corp., Wilkes-Barre, Pa.	Power equipment	59,895.00
Hussmann-Ligonier Co., St. Louis	Refrigerators	11,659.00
Hydraulic Press Mfg. Co., Mt. Gilead, O.	Molding presses	24,070.00
Industrial Brownhoist Corp., Bay City, Mich.	Locomotive cranes	120,095.00
Ingersoll-Rand Co., New York	Centrifugal boiler pumps	10,855.00
Jacobson & Co. Inc., New York	Stands	16,952.00
Jones & Lamson Machine Co., Springfield, Vt.	Lathes	148,677.25
Kaltenbach, R. W., Corp., Bedford, O.	Gantry cranes	236,500.00
King-Seeley Corp., Ann Arbor, Mich.	Air vapor eliminators	101,660.00
Landley Co. Inc., New York	Davits	20,768.00
Le Roi Co., Milwaukee	Parts for air compressors	51,367.28
McDonald Machinery Co., St. Louis	Power presses	11,140.00
McKiernan-Terry Corp., Dover, N. J.	Staking machines	139,706.00
Martin Machinery Corp., New York	Gathering machines	21,500.00
Meyerstein, Anthony M., Inc., Brooklyn, N. Y.	Cranes	319,280.00
Montgomery Elevator Co., Moline, Ill.	Freight elevators	17,082.00
Morse Diving Equipment Co. Inc., Boston	Pumps, diving apparatus	17,657.40
Nash-Kelvinator Corp., Detroit	Refrigerators	1,311,250.00
National Cash Register Co., Dayton, O.	Practice shells	32,051.05
New England Auto Products Corp., Pottstown, Pa.	Universal joints	38,210.91
Northern Pump Co., Minneapolis	Pumps	39,884.00
Olympic Foundry Co., Seattle	Welding slabs	33,900.00
Orton Crane & Shovel Co., Chicago	Hammerhead cranes	238,824.00
Parker Appliance Co., Cleveland	Tube benders	31,590.00
Pittsburgh Steel Foundry Corp., Glassport, Pa.	Rack castings	67,500.00
Prosperity Co. Inc., Syracuse, N. Y.	Laundry equipment	369,676.45
Read Machinery Co Inc., York, Pa.	Preheaters	74,227.20
Rheem Mfg. Co., Los Angeles	Furnaces	140,062.50
Round Oak Co., Dowagiac, Mich.	Furnaces	13,295.16
St. Joe Machines Inc., St. Joseph, Mich.	Washers, presses	91,597.00
Sipp Eastwood Corp., Paterson, N. J.	Drilling machines	24,375.00
Star Iron & Steel Co., Tacoma, Wash.	Cranes	238,500.00
Stokes, F. J., Machine Co., Philadelphia	Pelleting presses	196,950.00
Swenson Evaporator Co., Harvey, Ill.	Evaporators	15,500.00
Timken-Detroit Axle Co., Detroit	Axle and hub assemblies, parts for tanks	111,791.44
Trent, Harold E., Co., Philadelphia	Reducing kettles	17,815.00
Tungsten Electric Corp., Union City, N. J.	Carbide blanks	38,250.00
U. S. Hoffman Machinery Corp., New York	Laundry equipment	576,821.00
Victor Equipment Co., San Francisco	Portable welding kits	12,225.00
Vinco Corp., Detroit	Gages	11,748.95
Western Gear Works, Seattle	Winches	44,460.00
Wheeler, C. H., Mfg. Co., Philadelphia	Condenser, auxiliaries	23,750.00
Wiedemann Machine Co., Philadelphia	Gages	12,783.00
Willis, E. J., Co., New York	Bilge pumps	24,500.00
Wolf Co., Chambersburg, Pa.	Cartridge assemblies	272,779.60
Young, H. G. W., Co., Boston	Slicing machines	34,758.75

*Estimated.

Defense Awards

(*Concluded from Page* 44)

Mass., lift trucks, trucks, steel boxes, $4522.50.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $4764.40.
Lindberg Engineering Co., Chicago, annealing furnaces, $3561.
Lombard & Co. Inc., Somerville, Mass., grinding wheels, $2520.
Lovejoy Tool Co. Inc., Springfield, Vt., right and left hand inserts, $2332.40.
Lyon Metal Products Inc., Davenport, Iowa, shelving parts, $1409.
MacDermid Inc., Waterbury, Conn., "parkerizing" equipment, $2942.
McKenna Metals Co., Latrobe, Pa., tools, $1240.
Machinery Builders Inc., Long Island City, N. Y., machines, $3124.47.
Magnaflux Corp., Chicago, inspection machines, $2507.75.
Marshall & Huschart Machinery Co., Chicago, presses, $14,505.
Mattatuck Mfg. Co., Waterbury, Conn., artillery ammunition, $5250.
Micromatic Hone Corp., Detroit, honing heads, $2403.
Midvale Co., Philadelphia, forgings, $22,456.07.
Milwaukee Saddlery Co., Milwaukee, fire control equipment, $11,034.
Morse Twist Drill & Machine Co., New Bedford, Mass., steel, $1620.
Morton Mfg. Co., Chicago, ammunition chests, $260,025.35.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., drill assemblies, taps, lathes, cutting tools, $10,624.08.
Noble & Westbrook Mfg. Co., East Hartford, Conn., marking machines, $13,260.50.
Norton Co., Worcester, Mass., grinding wheels, $1266.
Ohio Seamless Tube Co., Shelby, O., seamless steel, $3720.15.
Otis Elevator Co., Buffalo, artillery materiel, $47,296.54.
Overhead Door Co. Inc., Hillside, N. J., metal doors, $3870.
Parent Metal Products Inc., Philadelphia, wire and steel, $2051.80.
Pipe Machinery Co., Cleveland, gages, $1855.70.
Porter, H. K., Inc. Pittsburgh, machines, $1100.
Powers, E. C., Sons, Philadelphia, exhaust system, $4600.
Pratt & Whitney Co., Hartford, Conn., gages, $3760.
Precision Mfg. Co., Philadelphia, gages, $5771.
Prentiss, Henry, & Co. Inc., New York, punch press, $1613.
Proctor & Schwartz Inc., Philadelphia, drying machines, $3945.
Producto Machine Co., Bridgeport, Conn., tools, $11,332.80.
Putnam Tool Co., Detroit, cutting tools, $11,753.44.
R. & M. Mfg. Co., Royal Oak, Mich., gages, $1083.60.
Reliable Tool Co., Irvington, N. J., fixtures, $4372.
Remington Rand Inc., Boston, swivel chairs, $2231.87.
Republic Steel Corp., Cleveland, steel bars, corrosion-resisting steel, steel, $68,351.14.
Revere Copper & Brass Inc., Baltimore, brass, $21,692.
Riverside Metal Co., Riverside, N. J., nickel silver strip, $3892.95.
Robinson Mfg. Co., Muncy, Pa., screening machines, $17,745.
Rustless Iron & Steel Corp., Baltimore, steel, $1836.41.
Scovill Mfg. Co., A. Schrader's Son division, Brooklyn, N. Y. tire gages, $2593.75.
Seeley Tube & Box Co., Newark, N. J., artillery ammunition, $84,410.
Sellers, William, & Co. Inc., Philadelphia, grinders, $1792.
Sheffield Gage Corp., Dayton, O., gages, $5973.08.
Sherman Engineering Co., Philadelphia,

vacuum pump units, $6600.
Shipley, W. E., Machinery Co., Philadelphia, turning machines, oil extractors, $13,354.
Snap-On Tools Corp., Kenosha, Wis., wrenches and handles, compressor wrenches, spark plug sockets, $8662.62.
Somerville, Thomas, Co., Washington, washfountains, $1155.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., fire control equipment, $1250.
Springfield Gas Light Co., Springfield, Mass., installation of gas pipe, $1250.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $1176.
Standard Pressed Steel Co., Jenkintown, Pa., tables, $4432.
Stedfast & Roulston Inc., Boston, automatic machines, $11,170.
Stokes, F. J., Machine Co., Philadelphia, rotary presses, $3650.
Sturtevant, B. F., Co., Camden, N. J., ventilating system, $8400.
Swind Machinery Co., Philadelphia, hack saws, $1148.50.
Taft Peirce Mfg. Co., Woonsocket, R. I., gages, $3240.17.
Talon Inc., Meadville, Pa., gages, $5802.
Thurston Mfg. Co., Providence, R. I., cutting tools, $3642.20.
Timken Detroit Axle Co., Detroit, shield plates, tank parts, $53,372.46.
Timken Roller Bearing Co., Steel & Tube division, Canton, O., steel, $12,390.11.
Tinius Olsen Testing Machine Co., Philadelphia, machines, $1000.
Titeflex Metal Hose Co., Newark, N. J., tubing, $10,263.66.
Toledo Scale Co., Philadelphia, gages, $1595.
Tools & Gages Inc., Cleveland, gages, $2920.
True Alloys Inc., Detroit, hoist castings, $1008.
Union Twist Drill Co., Athol, Mass., high speed steel cutters, tools, reamers, drills, $16,202.10.
United Shoe Machinery Corp., Beverly, Mass., gears, $2203.24.
Universal-Cyclops Steel Corp., Bridgeville, Pa., steel rods, $226,143.41.
Veit & Young, Philadelphia, tools, $45,988.50.
Vinco Corp., Detroit, gages, $6414.70.
Vulcan Mold & Iron Co., Latrobe, Pa., cast iron chill molds, $2127.10.
Waterbury Button Co., Waterbury, Conn., artillery ammunition, $9018.49.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., hoppers, presses, $14,150.
Weaver Mfg. Co., Springfield, Ill., artillery materiel, $4200.
Weber Machine Corp., Rochester, N. Y., gages, $2232.
Weil, J. H., & Co., Philadelphia, tools, $1531.42.
Weinstein, S., Supply Co., New York, hardware, $3964.06.
Welden Tool Co., Cleveland, tools, $1095.36.
Western Cartridge Co., East Alton, Ill., small arms ammunition and materiel, $3,773,851.05.
White, Howard L., Brooklyn, N. Y., tools, $3200.
White Motor Co., Cleveland, automotive equipment, $3629.81.
Whitehead & Kales Co., River Rouge, Mich., trailers, $2220.
Yale & Towne Mfg. Co., Philadelphia, steel trolleys, $1299.43.

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Navy department reported the following:

Bureau of Supplies and Accounts Awards

American Brass Co., Waterbury, Conn., copper-nickel-alloy tubing, $35,396.35.
American-LaFrance-Foamite Corp., Elmira, N. Y., oxygen cylinders, $157,730.76.
Bendix Aviation Corp., Julien P. Friez & Sons division, Baltimore, thermometers, indicators, and temperature elements, $7060.
Carroll Chain Co., Columbus, O., chains and fittings, $40,690.60.
Chicago Metal Hose Corp., Maywood, Ill., steel hose, $5020.08.
Crucible Steel Co. of America, New York, round bar steel, $26,312.
Euclid Crane & Hoist Co., Euclid, O., electric hoists, $178,795.
Foster Wheeler Corp., New York, distilling units and spare parts, $355,510.80.
Gardner-Denver Co., Quincy, Ill., air compressor, $13,832.
General Motors Corp., Cleveland Diesel Engine division, Cleveland, engines, $27,290.11.
Jenkins Bros., Bridgeport, Conn., flooding angle valves, $212,180.60.
Kidde, Walter, & Co. Inc., New York, oxygen cylinders, $424,653.78.
Mosler Safe Co., Hamilton, O., burglar-resisting safes, $41,980.
Motley, James M., & Co. Inc., New York, bolt heading and forging machines, threading machines, $18,724.
Norris Stamping & Mfg. Co., Los Angeles, aluminum cartridge containers, $1,336,580.
Pollak Mfg. Co., Arlington, N. J., aluminum cartridge containers, $210,140.
R.C.A. Mfg. Co. Inc., Camden, N. J., distribution system, radio broadcast receiving antenna, motion picture equipment, $34,263.36.
Reynolds Metals Co., Louisville, Ky., aluminum alloy pipe, $6613.12.
Sandy Hill Iron & Brass Works, New York, winches, $390,510.
Simmons Machine Tool Corp., Albany, N. Y., overhauling and new equipment for Bridgeford lathe, $23,113.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y. gyro compass equipment, $76,686.
Square D Co., Kollsman Instrument division, Elmhurst, N. Y., indicators and transmitters, $149,715.00.
Standard Pressed Steel Co., Jenkintown, Pa., conveyors, engine parts, $12,523.60.
Steuart Motor Co., Washington, motor trucks, $8272.20.
Taylor, S. G., Chain Co., Hammond, Ind., chains and fittings, $11,733.15.
United Aircraft Corp., Hamilton Standard Propellers division, East Hartford, Conn., propeller blade assemblies, $23,268.
Wallace Supplies Mfg. Co., Chicago, pipe bending machine, $5270.
Yale & Towne Mfg. Co., Philadelphia, electric trucks, $78,204.

Bureau of Yards and Docks Awards

Barney, W. J., Corp., New York, extension to medical supply storehouse and garage at naval medical supply depot, Brooklyn, N. Y., on a cost plus fixed fee basis, $290,000.
Cahill Bros. and Ben C. Gerwick Inc., San Francisco, mine-handling and waterfront facilities at naval ammunition depot, Mare Island, California, $1,250,000 on a cost plus fixed fee basis.
Elevator Engineering Co., Baltimore, elevator at Norfolk Navy yard, Portsmouth, Va., $3635.
Hershson, Harry, Co. Inc., New York, radio towers at naval air station, Lakehurst, N. J., $22,250.
Kelly, J. J., Co., Philadelphia, projectile loading plant at naval ammunition depot, Ft. Mifflin, Pennsylvania, $65,285.
Otis Elevator Co., New York, elevators and dumbwaiters at naval medical center, Washington, $194,444.
Robertson, H. H., Co., Pittsburgh, cellular steel floors for administration building at navy yard, Mare Island, California, $28,654.
Winn Senter Construction Co., Kansas City, Mo., garage building and services at naval reserve aviation base, Kansas City, Kans., $18,350.

Structural Steel Use Restricted in Canada

TORONTO, ONT.

■ Restrictions confining use of structural steel to government war projects and industrial plants engaged in war work were enacted last week by H. D. Scully, Canadian steel controller. Spokesmen claim this new policy will make more steel available for war needs and will result in post-war construction on a far greater scale than might otherwise be the case. Thus demand for steel will be present after war needs have been exhausted.

Steel Co. of Canada Ltd., Hamilton, Ont., has completed and put into operation its 110-inch plate mill, installed at cost of $4,700,000. New mill will roll plate to 100 inches wide by 6 inches thick. Rated capacity is 180,000 tons per year. Output in early months of operation is expected to be at about one-third rated capacity, partly due to restricted steel supply. Increase in rate, it is reported, will occur after mid-year, when the new blast furnace comes into production.

New heat-treating unit being installed will enable Steel Co. of Canada to roll plate, including armor, for shipbuilding and tank manufacture in the near future.

Contracts aggregating $11,343,398 were reported by the department of munitions and supply for the week ended March 12. Orders valued at $467,462 were placed with United States companies. The awards:

Munitions: Department of Transport, Ottawa, Ont., $125,280; War Office, England, $25,454.

Ordnance: Messrs. Gauthier & Julien, Portneuf Station, Que., $15,400.

Tools: Air Ministry, England, $6000; British Aeroplane Engines Ltd., Montreal, Que., $7776.

Machinery: Williams & Wilson Ltd., Montreal, $31,990; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $12,283; E. W. Bliss Co. of Canada Ltd., Toronto, $48,861.

Electrical equipment: British Admiralty, England, $11,090; Canada Wire & Cable Co. Ltd., Montreal, $9585; Canadian Marconi Co., Montreal, $8696; Aviation Electric Ltd., Montreal, $21,151; Northern Electric Co. Ltd., Ottawa, $97,222; Canadian General Electric Co. Ltd., Ottawa, $20,219; R. C. A. Victor Co. Ltd., Ottawa, $149,380; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., $22,350; Canadian Telephones & Supplies Ltd., Toronto, $6171; Boston Insulated Wire & Cable Co. Ltd., Hamilton, Ont., $7214; Federal Wire & Cable Co. Ltd., Guelph, Ont., $7214.

Instruments: Air Ministry, England, $5760; J. F. Hartz Co. Ltd., Toronto, $7868; Ingram & Bell Ltd., Toronto, $8368; Sutton-Horsley Co. Ltd., Toronto, $51,750; Dominion Electrohome Industries Ltd., Kitchener, Ont., $88,213.

Land transport: Canadian Duff-Norton Co. Ltd., Coaticook, Que., $7445; International Harvester Co. of Canada Ltd., Ottawa, $19,180; General Motors Products of Canada Ltd., Oshawa, Ont., $34,264; Eastern Steel Products Co. Ltd., Preston, Ont., $52,784; Ford Motor Co. of

(*Please turn to Page* 109)

Pittsburgh Steamship Co. Orders 640-Foot Carriers

■ Contract for construction of two new ore freighters, largest ever to be built on the Great Lakes, has been awarded to the Great Lakes Engineering Works, River Rouge, Mich., by Pittsburgh Steamship Co., United States Steel Corp. subsidiary.

The vessels will be 640 feet long over all. Keel length will be 614 feet; beam, 67 feet; depth, 35 feet; maximum loaded draft, 23 feet 10 inches; loaded speed in deep water, about 13 miles an hour at maximum draft; maximum single cargo capacity, about 17,500 gross tons.

Carriers will be single screw, double reduction gear, turbine driven vessels. Normal power will be 4000 shaft horsepower at 90 revolutions per minute and maximum power, 4400 shaft horsepower at 93 revolutions per minute.

Main drive will be double reduction gear steam turbine. Steam pressure will be 400 pounds per square inch with total steam temperature of 750 degrees Fahr. at the throttle and 28½-inch vacuum.

Steam will be supplied by two water tube boilers designed for 450 pounds per square inch pressure. Boilers will be fitted with interdeck superheaters, airheaters, water side walls and coal-fired mechanical spreader-type stokers.

Full automatic combustion control will be used.

Auxiliaries and deck machinery will be electrically driven. Power will be supplied by two 325-kilowatt turbo-generators having the same steam conditions as the main unit.

Michigan Releases Ferry for Use as Ice Breaker at Soo

To accomplish an earlier opening of Great Lakes navigation and movement of a greater tonnage of iron ore to lower lake ports the Michigan State Highway Department has released the ferry SAINTE MARIE from its regular service to permit its use as an ice breaker in the St. Marys river and the straits of Sault Sainte Marie.

This action, through G. Donald Kennedy, Michigan state highway commissioner, was announced by William S. Knudsen, director general, Office of Production Management.

"One of the most important transportation needs at present facing transportation agencies is the movement of iron ore from the Superior iron range to the lower lake ports for the production of steel," said Mr. Knudsen. "I want to heartily endorse the co-operative action of Commissioner Kennedy in meeting the request of the National Advisory Commission in this emergency."

Great Lakes shippers anticipate a record movement of iron ore during the coming season, estimates generally ranging from 72,000 000 to 73,000,000 gross tons. (STEEL, March 24, p. 51.)

■ Domestic sales of heat treating furnaces in 1940 numbered 4349 units, valued at $22,643,010 compared with 2699 units valued at $10,045,978 in 1939.

Awarded American Foundrymen's Association Gold Medals

Charles E. Hoyt

Donald J. Reese

Max Kuniansky

Fred L. Wolf

■ American Foundrymen's Association, Chicago, last week announced its four major Gold Medal awards, to be presented at its annual convention in New York, May 12-15. They are:

The Joseph S. Seaman medal to **Charles Edgar Hoyt,** for his exceptionally outstanding service to the industry as manager of the foundry exhibits since 1903, as secretary and treasurer of the association from 1918 through 1936, and as executive vice president since 1936.

The J. H. Whiting medal to **Donald J. Reese,** engineer, Research and Development Division, International Nickel Co., New York, for his outstanding contributions to the industry and the association through his work in the improvement of cupola melting methods.

The W. H. McFadden medal to **Max Kuniansky,** general manager, Lynchburg Foundry Co., Lynchburg, Va., for outstanding contributions to the gray iron industry and the association.

The John A. Penton medal to **Fred L. Wolf,** technical director, Ohio Brass Co., Mansfield, O., for his outstanding contributions to the nonferrous and malleable castings industry and the association.

The association also is recognizing the long continued service and early pioneering in technical work of **Henry M. Lane,** Grosse Isle, Mich., making him honorary life member.

The awards board, established in 1923, consists of the last seven living past presidents. This year the board is under the chairmanship of Henry S. Washburn, president, Plainville Casting Co., Plainville, Conn. Serving with Mr. Washburn are Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; H. Bornstein, director of laboratories, Deere & Co., Moline, Ill.; James L. Wick Jr., president, Falcon Bronze Co., Youngstown, O.; D. M. Avey, Tulsa, Okla.; Frank J. Lanahan, president, Fort Pitt Malleable Iron Co., Pittsburgh; T. S. Hammond, president, Whiting Corp., Harvey, Ill.

Flimsy Pretexts for Strikes Challenging Government

■ Out of the murk of untimely and disastrous labor discord loom two beacon lights of encouragement.

One is the fact that the American public is becoming "fed up" with the greedy tactics of union labor.

The other is the evidence that some of the staunchest and most influential friends of labor are disgusted with the present attitude of the unions.

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According to the Gallup poll, 68 per cent of the public thinks that labor is not aiding production for defense as much as it should. Asked which is trying harder to assist production— union leaders or industrial executives—only 10 per cent voted for the labor chiefs, whereas 56 per cent voted for management.

Senator Norris, long a warm friend of labor; Senator Thomas, chairman of the Senate Labor Committee; and Representative Ramspeck, for many years a member of the House Labor Committee, during the past week have spoken critically of the attitude of union labor in the present crisis.

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This change of heart is significant. Several years ago when the discriminatory administration of the Wagner act precipitated a congressional investigation, these friends of labor in co-operation with President Roosevelt and the administration sidestepped the public demand for a revision of the labor law by throwing the bulk of the blame upon NLRB.

The President jettisoned the most radical element of NLRB and in so doing, said in effect that the Wagner act would work all right if it were administered fairly.

This move appeased many critics. In fact, when Wendell Willkie was campaigning for the presidency, he declared that the Wagner act was workable and that all that was needed was an unbiased administration of it.

Many industrialists, who had first hand experience in dealing with the Wagner act, remained unconvinced. They felt that a law so one-sided in intent is dynamite—subject to detonation at any time.

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Current events substantiate their judgment. A careful survey of the labor disturbances now throttling defense production shows that an overwhelming majority of them originates in jurisdictional issues and not in honest grievances over wages or conditions.

In short, most of the trouble is due to the greed of one union to beat its rival to the lucrative franchise of collecting dues and initiation fees from exploitable employes in a given plant.

The encouragement to use any tactics—legal or otherwise—to gain this franchise is provided by the Wagner act.

Had we modified that law, as common sense so clearly dictated when the Smith investigation committee reported, we would not be losing production because C. I. O. challenges A. F. of L. jurisdiction, or vice versa.

Will we ever learn to trust experience more and to rely upon fanciful theory less?

E. L. Shaner

EDITOR-IN-CHIEF

The BUSINESS TREND

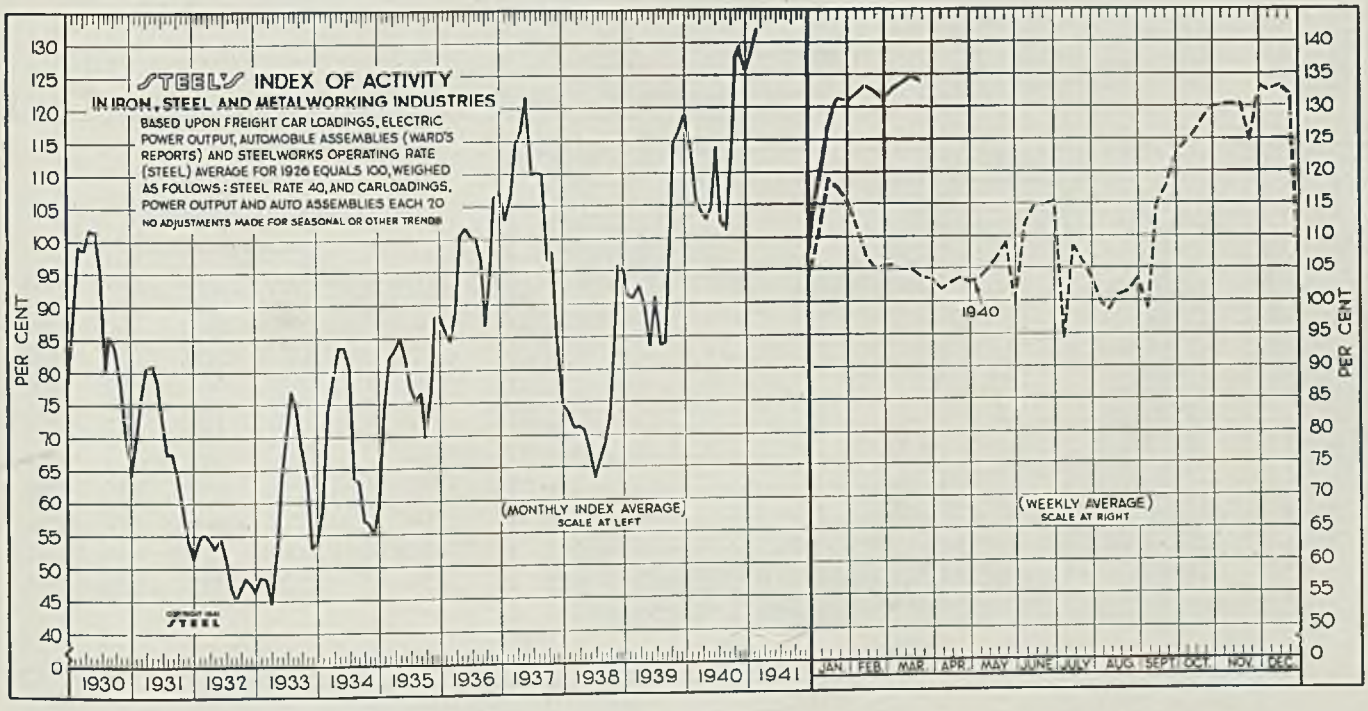
Influx of New Demand Extends Order Backlogs

■ UNDERLYING trend of industrial activity continues upward. However, temporary interruptions resulting from equipment breakdowns, labor disturbances, etc., have tended to level out the sharp upward trend of production. With the completion of numerous expansion programs now underway, activity in many industries should move into new high ground over the coming months.

New demand in a number of industries continues to exceed output, despite the intensified buying movement during the closing months of last year and the recent determined efforts of manufacturers to restrict orders to actual needs. As a result of this steady inflow of new business, little if any headway has been made against the record breaking backlog of orders accumulated by the close of last year.

Reflecting the seasonal decline in electric power consumption and automobile production during the week ended March 22, STEEL's index eased 1.2 points to 133.8 for that period. This compares with the 103.7 level recorded by the index at this time last year. In the same week of 1937 and 1929 the index stood at 113.1 and 115 respectively.

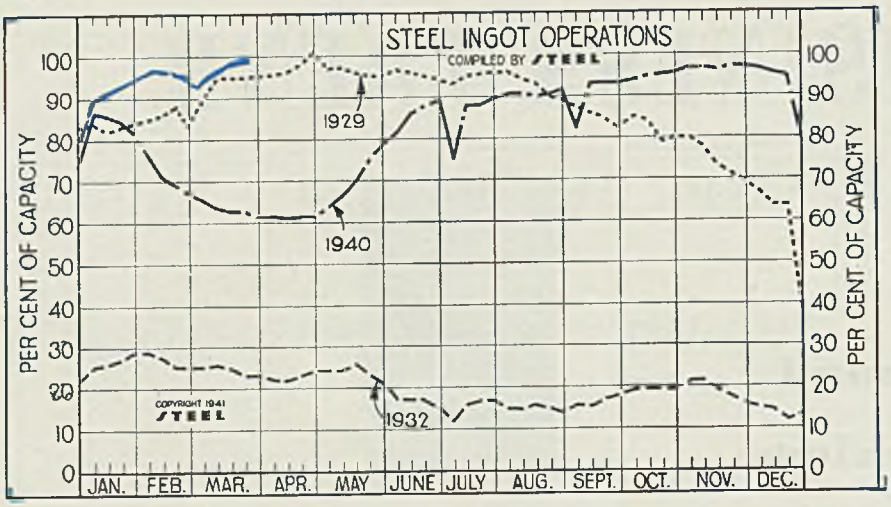
Revenue freight traffic and steelmaking operations during the latest period climbed to the highest levels for the year to date.



STEEL'S index of activity declined 1.2 points to 133.8 in the week ended March 22:

Week Ended	1941	1940
Jan. 4	114.5	110.3
Jan. 11	128.2	119.2
Jan. 18	130.8	117.3
Jan. 25	130.7	115.4
Feb. 1	132.0	111.6
Feb. 8	132.7	107.2
Feb. 15	132.3	105.1
Feb. 22	131.2	105.4
March 1	133.0	105.6
March 8	133.1	104.7
March 15	135.0	104.9
March 22	133.8	103.7

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	.....	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	.....	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	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

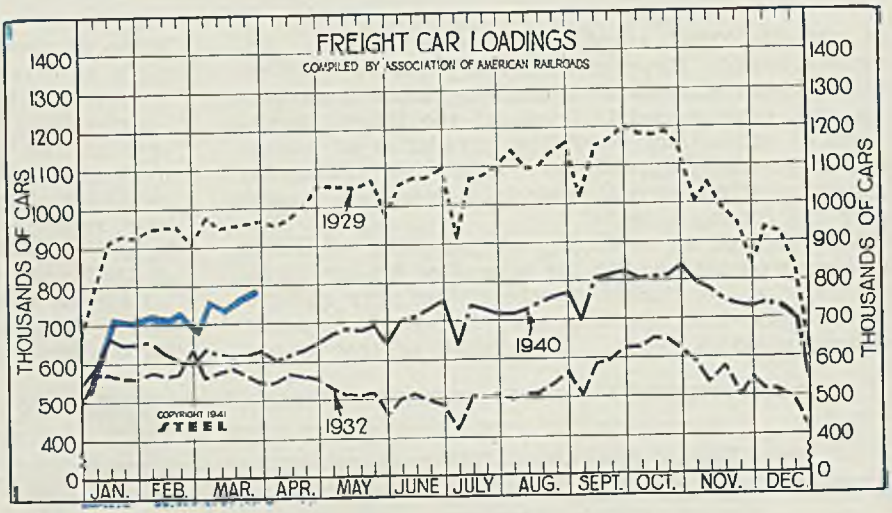
(Per Cent)

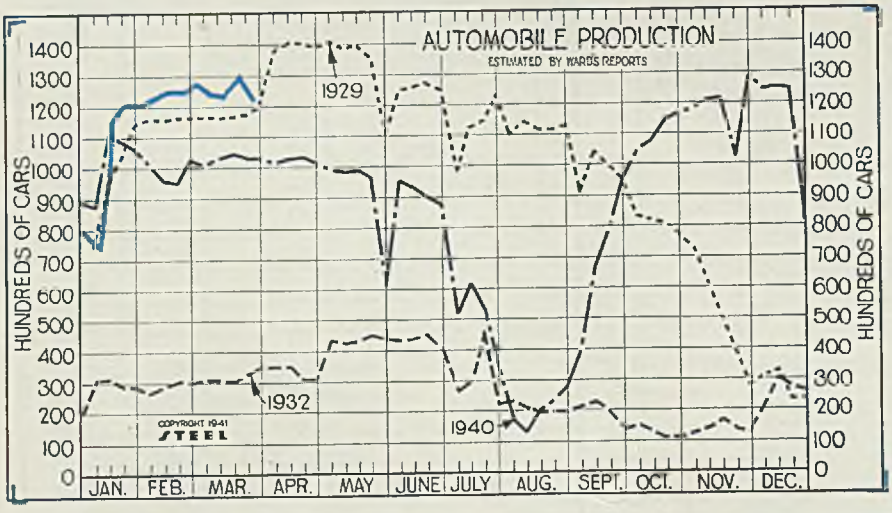
Week ended	1941	1940	1939	1938
March 22 ..	99.5	62.5	55.5	35.0
March 15 ..	98.5	62.5	56.5	32.0
March 8 ...	97.5	63.5	56.5	30.0
March 1 ...	96.5	65.5	56.0	29.5
Feb. 22	94.5	67.0	55.0	30.5
Feb. 15	96.5	69.0	55.0	31.0
Feb. 8	97.0	71.0	54.0	30.0
Feb. 1	97.0	76.5	53.0	31.0
Jan. 25	95.5	81.5	51.5	33.0
Jan. 18	94.5	84.5	51.5	30.5
Jan. 11	93.0	86.0	52.0	29.0
Jan. 4	92.5	86.5	51.5	26.0
Week ended	**1940**	**1939**	**1938**	**1937**
Dec. 28	80.0	75.5	40.0	21.0
Dec. 21	95.0	90.5	52.0	23.0
Dec. 14	95.5	92.5	58.0	27.0
Dec. 7	96.5	94.0	61.0	27.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
March 22....	769	619	605	573
March 15	759	619	595	540
March 8	742	620	592	557
March 1.....	757	634	599	553
Feb. 22.....	678	595	561	512
Feb. 15.....	721	608	580	536
Feb. 8.....	710	627	580	543
Feb. 1.....	714	657	577	565
Jan. 25.....	711	649	594	553
Jan. 18.....	703	646	590	570
Jan. 11.....	712	668	587	581
Jan. 4.....	614	592	531	552
Week ended	**1940**	**1939**	**1938**	**1937**
Dec. 28.....	545	550	500	457
Dec. 21.....	700	655	574	460
Dec. 14.....	736	681	606	603





Auto Production

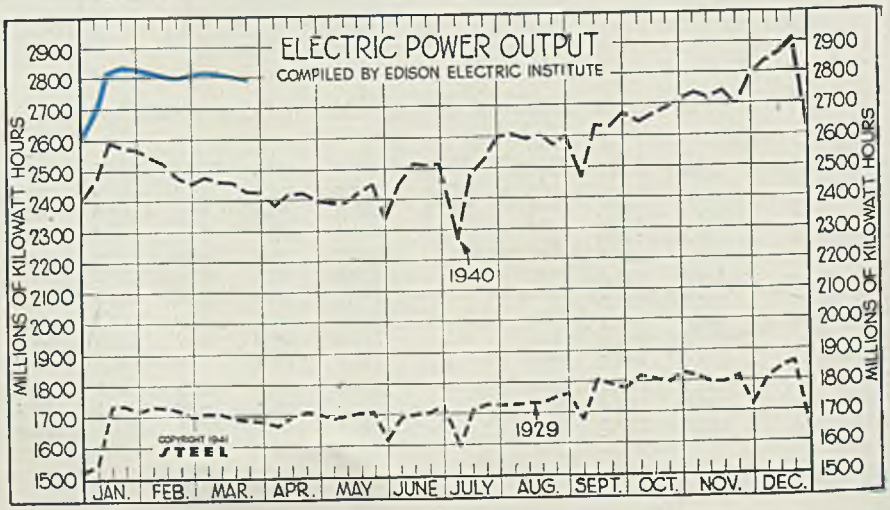
(1000 Units)

Week ended	1941	1940	1939	1938
March 22..	124.8	103.4	89.4	56.8
March 15 ..	131.6	105.7	86.7	57.6
March 8 ..	125.9	103.6	84.1	57.4
March 1...	126.6	100.9	78.7	54.4
Feb. 22....	129.2	102.7	75.7	57.0
Feb. 15 ...	127.5	95.1	79.9	59.1
Feb. 8....	127.7	96.0	84.5	57.8
Feb. 1....	124.4	101.2	79.4	51.4
Jan. 25....	121.9	106.4	89.2	59.4
Jan. 18 ...	124.0	108.5	90.2	65.4
Jan. 11....	115.9	111.3	86.9	65.7
Jan. 4....	76.7	87.5	76.7	54.1
Week ended	**1940**	**1939**	**1938**	**1937**
Dec. 28....	81.3	89.4	75.2	49.6
Dec. 21....	125.3	117.7	92.9	67.2

Electric Power Output

(Million KWH)

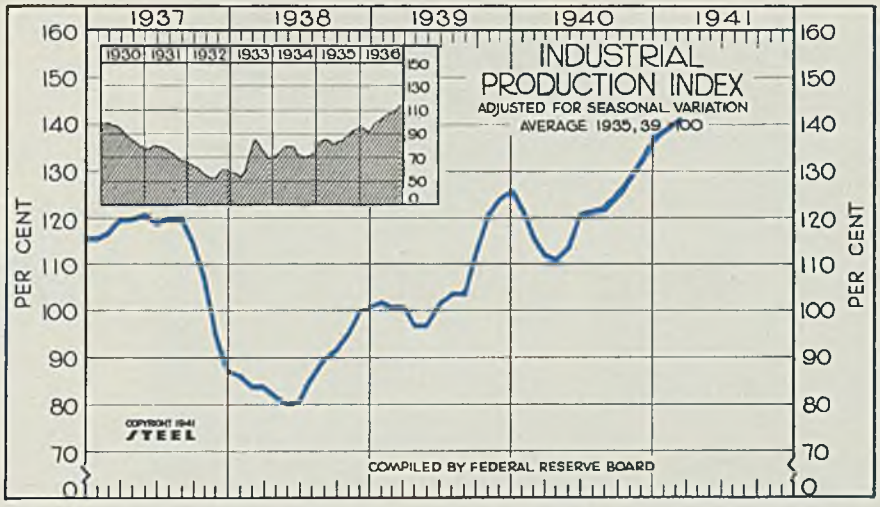
Week ended	1941	1940	1939	1938
March 22.	2,809	2,424	2,199	1,975
March 15 .	2,818	2,460	2,225	2,018
March 8..	2,835	2,464	2,238	2,015
March 1..	2,826	2,479	2,244	2,036
Feb. 22...	2,820	2,455	2,226	2,031
Feb. 15...	2,810	2,476	2,249	2,059
Feb. 8...	2,824	2,523	2,268	2,052
Feb. 1. .	2,830	2,541	2,287	2,082
Jan. 25...	2,830	2,566	2,293	2,099
Jan. 18...	2,844	2,572	2,290	2,109
Jan. 11...	2,835	2,593	2,270	2,115
Jan. 4...	2,705	2,473	2,169	2,140
Week ended	**1940**	**1939**	**1938**	**1937**
Dec. 28...	2,623	2,404	2,121	1,998
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 14...	2,862	2,605	2,333	2,202

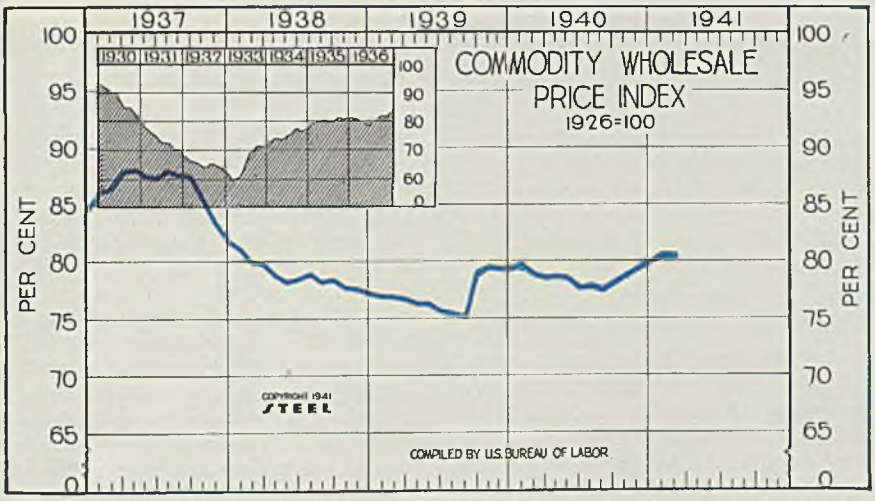


Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

	1941	1940	1939	1938	1937
Jan.	139	122	102	86	116
Feb.	141	116	101	84	117
March	...	112	101	84	120
April	...	111	97	82	120
May	...	115	97	80	121
June	...	121	102	81	119
July	...	121	104	86	120
Aug.	...	121	104	90	120
Sept.	...	125	113	92	115
Oct.	...	129	121	95	107
Nov.	...	133	124	100	95
Dec.	...	138	126	101	87
Year Ave.	...	122	108	88	113





All Commodity
Wholesale Price Index
U. S. Bureau of Labor

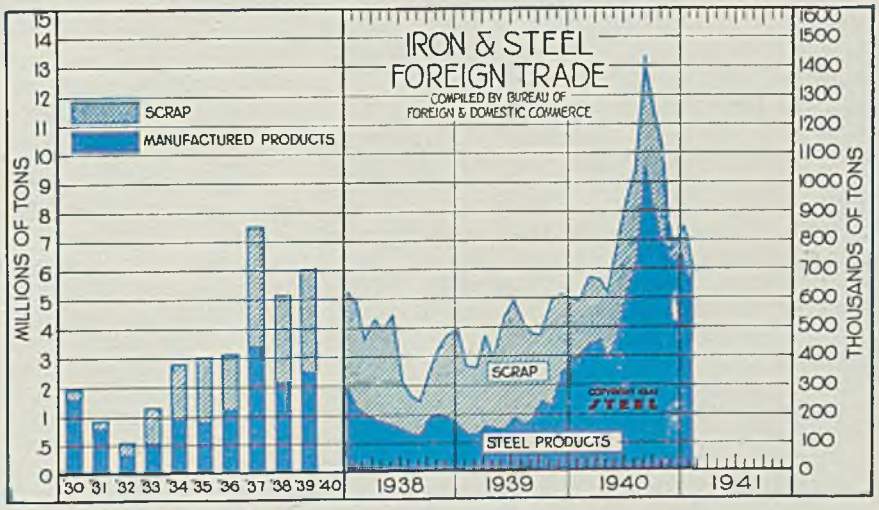
(1926 = 100)

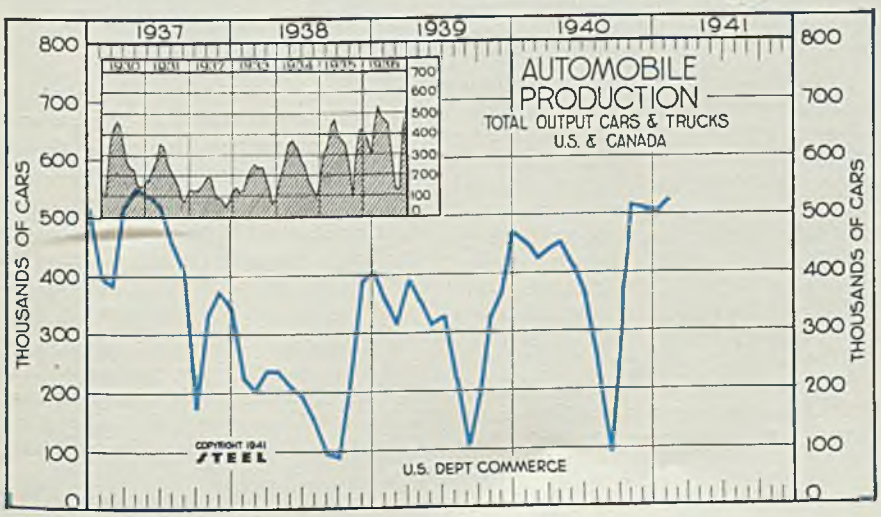
	1941	1940	1939	1938	1937
Jan.	80.5	79.4	76.9	80.9	85.9
Feb.	80.5	78.7	76.9	79.8	86.3
March	....	78.4	76.7	79.7	87.8
April	....	78.6	76.2	78.7	88.0
May	....	78.4	76.2	78.1	87.4
June	....	77.5	75.6	78.3	87.2
July	....	77.7	75.4	78.8	87.9
Aug.	....	77.4	75.0	78.1	87.5
Sept.	....	78.0	79.1	78.3	87.4
Oct.	....	78.7	79.4	77.6	85.4
Nov.	....	79.6	79.2	77.5	83.3
Dec.	....	80.0	79.2	77.0	81.7
Ave.	....	78.5	77.1	78.6	86.3

Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	.....
Feb.	.....	436.6	.....	234.7	.....
Mar.	.....	457.1	.....	206.9	.....
April	.....	391.8	.....	221.2	.....
May	.....	471.5	.....	312.5	.....
June	.....	617.7	.....	318.4	.....
July	.....	707.8	.....	327.1	.....
Aug.	.....	1046.1	.....	346.1	.....
Sept.	.....	965.4	.....	251.1	.....
Oct.	.....	846.6	.....	258.5	.....
Nov.	.....	713.8	.....	74.3	.....
Dec.	.....	735.2	.....	70.0	.....
Total	.....	7,785.5	.....	2,823.1	.....





Automobile Production

(Unit: 1000 Cars)

	1941	1940	1939	1938	1937
Jan.	524.1	449.3	357.0	227.1	399.2
Feb.	.....	421.8	317.5	202.6	383.9
March	.....	440.2	389.5	238.6	519.0
April	.....	452.4	354.3	238.1	553.4
May	.....	412.5	313.2	210.2	540.4
June	.....	362.6	324.2	189.4	521.1
July	.....	246.2	218.5	150.4	456.9
Aug.	.....	89.9	103.3	96.9	405.1
Sept.	.....	284.6	192.7	89.6	175.6
Oct.	.....	514.4	323.0	215.3	338.0
Nov.	.....	511.0	370.2	390.4	376.6
Dec.	.....	506.9	469.0	407.0	346.9
Ave.	.....	391.0	311.0	221.3	418.0

Don't Let Work Holding Put Brakes

By GUY HUBBARD
Machine Tool Editor

As in the case of a high speed train which is allowed to linger unduly at station stops, a high speed machine tool can be decidedly inefficient if the time it saves during the cutting cycle is wasted during the loading and unloading cycle. Go through your shop with a critical eye for the workholding methods employed. If you find "muzzle-loading" technique being applied to "breech-loading" machine tools, don't be surprised—but get your tool engineers busy on the job of eliminating these anachronisms

■ MACHINE tools have become so highly developed—so replete with hydraulic, electrical and mechanical apparatus—that there is some tendency to overlook their basic function. That basic function is exactly the same as it always was. It is: "To bring tools and work into controlled contact for the purpose of removing from the work in the form of chips the excess metal—thus producing a piece of predetermined size, shape and finish as economically as possible."

Like the statue in the block of marble, the part is inside the casting or forging all the time and the only problem is to chip off the excess material in which it is encased. Like a talented sculptor, a modern machine tool has within itself the ability to do this work—but, like the sculptor, it can do it effectively only when provided with proper tools and with proper means for holding the piece on which the tools are to operate. It is with this last mentioned requirement that this article is particularly concerned.

The only time when a production machine tool is productive is when it is producing something, and that means when it is cutting metal. It is not productive when it is stopped to allow the work to be inserted or removed. Therefore, even if it is a highly efficient machine with highly efficient cutting tools, its overall efficiency may be much less than that of an old style machine with older types of tools—if due attention has not been paid to this business of loading and unloading the work.

A modern quick-firing cannon with the latest type of breech mechanism would make a poor showing if the gun crew ignored its breech loading possibilities and followed Civil war traditions by ramming the charge in through the muzzle. That imaginary situation is no more ridiculous than some of the "muzzle-loading methods" being used today in connection with "loading" modern machine tools. With machine tool production capacity at a premium, now of all times is the time to eliminate that kind of thing by widespread overhauling workholding methods.

A survey of your own shop made with this situation in mind, may surprise you, and what can be done by turning some competent tool engineers loose on this problem, may be equally surprising. The reason for such wholesale possibilities for improvement in this direction is that more perhaps than any other phase of machine shop practice, workholding has been allowed to go on in traditional ways—unquestioned.

Undoubtedly one of the first things to be brought to light through such a survey as has just been mentioned, will be the large number of places where self-centering chucks of one kind or another will save time. The type of chucks desirable will vary greatly, and will include collet chucks, standard jaw chucks, and chucks of special types designed to hold certain parts without distortion, and in exact position.

Among these last-mentioned chucks are those designed to hold gears or threaded work by gripping on the pitch line. Certain manufacturers, one of them being Garrison Machine Works Inc., Dayton, O., have made a business of working out practical solutions for problems of gripping and exactly locating gears and threaded work on which subsequent operations must be performed in exact relation to the teeth or threads. These chucks, which are simple and quick-acting, save a tremendous amount of time on work of that nature—making it possible for ordinary machine operators to make setups which otherwise would require the attention of skilled mechanics.

In general, it can be said that critical attention should be devoted to any point in a production shop where operators are found using chalk and indicators in truing up routine work, or where they are using "tool room methods" for locating such work on the tables of milling machines, drilling machines, boring machines, etc. In such cases the chances are that you are in effect paying for proper jigs, fixtures or other holding devices without having the benefit of them. The loss of man-hours is obvious, but the cost of lost machine hours is far more serious these days. It might stimulate action if every machine

(*Please turn to Page* 77)

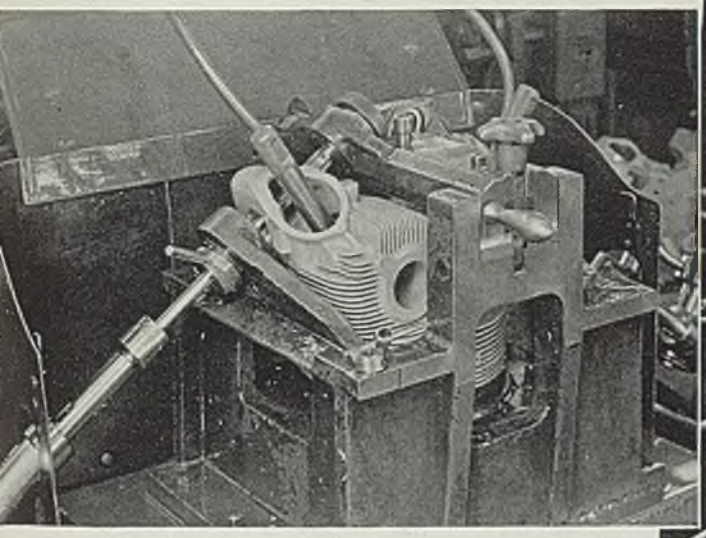
Fig. 1. (Top)—Simple fixture designed at Westinghouse Nuttal Works holds gear case solidly for boring and provides quick shift from one boring operation to another

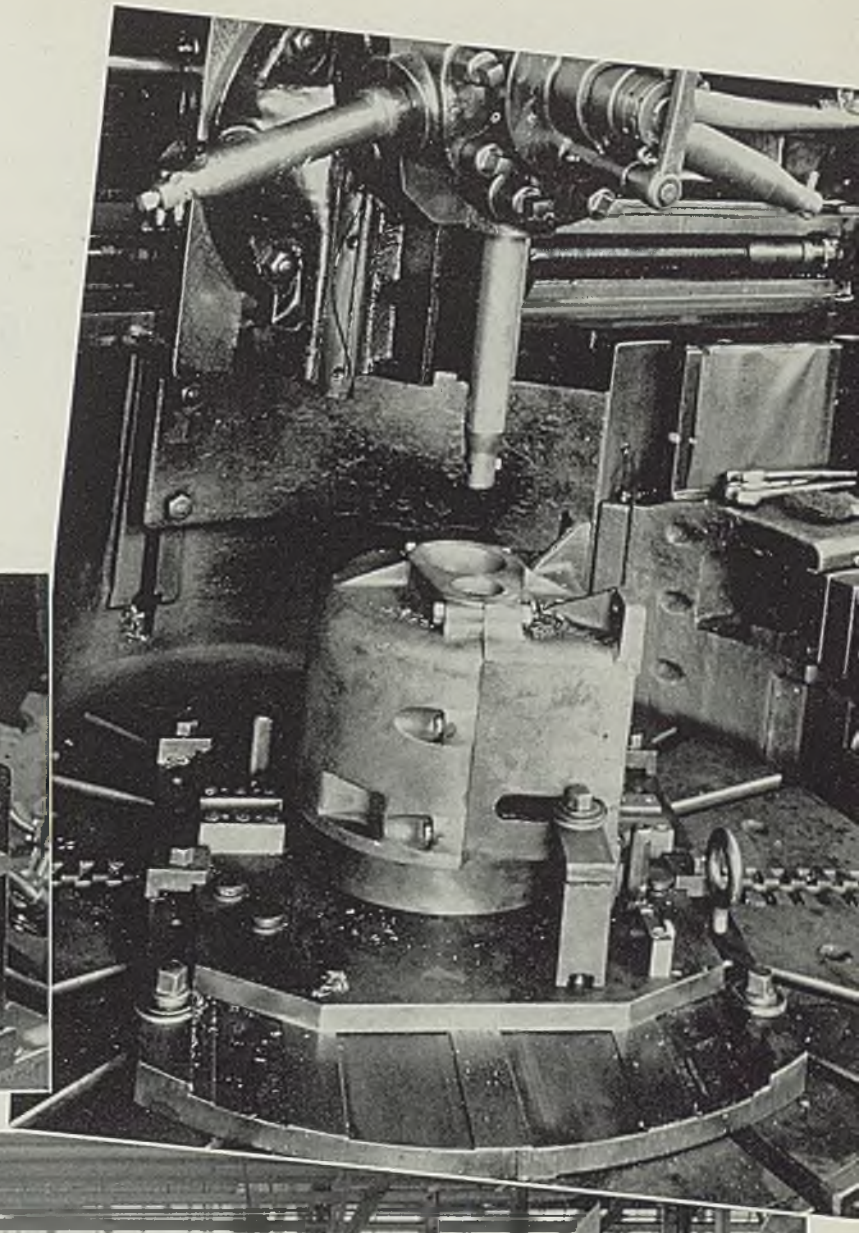
Fig. 2. (Center)—Jig used for locating and holding Pratt & Whitney aircraft engine cylinder while precision reaming rocker arm hole by means of special 2-spindle Leland-Gifford machine

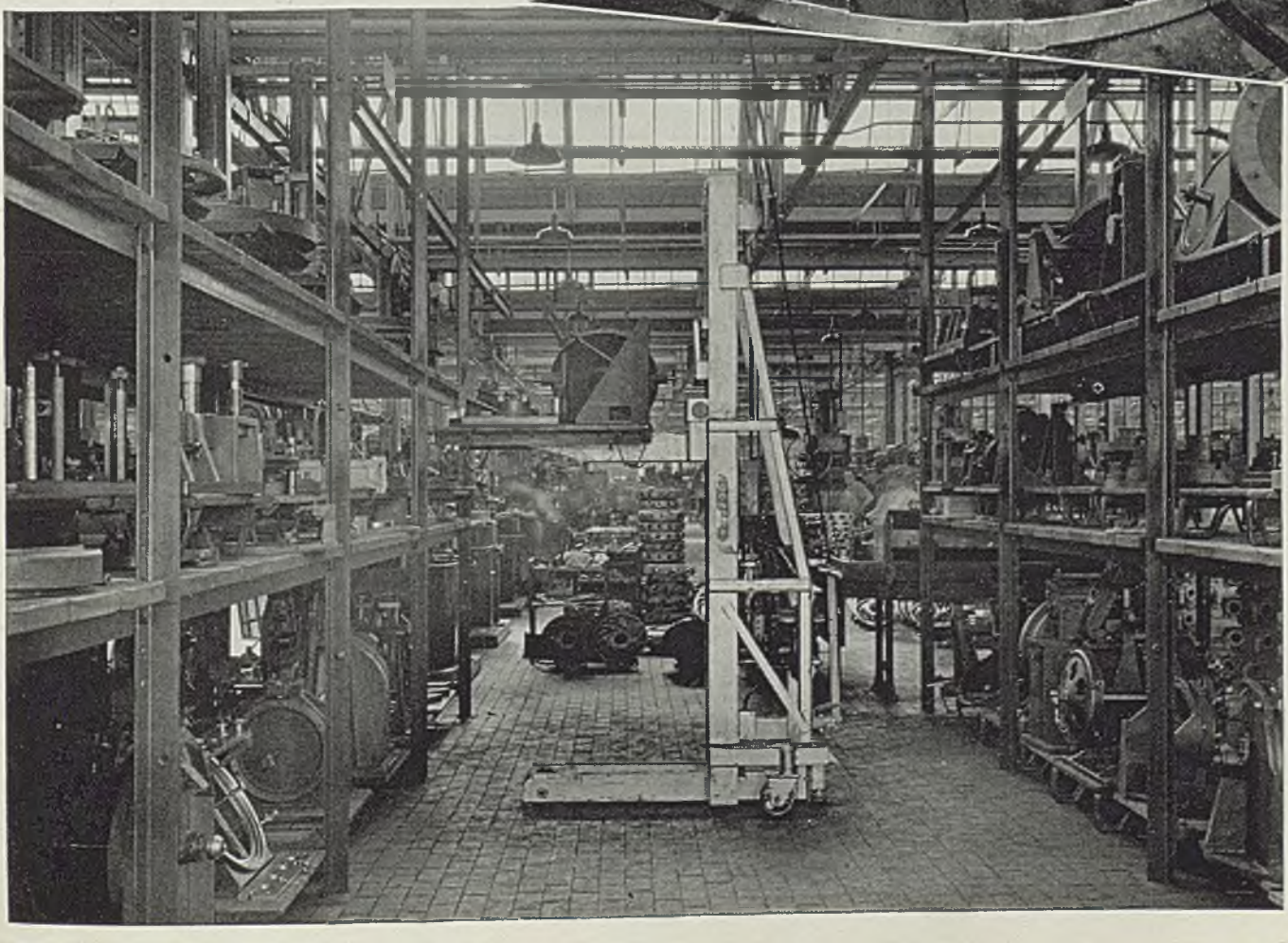
Fig. 3. (Bottom)—Big role that tool engineering plays in aircraft engine production is indicated by this glimpse into jig and fixture storage section in the Pratt & Whitney crankcase department here

Devices

on Production







Survey of Equipment for

MACHINING

High-Explosive

■ THIS article—the tenth weekly presentation in the series on the manufacture of high-explosive shell—rounds out our discussions of the type of equipment required to process the shell blank as it is received from the forge shop. These references have included the latest and speediest designs which Yankee ingenuity has been able to devise. Among them were the "special purpose" lathes of the National Machine Tool Builders' Association and of the Prescott Co., Ex-Cell-O automatics and Bullard Mult-Au-Matics; the "Blood" lathes of W. C. Lipe; the nosing and banding presses of Bliss and West; together with other items representing the best practice in their respective fields.

It is now proposed to offer in tabular form a rather complete list of the various types of machines capable of shell turning, threading, banding and so forth, together with their production rates on various caliber shell, their price and the name of the manufacturer. This information was secured under the direction of Colonel C. E. Davies, secretary of the American Society of Mechanical Engineers, who now is on emergency duty in the office of the Chief of Ordnance, and the lists kindly lent to the writer by Robert T. Kent, advisory engineer, Ordnance Department, Washington. It is hoped that the data presented here will be helpful to those contemplating expansion of their shell manufacturing facilities.

The relation between the highly developed automatic (now in one case, at least, unobtainable) and the multi-spindle automatic to the shell manufacturing program has already been touched upon. Since we should by now be fully aware of both the magnitude and the urgency of the job ahead of us, there is perhaps little necessity to point out that if new machines especially adapted to the purpose are not readily available, resort should be had to every improvisation which practical common sense dictates, including not only the utilization of existing machines but the farming out of work.

The use of accurate fixtures may sometimes be the means of making an old and inaccurate machine function satisfactorily, and consideration should always be given to the possibility of performing a familiar operation in an unfamiliar way. The ordinary lathe was never designed as a special purpose machine but may be so set up. Indeed the basic principles of a wide range of machine tools changes little with the passage of the years. While backbones may be heavier to take the extra load imposed by heavy duty carbide tools, high-speed steel mounted in a machine having even a poor claim to modernity, can still do a good day's work. Machines regarded as completely obsolete might with advantage be pressed into the service. Let it always be remembered that the simpler the operation, the easier it is to train a man to perform it.

These remarks, with a slightly different orientation might well be applied to the problem of gages also. Skilled men capable of producing accurate gages are hard to obtain, and the supply of these items is far short of the demand. Here again it might be possible to "get by" for a time at least with gages which would hardly measure up to normal specifica-

Other Articles on Production of Ordnance

■ For other articles in addition to the series by Professor Macconochie, see issue of March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines; Feb. 10, 1941, p. 67, for New Method of Checking Gun Bores.

Here Professor Macconochie presents tabulated data gathered by American Society of Mechanical Engineers in a recent survey of shell machining equipment. Also he gives a detailed production-time study of the S. A. Woods Machine Co. setup described in section 8 of this series, appearing in STEEL, March 17, 1941, p. 56

Shell

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

tions but which might answer the purpose even if "soft" and not lapped with the usual accuracy. Limits on gage manufacture might in some cases at least be the subject of an inquiry with a view to possible temporary relaxation.

Table I was prepared from information obtained in answer to a questionnaire sent out to determine the machines and equipment now being utilized for machining various sizes of shell. The list is not complete by any means, being confined to those units upon which reports were received. However, each one mentioned is a machine now in actual use and the production rates shown are those being obtained in actual production.

In Table I, subheads describe the operation or operations involved. Note that the operations are listed in a sequence that would be quite near to that used in production work. Under each subhead are the machines used for the operation listed under the subhead. The second column shows the maker of the machine. Third, fourth, fifth and sixth columns show production rates being obtained for various sizes of shell. The blank spaces do not necessarily mean that the particular machine is not suitable for that size shell. It may mean only that production rates for that size shell were not reported. Column seven shows prices of the machines where this was reported.

Since all manufacturers do not agree on the sequence of machining operations nor the particular ones or arrangements used where two or more operations are handled on one machine, some of these variations are pointed out in the first column as noted in parenthesis.

It is understood, of course, that any machine listed in column one can be used for the operation men-

Production-Time Analysis for S. A. Woods Setup

■ Supplementing the information given in section 8 of this series, see STEEL, March 17, 1941, p. 56, describing operations at plant of S. A. Woods Machine Co., Boston, please note the following regarding production output:

The operations listed in Table I of that article are those illustrated and described pictorially on pages 58, 59, 60, 61 and 62. Since the S. A. Woods setup was designed merely to handle an educational order, only one of each machine was used. Thus, disregarding handling time, the maximum production rate obtainable here is determined by the longest single operation—70 seconds, from column three, Table I. This means a finished shell every 70 seconds or 42.86 shell bodies per 50 minute hour—total of approximately 342 completed shell bodies per 8-hour day. This is the output given on page 63 for the conveyorized layouts where handling time is eliminated by conveyors delivering the work to each station. But here, several operations have been combined in a number of places on the line, as is explained in operation sequence, page 63.

However, to show the number of machines required for a high production layout, Table I also includes, in column chines; operation 20, at least 10 inspection stations; operation various operations. An output of a shell every 5 seconds is taken as the basis for figures in column four simply because this is the time of the fastest single operation—weighing, operation 19. To get maximum efficiency possible, there must be enough machines to permit moving a shell out of each operation at this same rate—one every 5 seconds.

Based on a shell progressing down the line at a rate to give a completed shell every 5 seconds—600 shells per 50-minute hour, 4800 per 8-hour day—if operation 1 requires 50 seconds, obviously at least 10 machines must be used to pass a shell through this operation every 5 seconds. To be safe, 12 machines are specified. Similarly operation 3, taking 70 seconds, requires at least 14 machines, 16 being specified. Operation 4, taking only 13 seconds, easily obtains the desired output with three machines.

Continuing to check down column four, it is obvious that the number of machines for operation 8 must be at least five instead of the two given. Also operation 9 would need 16 machines; operation 11, 4 machines; operation 15, 4 machines; operation 20, at least 10 inspection stations; operation 24, 13 stations; operation 25, 6 stations.

tioned by the subhead above it.

Attention is also called to those items in column one marked with a †. These are the machines employed at Frankford Arsenal, Philadelphia, for those operations so marked.

Table II gives tabulation of Frankford Arsenal procedure separately for clearness. It shows machines and breakdown of operations they handle based on a production of 3000 shell per 8-hour day, 15-millimeter 1148 high-explosive type.

TABLE I—Breakdown of Operations in Machining Shell and Typical Equipment Used for Them

Operation—Type of Machine—Manufacturer	Production per Hour, 85% Efficiency 75mm	90mm	105mm	155mm	Price
Centering					
Centering Lathe, Foster Mach.	110	90	70	35	$4950
16″ Lathe, R. K. LeBlond	—	—	40	35	3609
11″ Lathe, R. K. LeBlond	50	45	—	—	2148
(Recommend drill press for 75mm)					
Special Centering, Frew Mach. Co.	—	—	—	—	——
†Centering, Foster Mach.	123	—	—	—	——
Sundstrand, Sundstrand	62	65	—	—	——
(Combine with cut-off)					
Cut-off with the saw					
Power Hack Saw, Peerless Mach.	—	—	—	42	2825
(Open end)					
Power Hack Saw, Peerless Mach.	—	—	—	15	2825
(Solid end)					
Power Hack Saw, Racine Tool & Machine Co.	—	—	—	—	2500
(Saws two shells at once)					
Cut-off and face base on the lathe					
16″ Automatic Lathe, R. K. LeBlond	—	—	—	20	8034
Special Facing Machine, Frew Mach. Co.	—	—	—	—	——
Special-3P-CC 155, Harris-Seybold-Potter Co.	—	—	—	20	——
(Includes centering)					
Cut-off on the lathe and center					
Sundstrand, Sundstrand	62	65	—	—	——
Rough turn, cut-off open end, and face base					
16″ Automatic Lathe, R. K. LeBlond	—	—	—	20	8549
16″ Automatic Lathe, R. K. LeBlond	—	—	30	—	8584
16″ Automatic Lathe, R. K. LeBlond	34	30	—	—	8284
Special-6T-R 155, Harris-Seybold-Potter Co.	—	—	—	20	——
Shell Mach. No. 414, Ex-Cell-O Corp.	66	—	—	—	——
Shell Mach. No. 724, Ex-Cell-O Corp.	—	—	—	21	——
3A Duomatic, Lodge & Shipley	42	32	19	10	10,500 to 15,000
†Fay Automatic, Jones & Lamson	44	—	—	—	——
Sundstrand, Sundstrand	65	42	34	—	——
(First roughing)					
Sundstrand, Sundstrand	65	52	37	12	——
(Second roughing)					
Rough and finish bore nose; countersink; face					
20″ Univ. Turret, R. K. LeBlond	—	—	—	12	9777
20″ Univ. Turret, R. K. LeBlond	—	—	20	—	9810
16″ Rapid Prod. Lathe, R. K. LeBlond	20	20	—	—	4515
Center Column Machine, W. F. & John Barnes	56	—	—	—	——
Multi-Spindle Drill, Baker Bros.	—	—	—	30	13,000
Sundstrand, Sundstrand	65	68	62	—	——
Drilling Machine, Baush Mach.	—	—	—	—	——
Rough and finish bore nose; countersink; face; thread					
2A Turret Lathe, Warner & Swasey	—	—	11	—	9940
3A Turret Lathe, Warner & Swasey	—	—	—	8.5	11,545
Automatic, New Britain	75	—	—	—	——
Tapping					
Tapping Machine, Landis Mach.	99	—	—	—	2950
Tapping Machine, Landis Mach.	—	81	81	72	3350
Nosing					
†No. 87 Crank Press, E. W. Bliss	163	—	—	—	——
Semifinish turn					
16″ Automatic Lathe, R. K. LeBlond	—	—	30	—	8490
12″ Rapid Prod. Lathe, R. K. LeBlond	34	35	—	—	6933
Center Col. Machine, W. F. & John Barnes	—	—	—	—	——
(See rough and finish bore for cost)					
Finish turn					
16″ Auto. Lathe, R. K. LeBlond	—	—	—	22	8449
16″ Auto. Lathe, R. K. LeBlond	—	—	30	—	8490
12″ Auto. Lathe, R. K. LeBlond	30	30	—	—	6884
Center Col. Mach., W. F. & John Barnes	—	—	—	—	——
(See rough and finish bore for cost)					
Spl.-6T-F155, Harris-Seybold-Potter	—	—	—	22	——
Shell Mach. No. 414, Ex-Cell-O Corp.	68	—	—	—	——
(Using three tools)					
Shell Mach. No. 414, Ex-Cell-O Corp.	61	—	—	—	——
(Using two tools)					
Shell Mach. No. 724, Ex-Cell-O Corp.	—	—	—	21	——

AN alloy was needed for a spinnerette for artificial fibre. The thickness of the spinnerette was limited to .008 inch. And 1200 holes had to be individually punched into its small area.

In addition, the alloy had to have high corrosion resistance and strength.

Revere was able to deliver a special alloy that could take all 1200 punches and still give the needed strength and corrosion resistance.

In modern metal working, many seemingly impossible tasks are possible *provided* you can get the right metal *to work.* Often minute, controlled amounts of special ingredients are able to give the familiar coppers, brasses, bronzes and other alloys exceptional qualities. In recent years, Revere Copper and Brass Incorporated has studied the effects of these minute, minor ingredients. Its laboratory findings have, in many instances, been confirmed by excellent operating records in industry.

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Operation—Type of Machine—Manufacturer	Production per Hour, 85% Efficiency 75mm	90mm	105mm	155mm	Price
3A DuoMatic, Lodge & Shipley	48	43	28	12	10,500 to 15,000
†Ex-Cell-O, Ex-Cell-O Corp.	37	—	—	—	——
Sundstrand, Sundstrand	64	49	40	13	——
Cut band; groove; crimp groove; undercut; knurl					
20″ Engine Lathe, Spl. Spindle, R. K. LeBlond	—	—	—	15	9344
20″ Engine Lathe, Spl. Spindle, R. K. LeBlond	—	—	25	—	9644
16″ Rapid Prod. Lathe, R. K. LeBlond	30	25	—	—	3553
Center Col. Mach., W. F. & John Barnes (See rough and finish bore for cost)	—	—	—	—	——
Spl. 6P-F155, Harris-Seybold-Potter	—	—	—	18	——
2A Turret Lathe, Warner & Swasey (Includes facing base)	—	—	11	—	10,856
3A Turret Lathe, Warner & Swasey (Includes facing base)	—	—	—	7.7	12,338
Automatic, New Britain (Combines with face base)	75	—	—	—	——
Sundstrand, Sundstrand (Facing omitted on 155mm; knurling omitted on all)	50	32	26	37	——
Face base and counterbore					
20″ Univ. Turret Lathe, R. K. LeBlond	—	—	—	20	9777
20″ Engine Lathe, R. K. LeBlond	—	—	20	—	8418
16″ Rapid Prod. Lathe, R. K. LeBlond	20	20	—	—	3627
2A Turret Lathe, Warner & Swasey (Included in turn band groove operation)	—	—	11	—	——
Automatic, New Britain (Combined with turn band groove)	75	—	—	—	——
Press on band					
Tire Setter, West	125	—	—	—	——
Drill and tap set screw hole					
†Bodine, Bodine Corp.	375	—	—	—	——
Stamp					
†Noble & Westbrook	412	—	—	—	——
Knurl					
†Morley	413	—	—	—	——
Notch					
†Productomatic, Producto Mach. Co.	230	—	—	—	——
Weld base cover					
†Seam Welder, Thomson-Gibb	1000	—	—	—	——
Turn band					
19″ Rapid Production Lathe, R. K. LeBlond	—	—	—	25	5361
19″ Rapid Production Lathe, R. K. LeBlond	—	—	40	—	5197
11″ Rapid Production Lathe, R. K. LeBlond	—	50	—	—	2642
Spl.-6P-B155, Harris-Seybold-Potter	—	—	—	48	——
†Sundstrand, Sundstrand	125	—	—	—	——
Sundstrand, Sundstrand	120	95	79	28	——

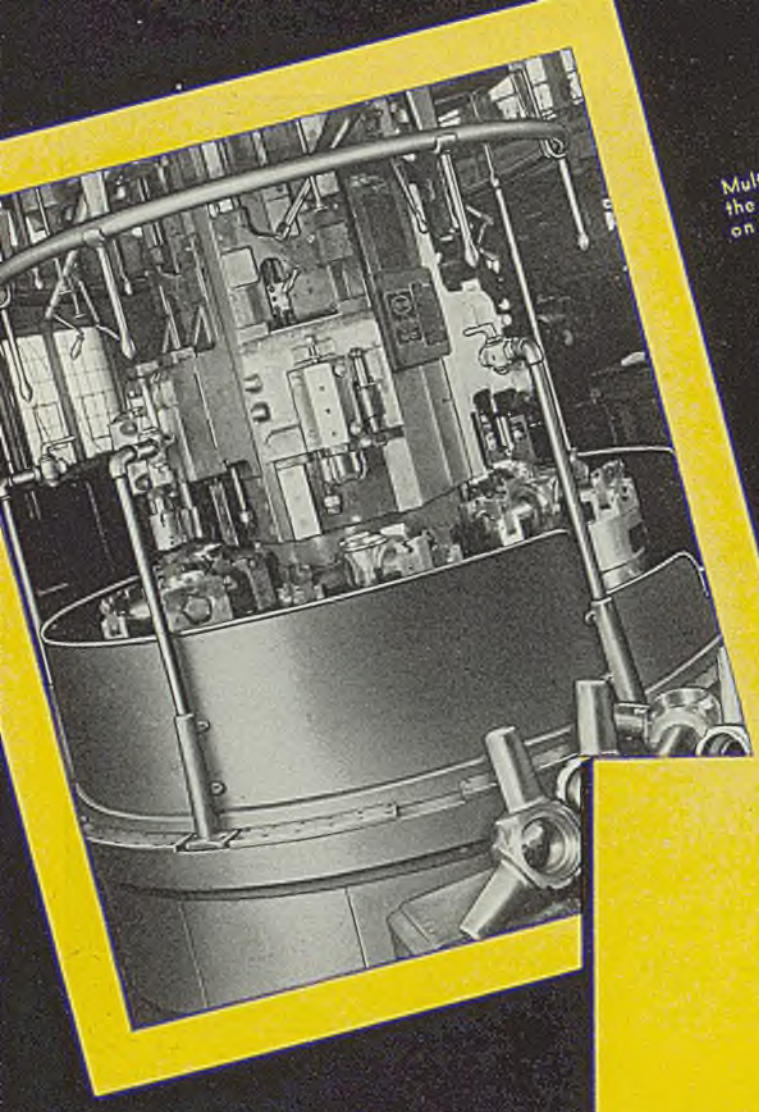
†Method used at Frankford Arsenal ,Philadelphia.

TABLE II—Frankford Arsenal Procedure for 75-Millimeter, 1148-High-Exposive Shell; Based on Production of 3000 Shell Per Eight-Hour Day; Finished Forged Cavity

Operation Number	Operation	Machine	Production per Machine (8 hour)	Number of Machines Required
1	Shotblast	Pangborn	1000	3.00
2	Center	Foster	1000	3.00
3	Cut-off, rough and face base	Fay automatic	360	8.33
4	Cold nose	Bliss No. 87 crank press	1300	2.31
5	Finish turn	Ex-Cell-O	535	5.61
6	Drill and tap set screw hole	Bodine	3000	1.00
7	Finish both ends and band seat	New Britain	600	5.00
8	Notch	Producto-Matic	1650	1.82
9	Stamp	Noble & Westbrook	3300	0.91
10	Knurl	Morley	3300	0.91
11	Apply band	West tire setter	1000	3.00
12	Turn band	Sundstrand	1000	3.00
13	Weld base cover	Thomson-Gibb seam welder	1000	3.00
	Total			40.89

This tabulation appeared in American Machinist, Sept. 4, 1940.

Note: A typical tooling setup for machining 40-millimeter shell on a vertical multi-spindle automatic lathe will be carried in STEEL next week.



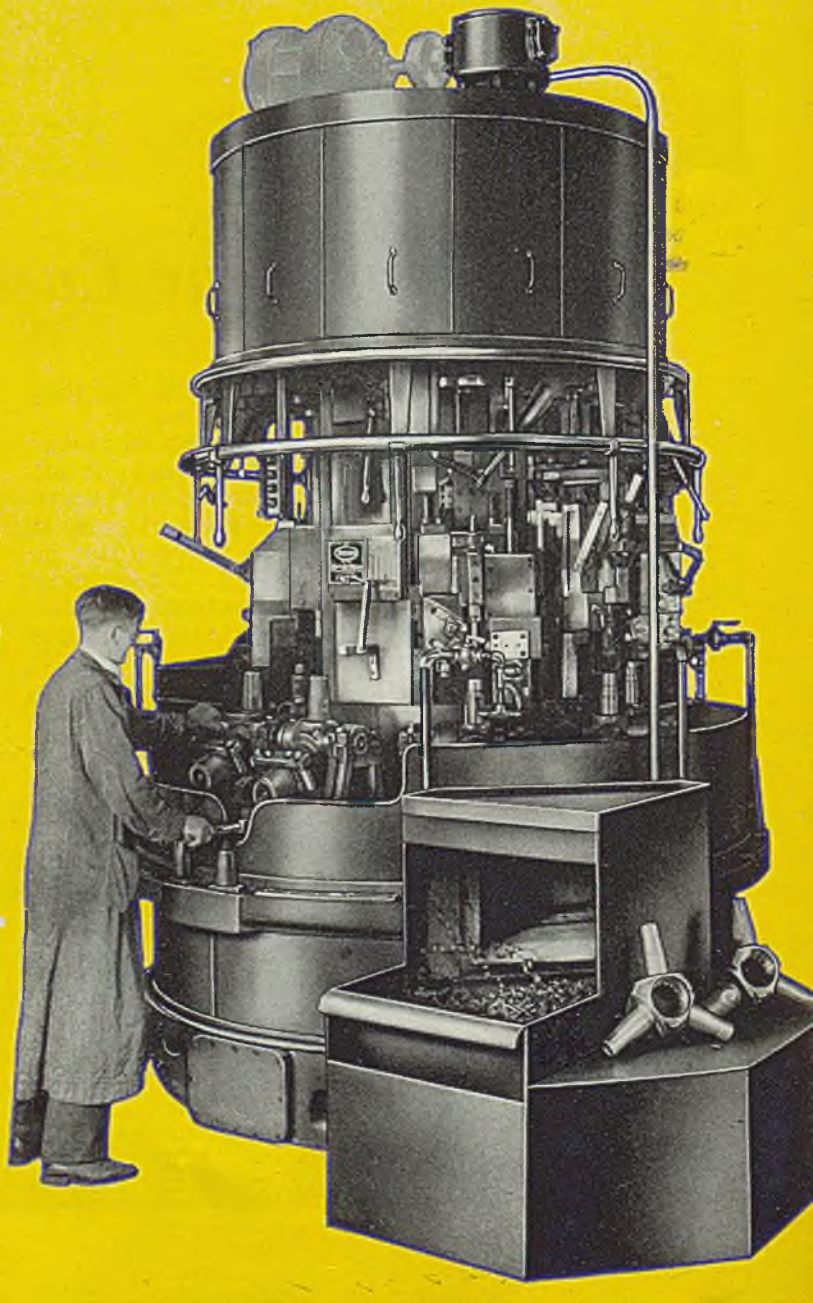
Mult-Au-Matic tooled for the operation mentioned on the opposite page.

BULLARD

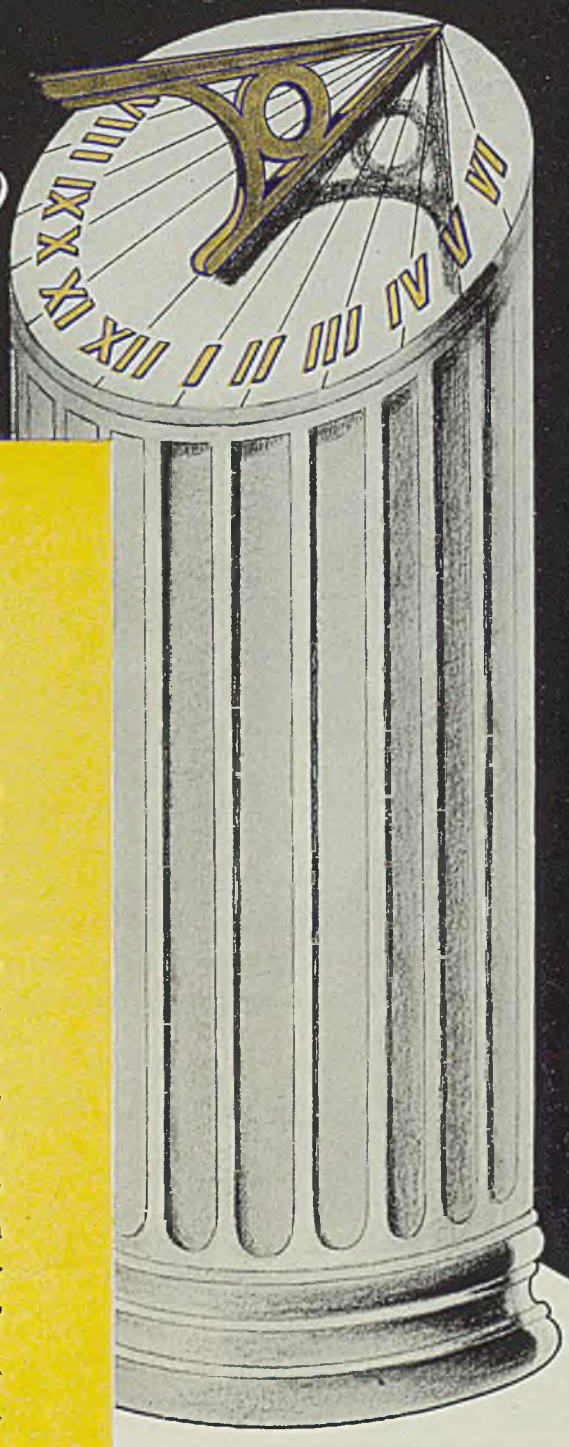
Old Time 96 Minutes

Mult-Au-Matic Time 6 Minutes

SAVED 90 Minutes



"TIME... said Ben Franklin IS MONEY"



TIME is more than money today—perhaps it's our very national life! So it is important to see just what makes Bullard Mult-Au-Matics such important time-saving tools.

The answer is the Mult-Au-Matic Method—a method by which the necessary machining of any given part is distributed among a considerable number of cutting tools and performed simultaneously. By multiple tooling on each of the five or seven working spindles, often 30 or more operations are performed simultaneously in the time taken by the longest single one, plus a few seconds for indexing. One example will illustrate: By using a Mult-Au-Matic, the machining time for an aeroplane propeller spider was cut from 96 minutes to 6 minutes. What more clearly shows the value of the Mult-Au-Matic method?

Bullard Engineers will gladly explain the application of the Mult-Au-Matic method to your production problems.

THE BULLARD COMPANY

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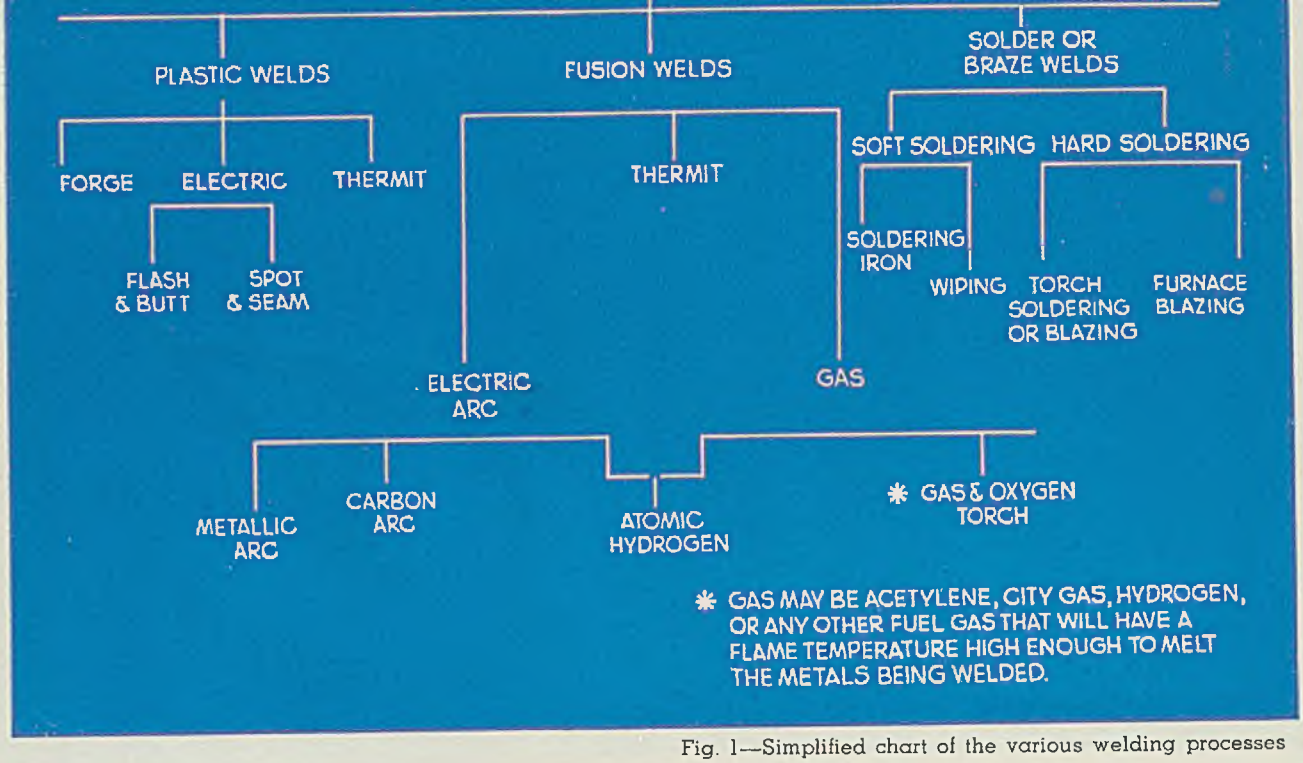


Fig. 1—Simplified chart of the various welding processes

WELDING METALLURGY

. . . . . Can Be Simplified

Here is a condensed and simplified presentation of the welding processes, designed to give to those who are interested a better understanding of the fundamentals of the many different variations of welding. The processes are discussed and related according to mechanics of making the joint and according to the temperatures involved in the work

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

■ WELDING has become so important that today there are few industries that do not make some use of the process. The mechanical side of the subject has been well taken care of by welding engineers. The metallurgical aspects have not been so well covered. The process itself is metallurgical in character and subject to all the fundamental metallurgical principles, modified only by the speed at which the reactions proceed.

A metallurgical classification of welds and welding would be of some value. Classifications so far published are based more on the mechanical features or on the basis of source of heat. While these are helpful, welds do not fall into logical divisions when grouped in this way. Some ackwardness if not actual confusion results.

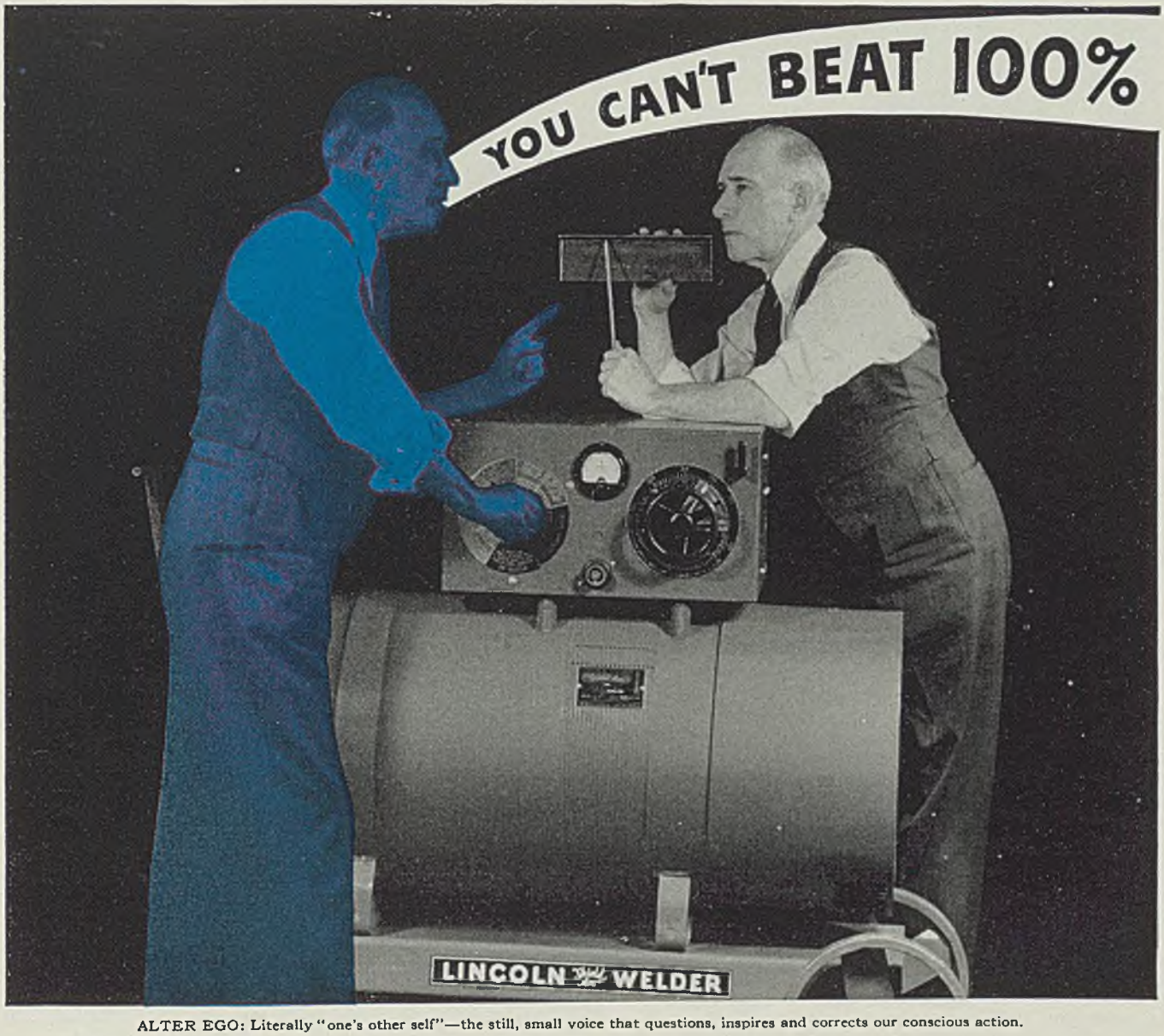
Metallurgically there are three kinds of welds—plastic, fusion and solder. This classification may be regarded as metallurgical for those who do not become frightened at the mention of that simple science. Unfortunately, many people believe the study of metallurgy requires the mental capacity of an Einstein. That is far, far from the actual truth. But to avoid that possible psychological handicap, let's proceed on the basis of finding out "what makes them stick."

Plastic Welds: The best known example of this type of weld is the one made by the blacksmith in the forge fire. The two pieces to be joined are heated to a temperature at which they are plastic but not melted. Then they are placed in contact and either hammered or pressed together. This process is used on iron and low-carbon steel in practice but may be applied to nearly any steel, provided the worker has the great skill required on much of this type of work.

As shown in Fig. 2, steel with 1.40 per cent carbon can be successfully welded by this method. But with this high carbon, the skill required is beyond that of the ordinary craftsman. Not only steels but other metals may be joined by the plastic type of weld. Two pieces of lead may be pressed together cold and be caused to join by the same method provided the surfaces to be joined are absolutely clean. See Fig. 3. In the case of lead, the plasticity in the cold state is high enough to cause the welding to take place. The actual union of the two parts is caused by a very simple metallurgical phenomenon, details of which are here omitted to simplify the subject.

In this same group of welds must be included the resistance weld, spot weld, resistance seam weld, and the flash weld. In the spot weld and resistance seam weld, as well as in the resistance butt weld, the heat is generated by the resistance of the joint to the passage of electric current. When enough heat has been developed, the parts are pressed together, producing a joint as shown in Fig. 4. These welds are as a rule superior to the forge fire weld. The old time blacksmith, contrary to the popular notion, did not make a very good weld.

All welds of this type are the same in principle except for the



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

ALTER EGO: What this new welder does for us should make you want to light a match under all the antiques we're operating and standardize on Lincoln.

The others seem to be satisfactory. Let's match performances—Lincoln versus—

ALTER EGO: Matching performances is right where the Lincoln shines! It is the *only* welder with Dual Continuous Control—in other words, with a Current Control PLUS a Job Selector—BOTH *continuous* in selection and *self-indicating*.

So what?

ALTER EGO: Then there can be no matching because that one advantage gives us unmatchable ease of control, unmatchable range of application and unmatchable arc stability.

All right, suppose my job is an overhead fillet weld. Then what?

ALTER EGO: Just set the Job Selector for "Overhead" and set the Current Control for any amperage to suit the size of plate and electrode. Then you're set for faster welding, less spatter and a stronger weld. Likewise for ALL types and sizes of work . . . in all positions. So if we make the shop 100% Lincoln, we get those benefits 100%. Can we afford less than 100%?

And what would appeal to me would be to pin undivided responsibility on Lincoln for tops in welding performance.

• •

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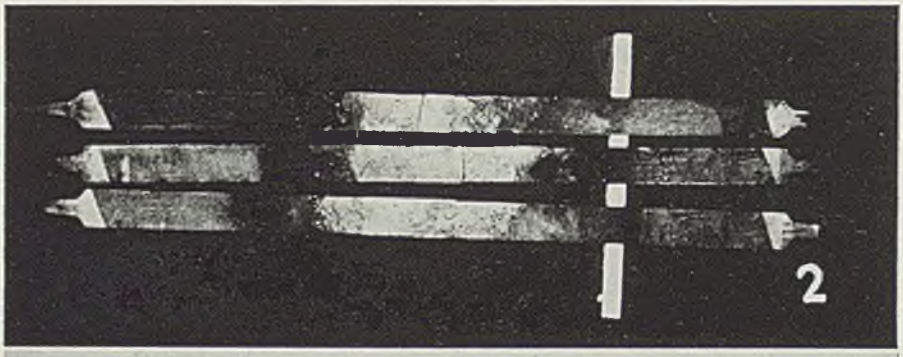


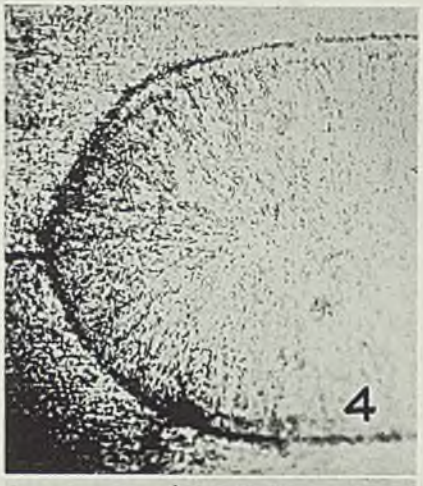


Fig. 2—Expert work in making forge or plastic welds is shown here in these files of 1.40 per cent steel. Much skill is required to weld high-carbon steel by this method

Fig. 3—Lead pieces welded together under a press without heating. These are true welds of the plastic type

Fig. 4—Cross section through spot weld in stainless steel at 75 diameters

Fig. 5—Cross section through fusion-type weld made by the oxyacetylene process

method of heating and type of equipment used to press the parts together. In the flash weld, it is true that some molten metal is produced. This, however, is thrown clear of the joint by magnetic forces or is trimmed off the finished weld and has little effect on actual welding.

Fusion Welding: In the first type of weld both parts were heated to a plastic state but neither was heated to fusion. In this second type, the parts to be joined are actually melted, the molten pool mingled and allowed to solidify in position. See Fig. 5. In this type of weld, all kinds are alike in principle, differing only in the method of applying heat. The electric arc weld uses the heat of the electric arc either directly from the filler rod or from a carbon electrode with a filler rod or simply by melting two edges of the pieces to be joined.

The gas-welding process uses the heat generated by burning some fuel gas in oxygen and, like the arc process, may or may not make use of a filler rod. The atomic hydrogen welding procedure is really a combination of gas and electric arc welding. Heat of the arc is used to tear molecules of hydrogen apart. When the gas has passed from the zone of electrical influence, the atoms go back into combination again liberating heat. This heat of recombination of atoms is used in the welding process. The weld itself is the same in principle as any other fusion weld. The superiority of this weld is due to the protection of the molten metal by an envelope of hydrogen which serves to exclude the air from the welding zone.

Lead burning, which is usually considered a soldering operation, belongs in the class of fusion welds. The extra skill needed for a workmanlike lead burning job does not change the principles upon which the operation is based.

Solder or Braze Welds: In the first class of welding, the parts to be joined were softened but not melted; in the second type, both parts to be joined were melted; in this third type, soldering, or brazing as it is often called, the parts are not softened or melted but are joined by a molten filler material. It is well known that a lump of sugar will dissolve in a cup of coffee. It is not as well known but equally true that a lump of iron will also dissolve in molten copper. A piece of nickel, melting at 1452 degrees Cent., may be placed in molten aluminum, melting at 658.7 degrees Cent., and the nickel will be completely dissolved even though the temperature is held just high enough to keep the aluminum in a melted condition. As some of the coffee also dissolves into the sugar, so too does some of the copper dissolve into the iron, and some of the aluminum is absorbed by the nickel. See Figs. 6, 7 and 8. It is this solution of the molten material into the solid that causes the bonding in the solder or braze type of weld.

Soft soldering, brazing by torch or hydrogen furnace and some of the hard-facing processes are examples of this type of weld. The soldering or brazing metal, soft solder, copper or bronze, is melted in contact with clean surfaces of the parts to be joined. Some of the liquid metal dissolves in the solid metal and forms a strong joint. See Fig. 6. The filler metal is then allowed to cool, producing a continuous metal part. Hard facing is done by this method though sometimes the base metal is also melted in which case the work would be classed in second type. Soldering employs the same principles employed in tinning and galvanizing sheet steel.

An interesting variation of the soldering-brazing processes that is not so well known is iron soldering. In this process, iron or low-carbon steel is melted by a gas torch and allowed to flow over a heated but not melted surface of either iron or steel. If properly done by a skilled operator, a definite soldering action takes place.

Thermite welding may be fusion or plastic, depending on the method employed. For repair of broken castings, fusion welding is used. Thermite welding of pipe in the field is usually done by the plastic method.

Temperature Classification: In any discussion of the various welding processes, it is extremely helpful to consider the temperatures

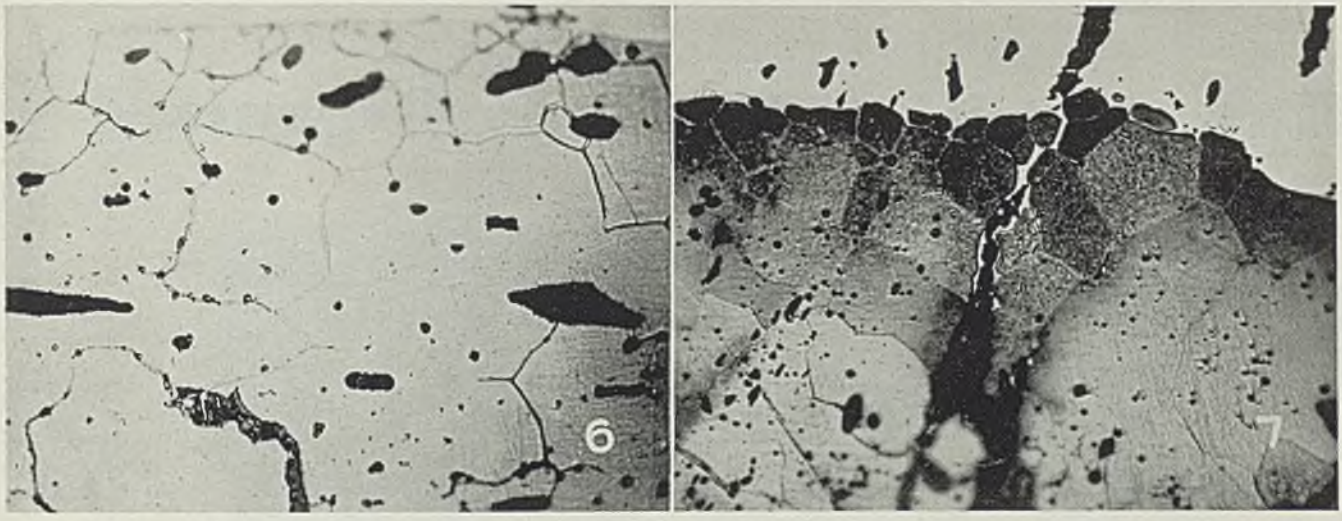


Fig. 6—Braze-type weld, left, showing penetration of the bronze into wrought iron along the grain boundaries near the top edge. Unetched area at extreme top edge is bronze which does not etch with the reagent used

Fig. 7. (Right)—Shows what happens when wrought iron is held in molten bronze. The solution reaction has proceeded farther than in the brazing operation, Fig. 6. Here solution of the iron into the bronze is shown as well as penetration of bronze into the iron

at which the joint is made. All fusion welds, of course, must be made at temperatures sufficiently high to melt the metals being joined. Thus classified according to temperature, fusion welds would come first as they require the highest temperatures.

In the next class would be the plastic welds since these are made at temperatures just below the melting point but sufficiently high to soften the metal so it will flow. Of course in flash and thermite welding there are temperatures near the joint much higher than the melting point of the material being joined. However the metal remaining in the joint itself rarely reaches the melting temperature and thus these types of joints are included with other plastic welds and are said to be made at temperatures below the melting point of the material joined.

Third in a classification according to temperature would be braze and solder welds. According to the usual usage of the term, brazed welds are made at slightly higher temperatures than solder welds since the material used to form the joint in brazing is usually copper or a bronze which has a higher melting point than alloys used in soldering work. In fact, the solder and brazed weld classification possibly covers the widest temperature range of any since the joining or bonding material may have a melting point ranging from above 2000 degrees Fahr. to 200 degrees or below. Usual brazing temperatures with bronzes run around 1600 to 1700 degrees Fahr. Silver solders and high-phosphorus brazing alloys may employ temperatures around 1000 to 1200 degrees Fahr. High-lead content solders usually work in ranges around 600 to 700 degrees Fahr. Special alloys such as Wood's metal may melt at temperatures below 200 degrees Fahr.

Consideration of the temperatures involved in any particular process often is helpful in obtaining a better understanding of the mechanics of joining.

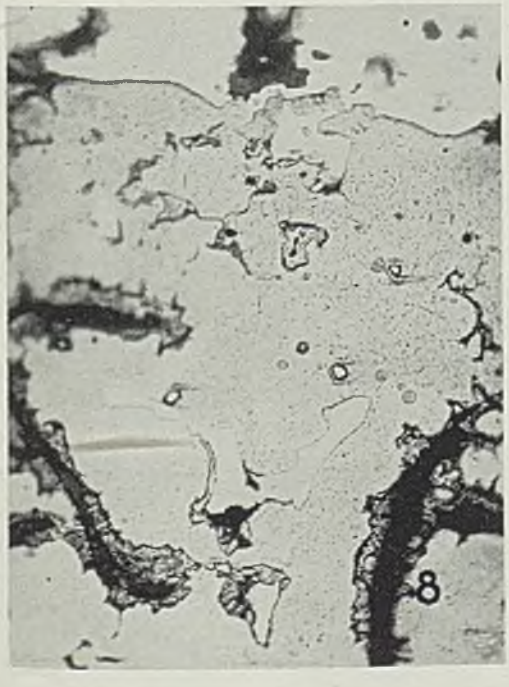


Fig. 8—When cast iron is held in molten bronze for a few moments, the bronze penetrates deeply as evidenced by the white unetched areas deep in the iron. Also graphite has been liberated by solution of the iron and is shown in the bronze coating at top of illustration

Betters Quality by Painting Extrusion Dies

■ To increase the number of "pushes" between successive redressing operations on extrusion dies, Revere Copper & Brass Inc., Detroit, is using "dag" colloidal graphite as a lubricant in making extruded shapes of aluminum alloys. Not only have the pushes been increased some 20 per cent, but of even greater importance is the fact the improved surface obtained will effect a considerable reduction in scrap produced by unsatisfactory surface conditions.

Application of the graphite is simple. Each time the dies are removed for redressing, they are coated with a graphite dispersion using an ordinary spray gun.

The sections produced by the extrusion process range from various architectural shapes, such as window frames, sills, angles, T's and Z's to thin ribbed and corrugated forms suitable for moldings and cover strips. Use of the graphite has proved of greatest importance with the thinner sections where the decorative value of the product required a smooth finish.

How Handling Work Is Organized For Field Erection of Steel Tanks

Materials handling work must be co-ordinated with proper equipment, adequate care in laying out sequence of operations and in actual design of the structure if the job is to be done efficiently. Just as improved materials handling methods offer the greatest possibilities for increasing efficiency of plant operations, so also do they afford great opportunities in field work, as Mr. Spangler points out here

By F. L. SPANGLER
Mechanical Engineer

METHODS used in the field for the erection of steel tanks vary considerably with the type and size of structure. Even the methods employed for the erection of any given structure often differ in important details among the various tank manufacturers.

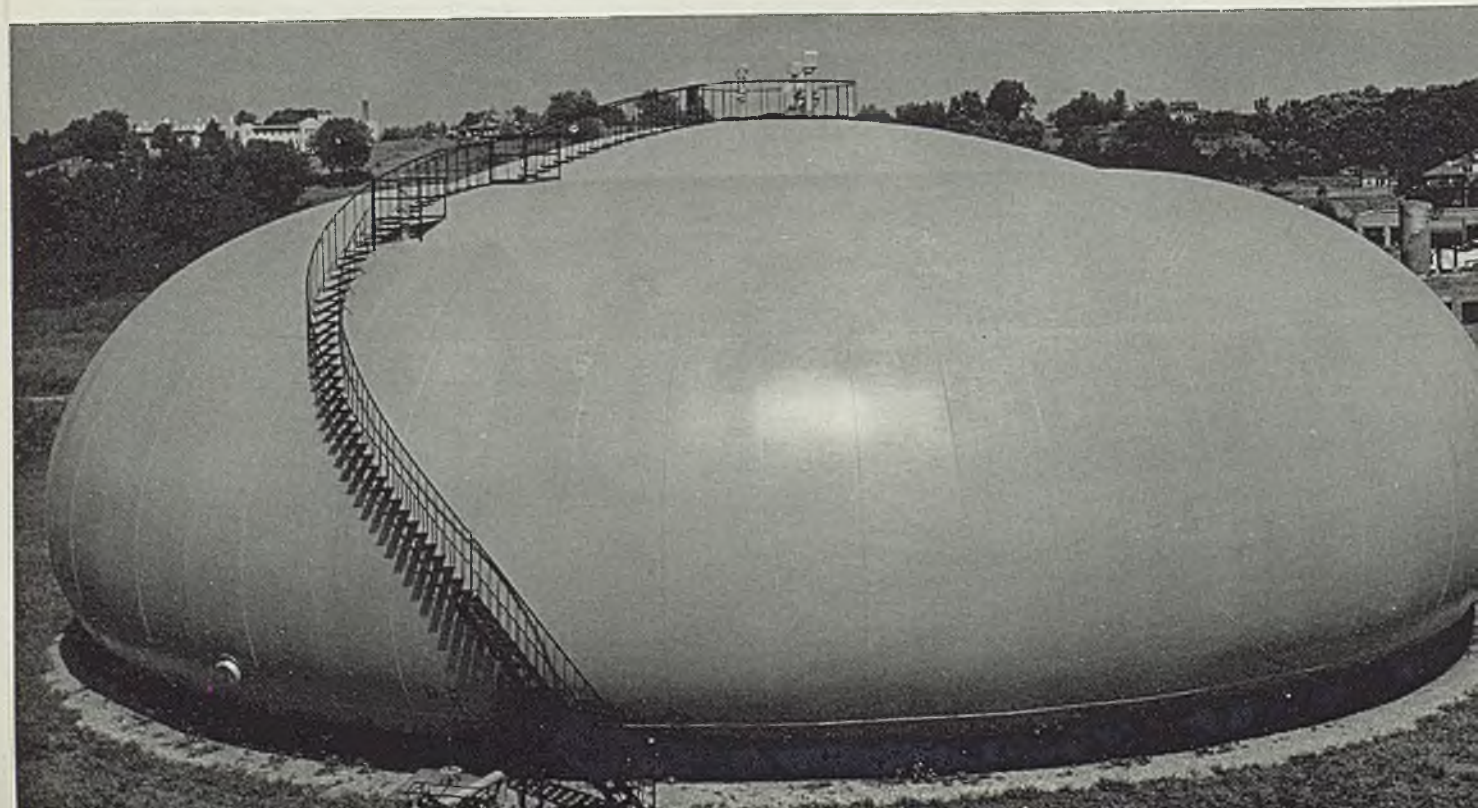
The parts comprising the structure may be assembled on the site by bolting, riveting or welding. As the height of the structure progresses, wooden gin-poles or steel derricks may be employed for hoisting plates, steel members and fabricated assemblies into place. If of small size, these parts may be pulled up by ropes in the hands of the workmen atop the structure.

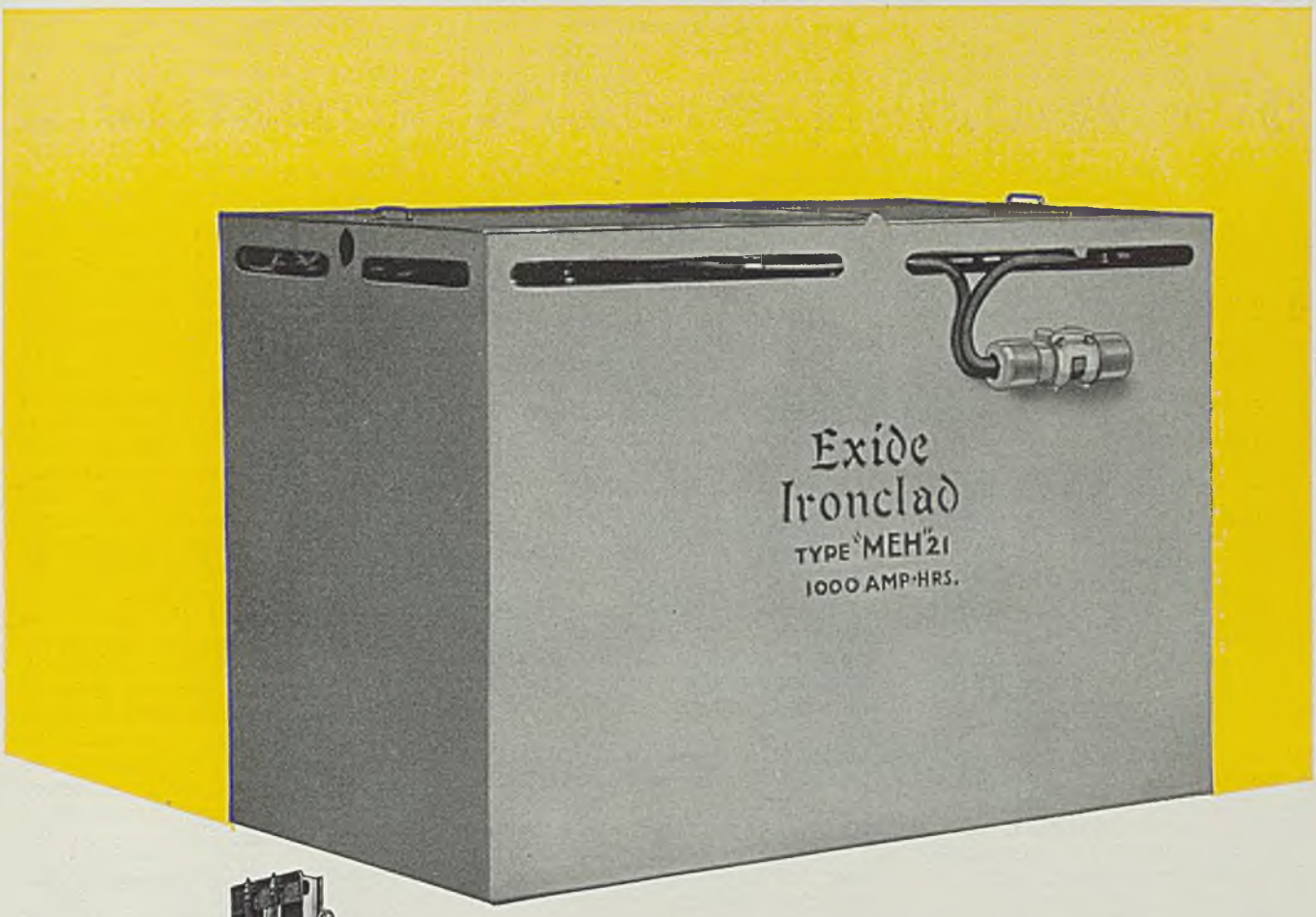
Plates are clamped into position before welding or riveting. Where welding is employed, the sequence of the welding operations is chosen with care to avoid warpage or shifting of the plates. The welding sequence and the fitting and clamping of plates are sometimes held as carefully guarded secrets by the individual tank manufacturers. Some of these operations even employ patented methods or devices.

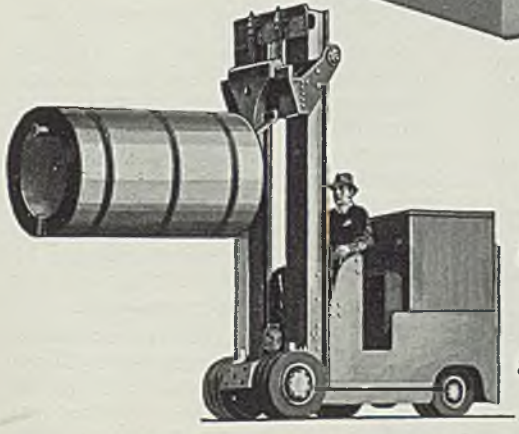
Can't Tell the Entire Story: Thus it is not possible to reveal all details regarding the field erection of tanks—not merely because of what some erectors regard as their own methods but because the many possible variations would require much more space to cover than is available here. However, the problems of field tank erection will be briefly discussed in this article, and one type of structure will be chosen for analysis.

In almost every type of tank erection job, a considerable amount of wire rope is required for hoisting and guying, and additional wire rope is frequently used for slings and for the temporary bracing or plumbing of framework. The element of safety as well as convenience enters into the selection of wire rope for these purposes.

Type of tank known as the Hortonspheroid, used to store volatile liquids such as gasoline. Problems in erecting this type of structure are discussed. A complete pictorial sequence of the operations will appear next week







A 15-TON STEEL COIL IS EASILY HANDLED BY A BATTERY LIKE THIS!

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AS steel coils have increased in size and weight, so has the capacity of the battery electric trucks that handle them in mill and fabricating plant. So also has the capacity of the Exide-Ironclad Batteries which power so many of these trucks.

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THE ELECTRIC STORAGE BATTERY CO., Philadelphia
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To conserve weight, sheaves and sheave blocks in erection work often are comparatively small in size, resulting in the introduction of high bending stresses in the ropes, thereby contributing to metallic fatigue, which ultimately makes its appearance in the form of broken crown wires in the ropes. Some erectors of steel structures employ preformed rope to reduce the fatigue effect, thereby adding to the rope service life. The resistance to fatigue offered by preformed rope is attributed to the almost total absence of locked-up stresses in the individual wires. Such a rope can be cut without the strands and wires flying apart at the cut end. This feature, according to many users of preformed rope, also adds to the ease and speed of reeving and of applying shackles or clips.

It is safer to handle, too, since there will be no broken wire ends sticking out from the rope to lacerate or puncture the hands because broken crown wires keep their position in preformed rope.

A portable winch-type of power unit is generally employed for the operation of hoisting ropes, boom-holding ropes, and slewing ropes. This unit is provided with one to three drums which are operated by an internal-combustion engine or electric motor.

Field erection of tanks is only one aspect of a larger problem which may be stated as follows: What parts of the structure shall be fabricated in the shop, and how shall these fabricated assemblies, as well as other parts, be delivered to the site and erected so the total cost will be the minimum? The answer to this question will influence the method of field erection.

If the structure is delivered to the site in lightweight units, erection may be accomplished with or without the assistance of gin-poles and a power drum unit. Where the loads are heavy or the lift is great, a derrick may be decidedly advantageous. Also, since almost all field tanks are circular in form with a diameter of, say, 20 feet or more, the limited reach of the gin-pole compared with the considerable reach of the derrick gives the latter a position of advantage in many cases.

Use Guy-Type Derricks

Derricks employed in tank erection are of the guyed type. The guy ropes are fastened to the top of the mast, after which the mast is lifted into an upright position and the guys are anchored. The erection of the mast may be by crane or by means of a rope passing from the top of the mast over a sheave on some temporary or permanent part of the tank structure, which may be a column or lattice-work support that has been erected without the aid of the derrick.

In order that the derrick may have the necessary lift and reach, it sometimes must be mounted onto some part of the tank structure instead of on the ground. The raising of the derrick mast into position frequently presents a problem requiring considerable ingenuity on the part of the men.

After the mast is in place, it can be used to hoist the derrick boom and swing it into position.

In the construction of an elevated tank of 1,000,000 gallons capacity, having a large riser connecting with the center of the tank bottom, the derrick mast was erected on the ground and the riser, constructed of plates, was built around it. Guy lines tying the top of the mast to anchors, and other ropes attached to the bottom of the mast and extending up inside the riser and passing over sheaves at the top of the riser, were used to raise the mast and keep it in position. As course after course of plates was added to the riser, the sheaves were advanced upward each time, and as erection proceeded the mast was lifted by ropes passing over these sheaves. With the riser completed, a temporary extension was added to the top so the sheaves supporting the bottom holding ropes could be moved higher, thereby allowing the mast to be hoisted until its bottom rested on a platform on the top of the riser proper.

Mast Handled Differently

In the erection of the Hortonspheroid, a still different method is employed to hoist the derrick mast into position. The Hortonspheroid, because of its unique shape and construction, as well as the large sizes in which it is built, presents unusual problems of erection. Hence, it is admirably suited as an example of how erection problems often call for the utmost ingenuity and skill.

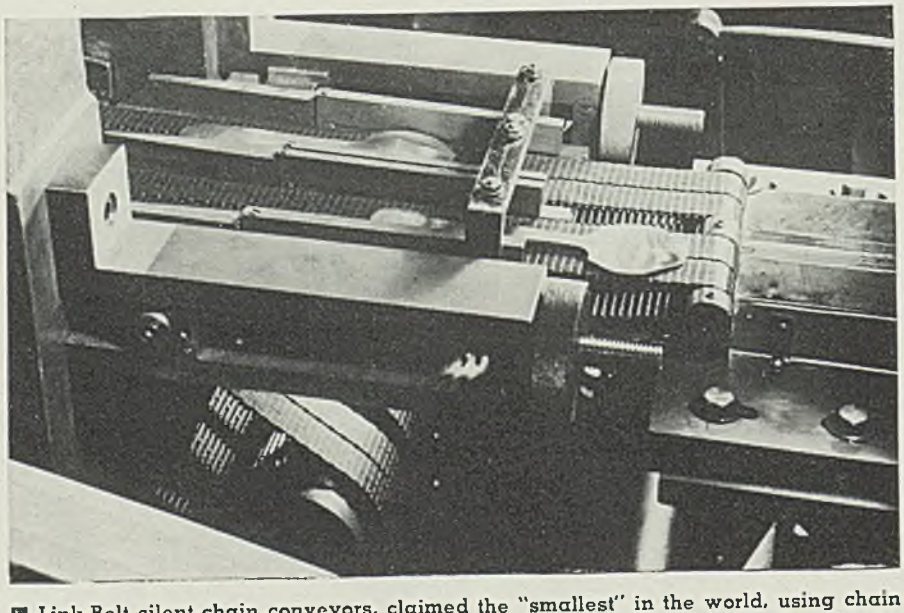
The Hortonspheroid is a constant-volume tank for the storage of volatile liquids. See accompanying illustration. All outside plates, including bottom, side and top plates, conform to mathematically determined curved surfaces designed to minimize unit stresses created by the pressure of the liquid and its vapor against the inner surface of the tank.

These tanks frequently are made for both low and high pressures. A vertical section through the center of the tank reveals a closed figure consisting of a series of cusps along the bottom and a series of nodes, or inverted cusps, along the top. At the sides of this figure, the ends of the nodes join the ends of the cusps in a smooth, unbroken curve.

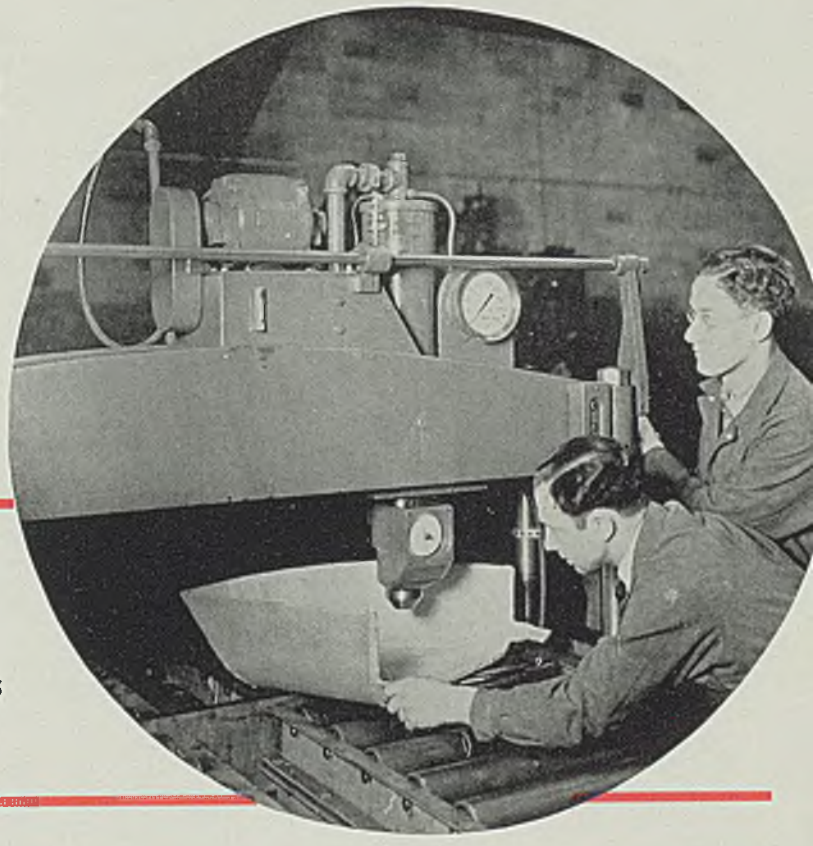
A general description of how the handling work is organized for the erection method employed by the Chicago Bridge & Iron Co., Chicago, for this type of tank will appear in section two of this article next week.

(Concluded Next Week)

Little Chains Conquer Big Cost Item



■ Link-Belt silent-chain conveyors, claimed the "smallest" in the world, using chain of but 3/16-inch pitch, were installed recently on a spoon rolling machine in the silverware plant of Oneida Ltd., Oneida, N. Y., to cut down on the time lost in repairs and production caused by previous conveyor belts which deteriorated from the effects of a special oil used to prevent roll marks on the spoons. The illustration above shows a spoon blank being carried away from the straightener. The oil, with this new setup, has been "tamed", and now serves as a lubricant.



Checking the hardness of an airplane seat section made of new type armor plate is accomplished on a special brinell testing machine. The testing instrument, mounted on a cross-head, may be moved through a motor drive which places it over any portion of the plate's surface. Rollers on the machine bed facilitate locating the test piece in desired position

Light Armor Plate

Heat Treated by New Process In 1/6th the Usual Time

■ ATTEMPTS to quicken production of work for the defense program are being aided in numerous instances by improved manufacturing practices. An outstanding example is a new process employed by an eastern manufacturer—Breeze Corps. Inc., Newark, N. J.—which allows light armor plate to be produced in but a fraction of the time required by conventional methods.

Increased application of protective armor to the weapons of modern warfare is typical of the major developments in mechanization of military forces since 1914-1918. Warships, as in the past, are protected by an encasement of hard, tough steel. But the important uses of armor plate no longer are confined to ships of war. Today it is an equally important factor in increasing the effectiveness of airplanes, tanks, trucks, motorcycles and guns.

More general use of armor plate results not only from the widespread employment of mobile weapons but also is necessary because modern guns are more deadly than those of 25 years ago. This calls for better armor as well as more of it.

No longer, as in 1914-1918, does the pilot of a fighter or bomber go aloft with little more than his skill as an aviator to protect him from enemy machine gun or anti-aircraft fire. A shield of armor plate now surrounds him. This plate naturally cannot be applied throughout the plane because the weight would be prohibitive, but it is fitted about the seat occupied by the pilot and around the compartments occupied by other members of the crew. The limitation of weight requires that the plate combine as light a gage as possible commensurate with effective resistance to projectiles.

Armor plate made by Breeze Corps. ranges up to 44 x 44 x 1½ inches, most of it being in ¼, ⅜ and ½-inch thicknesses. At present practically all of it is used in airplane construction. For a number of years, this company has been engaged in the manufacture of aircraft and naval parts—including tubing, engine starters, vessel hatches, radio shields, and the like. The new heat-treating process is the result of development work carried on during the past two years to reduce the time required to carburize the plate a sufficient depth below its surface.

Treated To Prevent Shattering

Armor plate essentially is a nickel alloy steel which is given added hardness by heat treatment while in contact with a carbonaceous material, the latter generally being in powder form. This gives the steel a high carbon content to a limited depth, the carbon concentration being maximum at the surface and decreasing below the surface till a point is reached where no carbon has been added. Carburization is desired on only the exposed side of the plate in order to give the armor a hard surface on that side with a more ductile but tough composition to back it up, thus giving maximum resistance to shattering.

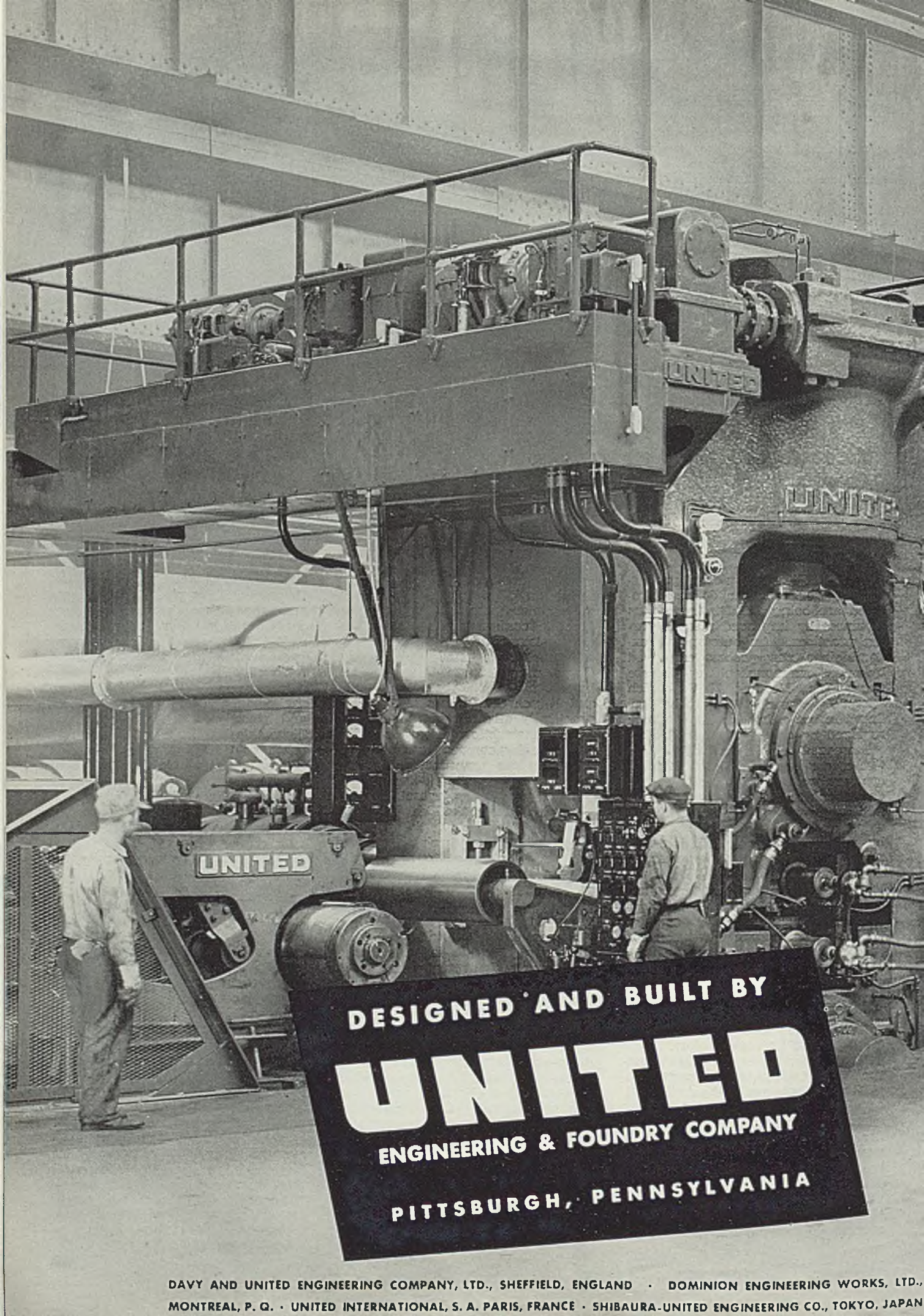
With carburized or face-hardened armor plate, carbon is added to the surface for about one-fourth the thickness of the plate to give extra resistance to penetration. The face surface will test about 54 or 55 rockwell C. The back side where no carbon is added will show 42 to 44 rockwell C.

In common practice the plate is packed in a box of carbon powder and placed in a heating furnace. Since this box may weigh twice as much as the steel which is being treated, considerable time and heat is consumed before the contents are raised to the desired temperature. As much as 50 hours may be required for a complete heat for ¼-inch plate.

The Breeze process permits the carrying out of three heats in 24 hours. Carburizing treatment given the plate is accomplished with a liquid salt bath in an electric furnace. This equipment enables the work to be charged and removed quickly; brings the plates up to desired temperature promptly, and makes accurate temperature control possible.

While this method of hardening is not new, heretofore it has succeeded in giving treated parts only a light case. The practice as developed by the Breeze organization involving some details which are not being disclosed at this time—is said to be the first which will give sufficient depth of carbon penetration to permit steel treated in this manner to meet government ballistic specifications for armor plate.

(*Please turn to Page* 88)



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PITTSBURGH, PENNSYLVANIA

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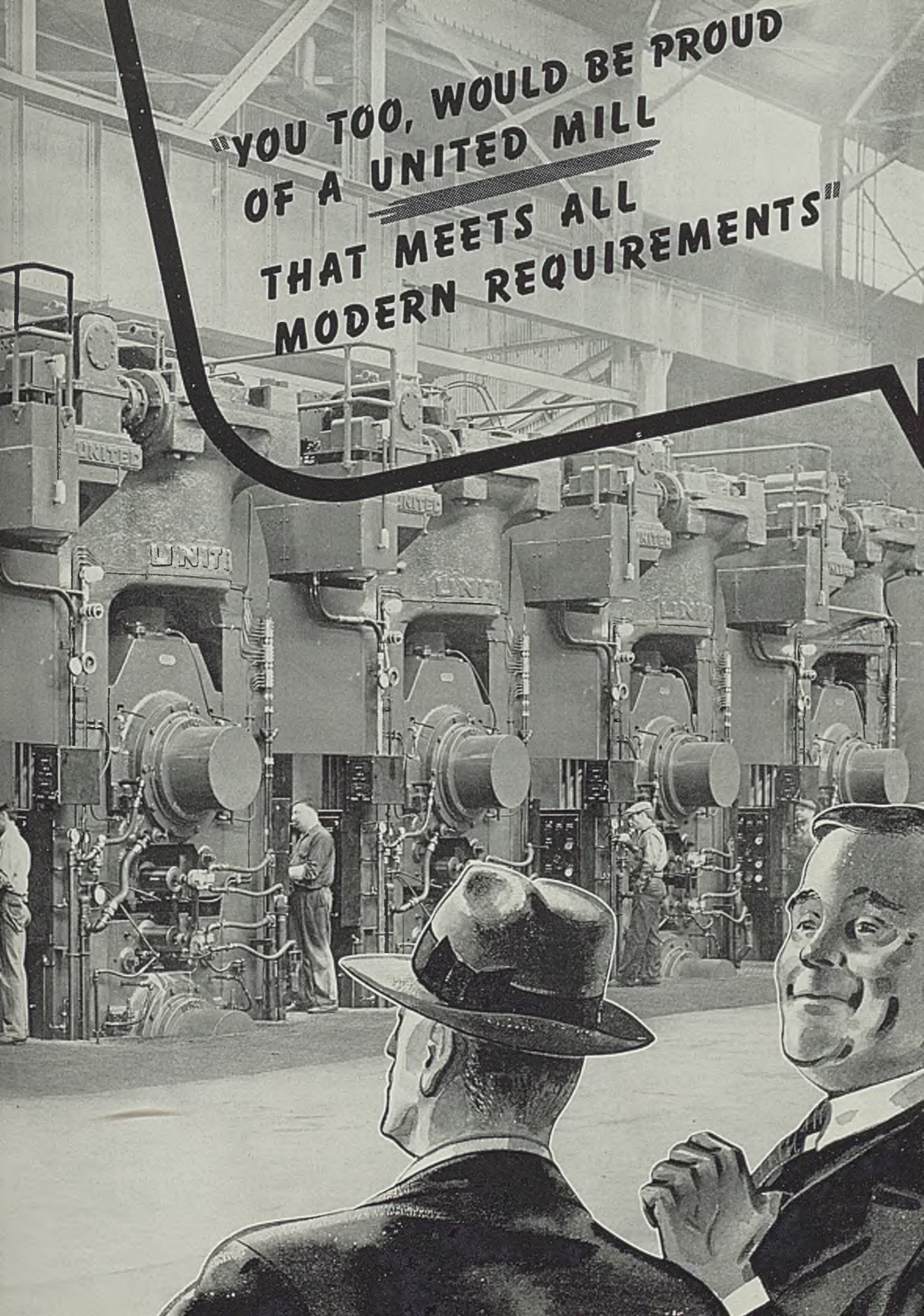

"YOU TOO, WOULD BE PROUD
OF A UNITED MILL
THAT MEETS ALL
MODERN REQUIREMENTS"

BETWEEN HEATS

WITH *Shorty*

■ Say Fellers:

I saw somethin' the other day that is becomin' rare in the iron 'n steel industry, 'n in case you'd like to 'ave a look before they disappear, you'd better be up 'n at it for there are only a couple or so left in this country. I'm speakin' 'bout hand-filled blast furnaces.

Down in the stockhouse they had three fellers handlin' the buggies of raw materials. 'N on top they had a couple of top fillers. Little narrow-gage tracks ran all over the stockhouse 'n it was over this system that the bottom fillers moved the buggies of ore, limestone and coke from the bin system to the elevator shaft.

At the top of the stack the top fillers moved the buggies from the hoist platform to a point over the center of the furnace and dumped the raw materials on the big bell. When one complete charge was in the hopper, the bell was lowered, the stock slid into the furnace 'n the escaping gas burst into a flame that shot high in the air.

While I was down in the stockhouse of this hand-filled furnace I got chinin' with one of the fellers who handles the ore buggies.

"Ya know, Shorty," sez he, "we put a lotta stock to the top of the little ol' pot in a day. 'Course nothin' like some of the other furnaces in the country are doin' with their skip hoists. When I first started on my job of bottom-fillin' we didn't have any of 'em funny lookin' little cars runnin' to the top of the stack. We loaded all the stock by hand in the buggies and we dumped it all by hand in the top of the furnace.

"How many men did ya have to keep the furnaces filled in the early days?" I asked.

"Well, I'll tellya. I remember of workin' at a little stack in Pennsylvania back in 'bout 1909. She threw 'bout 250 or 300 tons of iron a day out of the iron notch, 'n we had 'bout 22 men in the bottom filler's gang on each turn."

"I don't see that many fellers 'round this furnace doin' their stuff," I sez.

"Naw—three of us here in the stockhouse can keep 'er goin' alright, but 'course sometimes she keeps us steppin' right along. Same thing happened back at the ol' Emma furnace in Cleveland when I was bottom fillin' as a lad. We use to have a hard time keepin' 'er filled sometimes for she was a fast workin' furnace every so often. 'N when she'd start makin' iron fer fare—you—well, we'd have to step on the gas. One day, I remember, a young ingineer by the name of Mac came down in the stockhouse. He kept lookin' at the chargin' board where we kept track of the 'mount of stock we'd sent to the top.

"Sorta nosey like," I interrupted.

"Yeh—but he had the right dope, alright. He sez, 'Say, fellers, how'd ya like to have a contraption on the top of the furnace that would dump the stock itself? Somethin' like this.' Then he took the piece of chalk on the chargin board 'n drew a sketch showin' a receivin' hopper on top of a revolvin' cylinder with a small bell at the bottom. 'N all the time he kept talkin.' He sez, 'Ya see when the little bell is lowered the revolvin' cylinder will spread the charge on the big bell a whole lot better than ya can do it now.' Then he'd start puffin' on his cigar ag'in.

"I sez to 'im, Mac, it sounds okay to me. 'Course I didn't mean it, Shorty, cuz I thought he was foolin' all the time. But he was in earnest alright. He had the cigar in 'is mouth goin' like a steam engine and every once in a while, he'd stop puffin' and say, 'Well son, whaddaya say?' I sez to 'im, it's alright with me, son, if you can make 'er work but we've always had fellers in the stockhouse buggingin' ore 'n stone 'n coke to the hoist and we've always had a couple or three fellers on top droppin' 'er in the furnace. If y' think y' can do any better than the boys kin do, well son, she's all yours."

"What did he say?" I asked.

"He sez. 'No question but what she'll work.' Fac' is, Shorty, there wasn't any question in my mind either but what she'd work cuz I gotta a good look at Mac's eyes 'n y' could tell he was talkin' cold turkey. 'N all the time he had 'is cigar throwin' more smoke than was comin' out the stacks on the boilers. Boy, he really was goin' to town."

"Didja ever put 'is contraption on the furnace?" I asked.

"I'll say we did. Wait 'till I tellya 'bout it. The Big Boss kept sayin' to the young engineer, 'Mac, she won't work.' But Mac stuck to 'is guns 'n he sez, 'She's gotta work, boss. Ya can't be monkeyin' with 22 men in the stockhouse and three top fillers besides, if you want to make iron 'n stay in business.' I tellya Mac talked to the Boss like a Dutch uncle."

"Did he sell 'im on 'is idea?"

Fire Does the Trick

"Naw, not right then. But one day the ol' wooden cast house caught on fire 'n she burned to the ground. The heat twisted the cage of the hoist so that she wasn't any good 'n the Boss reckoned he'd have to build a new one. But all of a sudden he thought of the contraption that Mac, the ingineer, designed. He sez to 'imself, 'I've a good notion to give 'er a fling.' 'N he called Mac in 'is office and sez, 'Son, you've been pesterin' me long enough. Now let's see what y' can do with that trick top of yours. Y' say y' can put a skip on the ol' pot out there 'long with your new fang dangle apparatus for spreadin' the charge. So go ahead and do your stuff.' 'N you know, Shorty, that 's exactly what he did 'n that distributor was the first to be built in this country. 'N what's more. Pretty near every blast furnace in this country 'n many in foreign countries are usin' this distributor now."

"That so. What became of the ingineer who did the job?" I inquired.

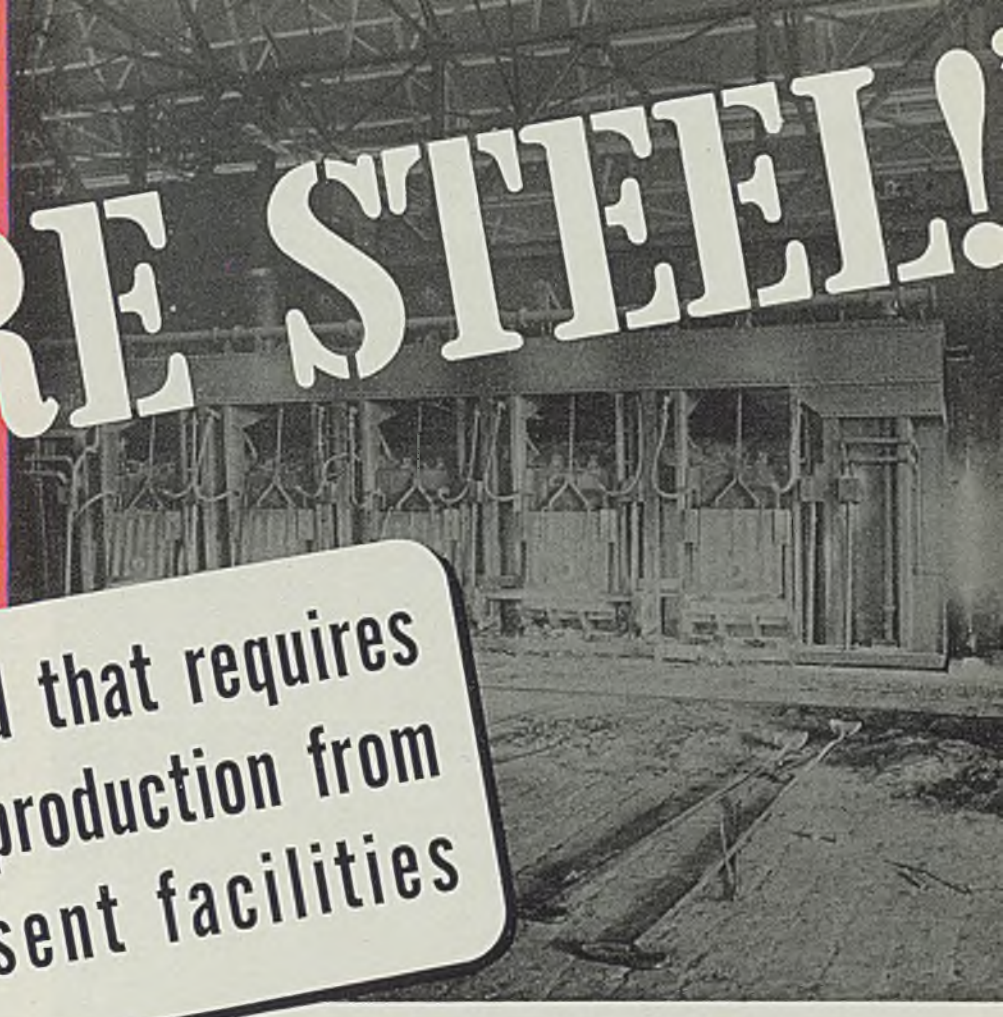
"Young Mac, as we called 'im? O, he's up in Cleveland. His real name is Arthur McKee 'n he 's the head of the ingineering firm of Arthur G. McKee & Co."

'N jus' as he finished gibin' me the low-down on the revolvin' distributor, the bell rang for more buggies 'n we parted company. So, fellers, when y' see Mac sometime, ask 'im if he remembers the day when a cast-house fire enabled 'im to put across 'is idea.

So long, fellers. I'll be seein' ya.

"Shorty" Long

"MORE STEEL!"



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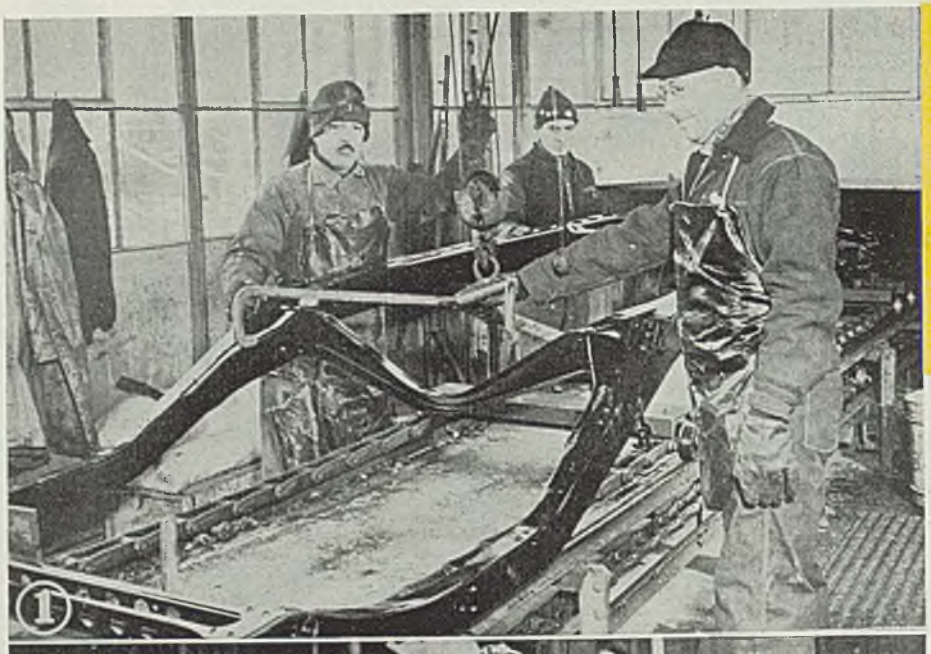
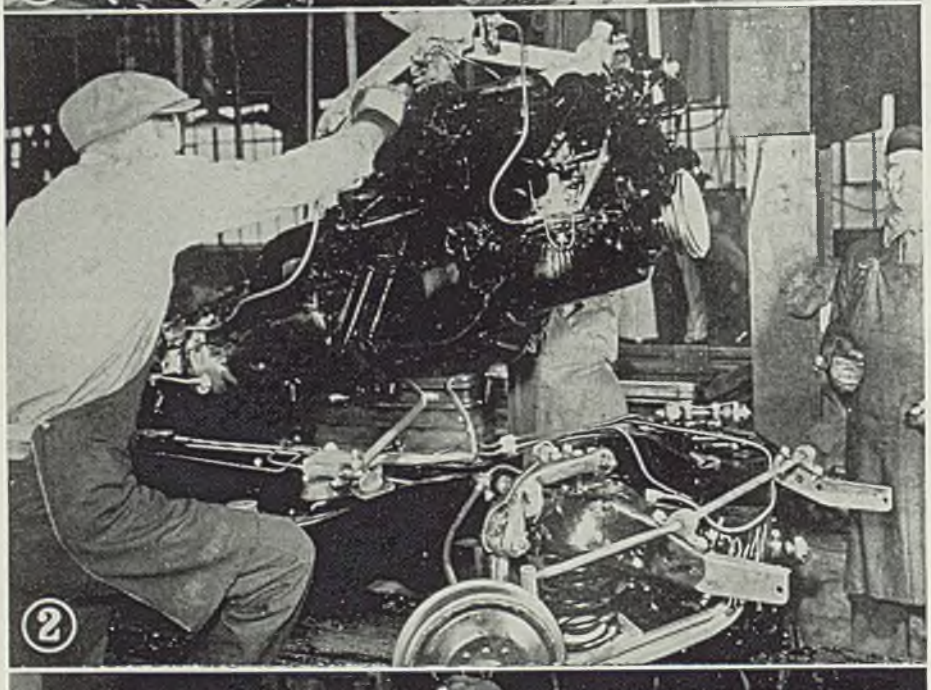
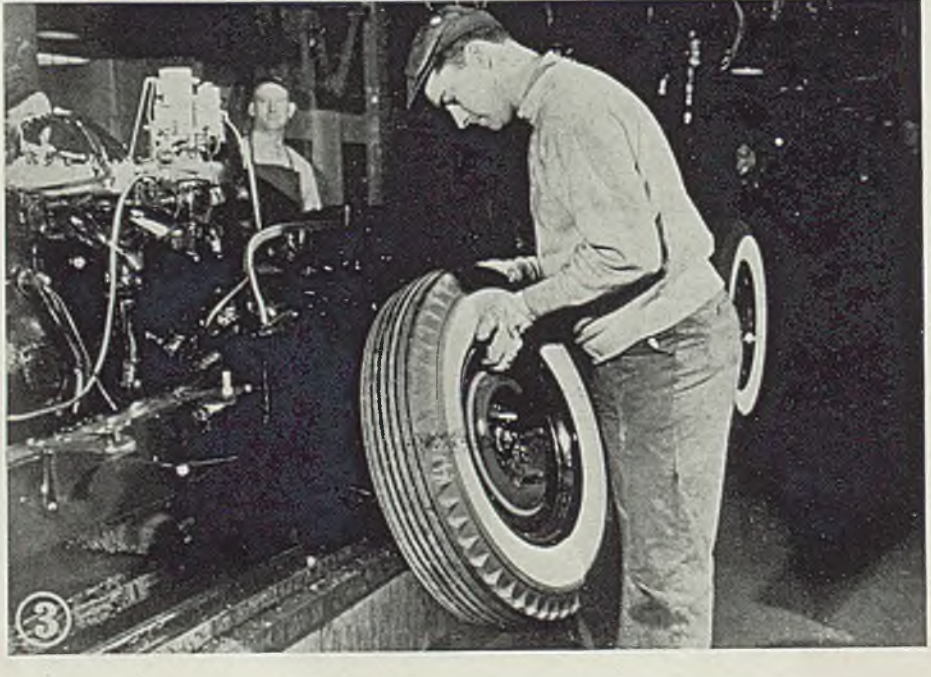
Making an

In One







It takes only an hour to assemble a Chrysler car. In that incredibly short time a bare frame starts at one end of the conveyor and a finished car comes off the other end. This, of course, represents only a small fraction of the hours of labor that enter into the building of a car. Final assembly has been likened to a book printing job in that the component parts, corresponding to the pages of a book, are gathered together and bound into the complete unit.

The miracle of modern mass production is not so much in the "binding" as in the manufacturing of parts so nearly perfect, and uniform within such microscopic tolerances, that the completed car will function to the owner's complete satisfaction. Constant inspection of these parts

Fig. 1—At 10 o'clock these men are placing the frame upside down on a conveyor, the first assembly operation

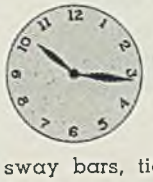


Fig. 2—Sixteen minutes later the engine is dropped into place. In the meantime front and rear springs, shock absorbers and front axle, brake and fuel lines, front and rear sway bars, tie rods, muffler assembly, exhaust pipe and tail pipe, brake pedal and master cylinder and many other parts have been placed on the chassis. Grease is shot under pressure into all Alemite fittings on the chassis at this point

Fig. 3—At 10:28 the wheels are being placed on the car. In the third period the exhaust assembly is hooked up to the engine, clutch and brake pedals lined up, and clutch over-center spring assembled to the clutch pedal; the propeller shaft assembled, and the motor number stamped onto the car frame

Automobile Hour

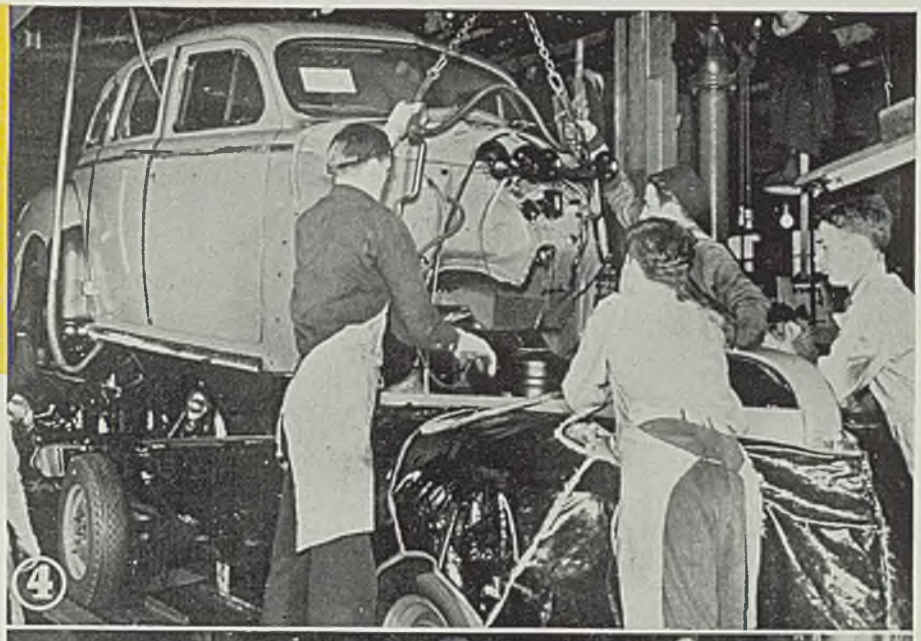
and of the minor assemblies into which they enter before final assembly make this possible. Furthermore, when the car comes off the assembly line, the final okay inspection line comprises several hundred operations and consumes almost as much time as the actual assembly.

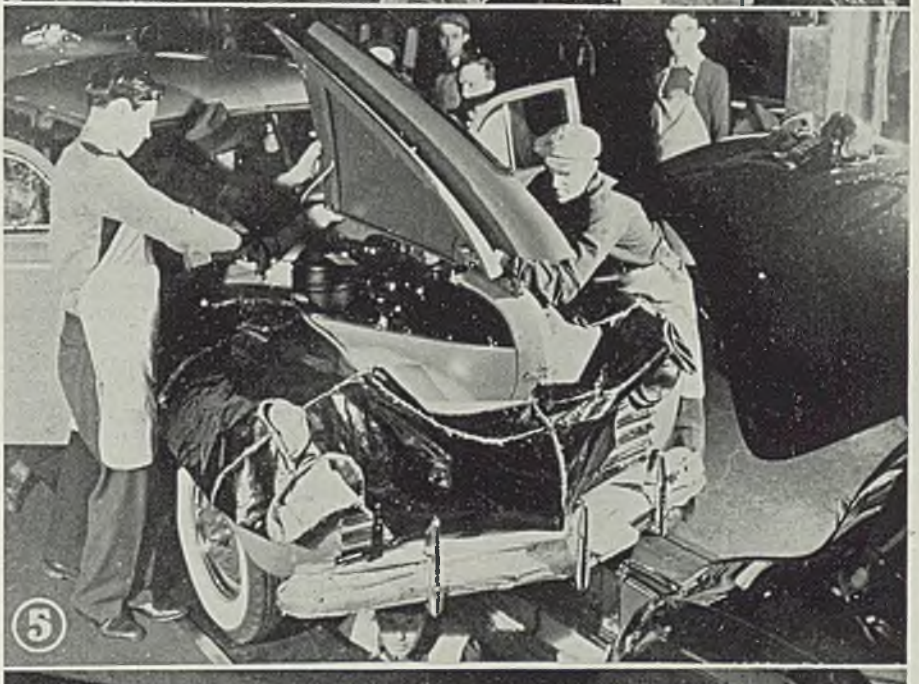
Here are shown the most important steps in progressive assembly during the hour that a Chrysler is being formed on the conveyor. These operations are fast and apparently simple, but only because of the infinite planning and work that has preceded them. On the final assembly line, operations of which are shown here, an average of 386 men are employed on the "float". To make a schedule of one a minute, 72 cars are in progress.

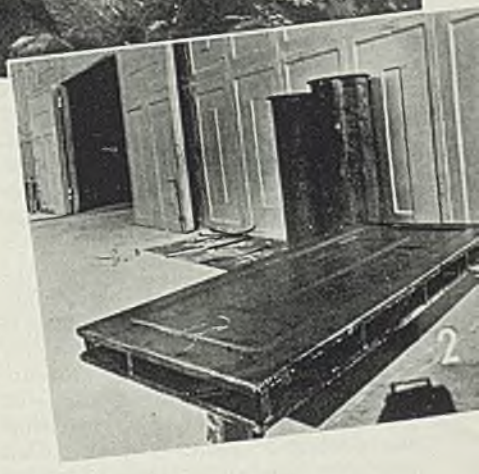
Fig. 4—At 10:39 the body is dropped into place by a traveling crane. The body is firmly bolted into place and toeboards, draft pads and clutch, brake and accelerator pedal pads are put on the car. Front and rear bumpers, batteries and all the wiring between the body and the chassis are installed and a score of other operations take place. Men in pits beneath the conveyor assemble parts to the underside of the car

Fig. 5—At 10:51 the hood is installed. Water, alcohol and anti-rust compound are placed in the radiator and gasoline in the fuel tank. An automatic device lines up the front wheels so the steering wheel may be placed properly

Fig. 6—At 11 o'clock the car is driven off the line under its own power—just one hour from frame to finished product. However, before shipment or delivery to a driveaway customer, each car must undergo a series of rigorous tests and inspections on the final O.K. line, some of the toughest tests in the industry







Arc Welded House Goes Up in Record Time

■ R. C. LE TOURNEAU employs arc welding exclusively to make heavy earth-moving equipment, used it to construct the company's Peoria, Ill., factory and many employes' homes there. Also, it was the sole method of construction for the $3,000,000 factory project completed at Toccoa, Georgia, this last summer. A portion is seen back of the arc welded steel panel section, Fig. 2, the basic element of Le Tourneau's building design. Panels are 12-gage sheet spaced 6 inches apart for walls, 18 inches for roof sections, have interior spacers not more than 24 inches apart. When field arc welded together inside and out, these units form continuous walls and roof. Lincoln welding equipment is used. Floors are concrete.

What would be more appropriate than for Mr. Le Tourneau to utilize these welded sections to construct his new home near the new Georgia plant? The house, Fig. 1, is 43 feet 8 inches wide, 70 feet deep. It has four large bedrooms; a maid's room; a living room, Fig. 4, about 15 x 27 feet, a connecting dining room almost 20 x 16 feet, a large kitchen, Fig. 3, and breakfast nook; separate utility, laundry and furnace rooms. House is heated by forced hot air, cooled by a water system.

House was built in two months. A welding operator with two helpers should be able to construct a 6-room house easily in 5 or 6 weeks, he states. Mr. Le Tourneau says advantages of this construction include: Security against termites, weathering, tornado, cyclone, storm and flood; low initial cost; flexibility in design; fast erection.

Work-Holding Devices

(*Concluded from Page* 53)

could have lettered upon it: "My time is worth blank cents per minute on this job," the "blank" being filled in by the properly figured overall cost per minute of the equipment in question.

A good deal is being said these days about the number of large machine tools all over the country which operate only occasionally on the large work for which they are particularly fitted. There is considerable agitation toward having large work sent in from other shops to keep these big machines busy "between times."

From what I have seen lately in a number of well-managed shops, plenty of work can be found right at home to keep these big machines busy, if thought be given to their capabilities on other than very large work. Take big planers and surface grinders for example. With the help of relatively simple fixtures in which small parts can be "ganged up" in large numbers, remarkable production can be attained on small parts in these machines.

Of course, if their capabilities on large work are required either by the owner company or an industrial neighbor, this small work should not be allowed to interfere, but with quickly removable fixtures there is no reason why it should. Banks of the small parts can be built up to carry over while the machine is doing its occasional big jobs.

"Action" of Fixtures Important

This article is not intended in any way to be a treatise on the broad subject of jigs and fixtures. However, it is impossible to discuss holding devices for production work without saying something about jigs and fixtures. What I have in mind particularly in bringing this up, is the desirability of checking up carefully on jigs and fixtures as workholding devices—especially as to their facility in loading and unloading. This is something to which tool engineers today pay fully as much attention as they do to the work-locating and tool-guiding features—once considered the most important functions.

At what point a holding device becomes a jig or fixture is debatable. A typical "fringe case" is that presented by Fig. 1, showing a setup for boring a gear case as carried on at Nuttal works of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The holding device—or fixture—is simple, but serves the purpose not only of locating and holding the casting accurately and firmly on the table of the boring machine, but also provides simple means for shifting it over for boring the second hole. The simpler a device of this kind can be—and still serve its purpose efficiently—the better the tool engineering it represents. Judged on that basis, this is a good job.

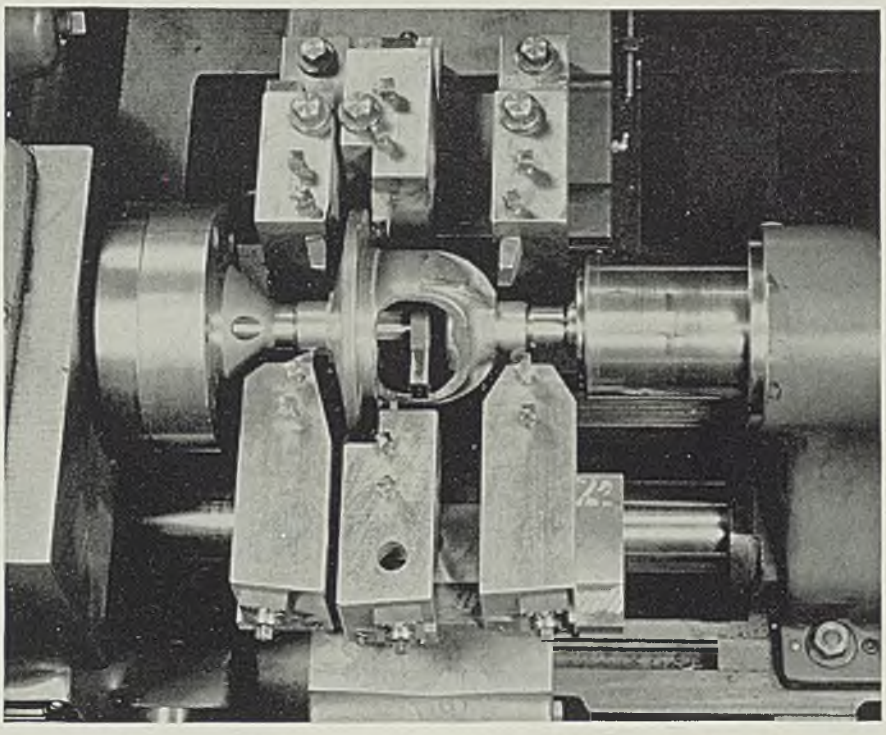


Fig. 4—Through use of special arbor and driver in conjunction with antifriction bearing "live" tailstock, loading and unloading of differential cases in this Gisholt automatic have been speeded up to save the time saved in machining with tungsten carbide tools

There has been a lot of loose talk about the lack of "production thinking" in the aircraft industry. As a matter of fact some of the finest kind of production thinking is going on in that industry, on problems that are different from those encountered in any other field of metalworking. If Figs. 2 and 3 will help to drive that fact home, their use here is well justified

When it comes to designing holding devices, jigs and fixtures for aircraft engine work, the problem is made doubly difficult by the extreme accuracies demanded and by the flimsy character of parts designed for maximum lightness. Fig. 2 shows how the situation was met at Pratt & Whitney division of United Aircraft Corp., as far as the machining of the rocker arm hole in cylinder heads is concerned.

This jig is used in connection with a special two spindle Leland-Gifford drilling machine—a stepped reamer being used to insure concentricity and alignment of holes which are larger in one of the horns than in the other. This jig, considered as a workholding device, has been engineered to allow easy and quick insertion and removal of a part of irregular shape, and locking is effected at points best able to stand locking pressure. It is a neat and simple piece of work.

The extent to which equally well thought out jigs and fixtures are used throughout the Pratt & Whitney engine plant is driven home by Fig. 3, showing the jig storage section of the crankcase department. Not only is the number of jigs and fixtures very impressive, but no less so is the effective means provided for their handling and storage. Note that each one rests on an individual skid platform, and that an electrically operated tiering truck is provided for their transportation and lifting.

The advanced character of aircraft engine jigs and fixtures can to some extent be judged by what can be seen on the racks.

Getting back finally to the basic subject of workholding, any shop can make good use of many simple devices such as that illustrated in Fig. 4. This tooling setup is on a differential case in a Gisholt hydraulic automatic lathe, in which hubs are finish turned and the flange finish turned and faced, by a set of tungsten carbide tools. The work is supported and driven at the headstock end by a combination arbor and driver, and is supported at the tailstock end by an antifriction bearing "live center." The arbor and driver does away with dogs and other timewasting makeshifts, while the live center eliminates fussy adjustments at the tailstock end and precludes burnt centers.

How to Obtain . . . . . .

High Concentricity in Light-Walled Tubing

By ROSS McLAREN
Superintendent Tube Mills
Timken Roller Bearing Co.
Canton, O.

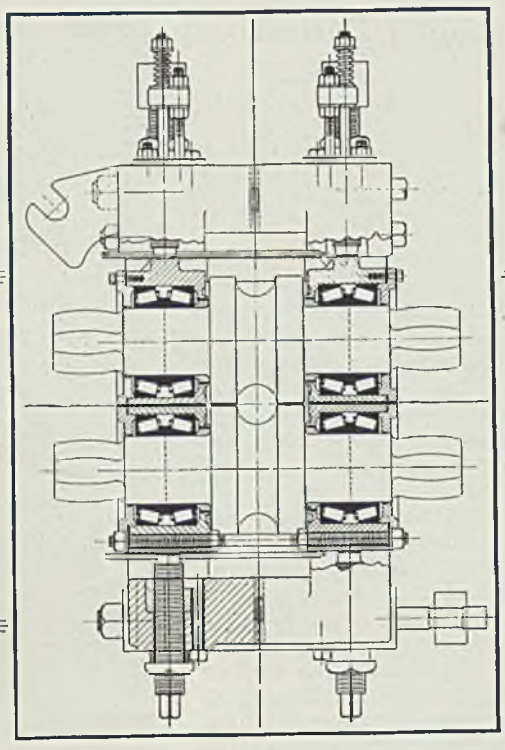


Diagram showing application of tapered roller bearings to tube reducing mill

One of the common reasons for the rejection of light-walled hot rolled tubing is the presence of ridges on the interior. By equipping the mills with roller bearings it is now possible to reduce tubing to 1-3/4 inches outside diameter and to eliminate the ridges. The accompanying article explains how this is accomplished

■ IMPROVING the product of the No. 2 tube reducing mill at the Timken Roller Bearing Co., Steel and Tube division, Canton, O., has been accomplished by the installation of tapered roller bearings. This mill consists of two tandem mills, each having bases for 16 mill stands. In reality it is two complete tube reducing mills. A total of 120 mill housings have been equipped with roller bearings on each roll neck. While 32 mill stands may be in the mill at one time, the remaining roll stands are assembled complete with bearings and rolls to permit frequent and quick changes in rolling schedules. Each tandem mill is driven by a 500-horsepower variable-speed motor with a speed range of 400 to 800 revolutions per minute.

Timken bearings, consisting of a double row cone and two single cups are applied directly to the roll neck and mounted into the bearing chock, as illustrated. Bearing adjustment is obtained by means of thin metal shims between the bearing chock and cup follower. With the bearings mounted in the chock this complete assembly may be slipped on to the roll neck easily. The annular groove closure has proved effective in sealing off the bearing chamber from mill water and scale. The bearings are grease lubricated.

Tubes with a 5-inch outside diameter are the largest this mill can take. With plain brasses in these mills it was impossible to consistently make a good 2-inch outside diameter, 10-gage tube. Trouble with tube eccentricity and ridges in the inside diameter was usually encountered. Obviously the presence of ridges in the tube inside diameter is reflected in high eccentricity which is a common reason for rejection of this light-walled, hot rolled tubing. As a result of equipping these mills with roller bearings it is now possible to reduce tubing down to as low as 1¾-inch outside diameter, 10-gage, and in so doing to obtain an excellent product with regard to eccentricity and with almost complete elimination of ridges.

The credit for this is due to the ability of the roller bearing to maintain accurate pass alignment at all times. The centerline of succeeding mill passes are alternately inclined one to the other so that the roll partings are not all in line; that is, the rolls are not horizontal, but alternately inclined to the horizontal. With this condition it is difficult to keep mill water from carrying mill scale, dirt, etc., into the lower plain bearing of each roll. The wear resulting causes the pass to open up eccentrically. Wear is almost completely eliminated in the roller bearing chock, hence the rolls are held permanently and positively in correct relation one to the other.

Accurate Adjustment Desired

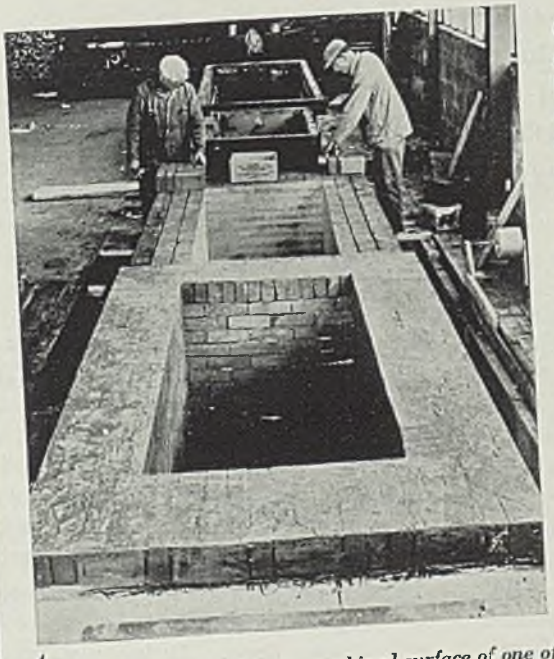
An effort is made to accurately set up the rolls in each mill housing before the mill housing is placed into operation. This may be better accomplished with tapered roller bearing equipped chocks than with ordinary brasses as tapered roller bearings can be adjusted within closer limits of running clearance and thus practically all external looseness removed. This fact explains why fewer tubes must be run through the mill when equipped with tapered roller bearings than when equipped with plain brasses before a quality product is obtained. Mill adjustments and general shutdown delays have been reduced to a minimum since changing over this mill from plain bearings.

While, of course, there is a power saving effected by applying roller bearings to these mills, the amount is low for the reason that bearing loads encountered in "sinking" or reducing are light. This operation consists primarily of reducing the size of tubes, which offer little

(*Please turn to Page* 88)

CARBON

The Corrosion Resistant Lining Material

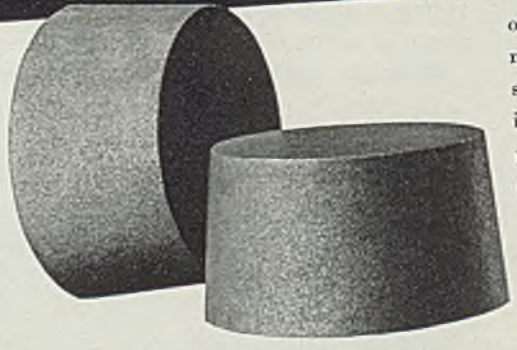


● High resistance to the destructive action of corrosive materials, including hydrofluoric acid and caustic alkalies, and ability to withstand severe thermal shock, lead to extensive use of carbon and graphite brick and structural shapes as linings for pickling tanks and other processing equipment. Experience has proved the economy of carbon and graphite linings in the presence of corrosive materials.

Corrosive waste liquids can be effectively handled in sump tanks lined with carbon or graphite brick. Temperature differential between waste materials run into the tank does not endanger the lining when carbon or graphite is used. Latent heat in hot corrosive waste can be effectively recovered by the use of heat exchangers made of graphite pipe.

This background is the machined surface of one of the several grades of "National" carbon materials.

CARBON MOLD PLUGS



offer economies when used in steel ingot molds. They eliminate ceramic inclusions and prevent sticking of plug to ingot. Each plug is good for several pourings. Sizes other than standard can be made to purchaser's order.

STANDARD SIZES

5 11/16" to 5 1/4" diameter by 3" long
5 3/8" to 5 1/16" diameter by 3" long

Write for information ON THE USE OF CARBON OR GRAPHITE PRODUCTS TO SOLVE YOUR DIFFICULTIES ARISING FROM CORROSION OR SEVERE THERMAL SHOCK

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
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The word "National" is a trade-mark of National Carbon Company, Inc.

"BELIEVE IT OR NOT".....

IT MAKES SQUARE HOLES

By NAT POMERANZ
Automatic Mfg. Co. Inc.
Harrison, N. J.

New method is suitable for multiple-hole piercing and punching operations on a wide variety of tubular sheet-metal objects. Main advantages are exceptional adaptability, low punch and die costs, low setup time, simplicity of operation, inherent safety, high output speeds ranging up to 1800 pieces per hour

■ "SURE, it's easy—when you know how." That's what Columbus said when his tremendous exploratory feat was belittled . . . and he proved it by challenging anyone to stand an egg on end. Fable tells us that no one could do it except Columbus, who jammed the end of the egg on a table top, breaking the shell and flattening its surface. Lo and behold, the egg stood on end. So it is with making square holes, oval holes, odd-shaped slots or half-moon effects—all are easy when you know how.

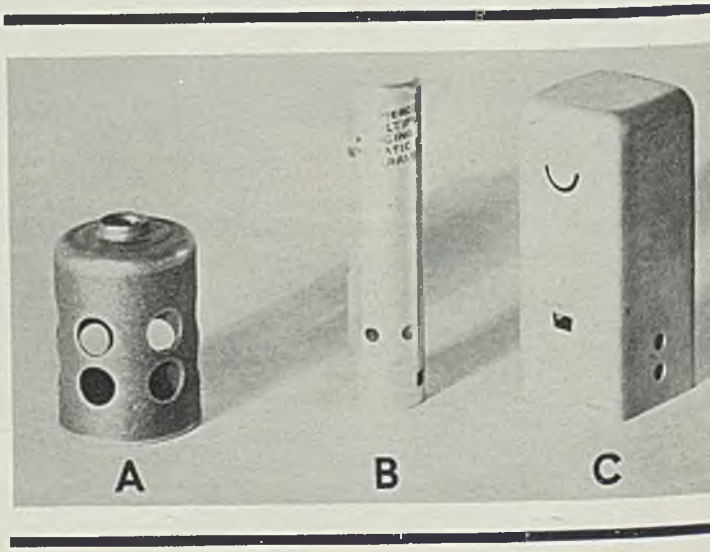
For many years factories large and small the country over have spent thousands of dollars in tools to pierce holes simultaneously around the periphery of an object. Tool rooms have been tied up for weeks on end with such jobs. Even though only one or two holes were made at a time, low production speeds and high labor costs were often encountered. Much drilling of holes has been done at considerable expense. Some manufacturers have even passed up orders completely where some integral part of the item required holes.

A new approach to this problem affords a fast economical method of making holes in an extremely wide variety ot tubular objects fabricated from sheet metal. Typical of the many items which can be handled by the new method are those shown in Fig. 1. Almost any tubular sheet-metal piece can be punched, providing it is open at one end to permit insertion into the dies. The objects may have sections that are round, elongated, square, rectangular, polysided or combination—part round and the remainder polysided. The shape of the object is of little consequence as long as a die and stripper plate can be made to fit it. Neither need the diameter or area at both ends of the piece be exactly alike for one may be slightly smaller than the other with the larger end of the piece being inserted into the die first.

Size of the object which can be handled is limited only by size of machine and by the holes which must be punched, as sufficient clearance must be provided inside the die to permit removal of the slugs. Number of holes that can be punched simultaneously is practically unlimited since as many as 180 ¼-inch holes have been pierced in a piece measuring 2 inches outside diameter and 6 inches long. The only limitation is that enough material must be left in the die to hold up under operation. Quantities of holes which might appear excessive are handled quite easily. On a small round piece ½-inch outside diameter and 1¾ inches long, 48 holes of various sizes and shapes have been pierced with room remaining for another 48.

Holes can be round, elongated, square, rectangular or irregular. Odd-shaped slots or half-moon effects are simply done. It is only necessary to provide the desired shaped hole in the die and stripper plate and to make a corresponding punch to do the job. Also, by shortening the length of the punch and providing a depressed hole in the die to match it, half shear or notch effects also are produced.

Principle employed in the new method is relatively



simple. Twelve individual punch units are equally spaced around a circle with all 12 operating on a common die in the center of the circle. Each individual punch is actuated by an eccentric shaft covered with a free steel sleeve. Each eccentric shaft is connected to a common master gear by means of a small gear. The eccentricity of the shafts provides a stroke toward the die at the center. See accompanying illustrations.

Standard interchangeable punch holders are attached to the sleeves at any point along the length of each shaft. The punch, held in place in the holder by a set screw, can be adjusted to the desired length so it is always engaged in the stripper plate-punch guide. As the eccentric shafts are rotated, the die oscillates in and out with respect to the center of the circle around which the 12 punches are spaced. The punches are at all times perpendicular to the surface of the die. Since the punches come down with a slight sideward motion, the die is arranged to turn to meet them, eliminating possibility of breaking.

In most cases the slugs are ejected from the front through the center of the die. A compressed air valve working in conjunction with the main trip can be set to operate either on the downstroke or upstroke to blow out the slugs. Where the piece being punched is open at both ends, the compressed air usually operates on the downstroke, causing the slugs to be ejected the instant they are punched. Where the piece is closed at one end, it is advisable to have the compressed air operate on the return stroke of the punches so no air is applied against the closed end of the piece during the punching operation. An added feature of return-stroke ejection is that the air can be utilized to push the piece out of the die into the operator's hand or into a nearby chute, thus affording automatic removal from the machine.

Where the amount of slugs may be too great to be removed through the front of the machine, they can be taken out the rear of the die by an air exhaust that is applied continuously. In still other cases, slugs may be removed by hand or by a mechanical ejector.

Dies for most jobs can be made from seamless steel tubing. Such tubing can be purchased in practically any size required. Also the stripper plate can be made of tool-steel tubing, cut to size and fastened to the die by means of set screws. The holes are spotted on the outside of this plate and then drilled through the plate and die. After all holes are inserted, the die may be hardened.

For square, rectangular or odd-shaped objects, the die can be made of tool steel. The stripper plate need only be attached to the die over such areas as require punching. The same dies and stripper plates can be used for more than one job if the overall dimensions are the same. Dies can be annealed, additional holes inserted, and rehardened. Holes not needed in the new work can be left out simply by omitting punches.

Punches themselves can be made of drill rod or tool steel.

Flexibility of the system is extremely great as the punches can be moved to any point along the eccentric shaft and two or more punches also can be placed on the same shaft. Thus there is practically unlimited flexibility as to spacing the holes lengthwise of the piece.

In some cases where the diameter or area at one end of the piece may be different than at the other end, the larger end of the piece may be inserted into the die first. In this case the die is made the exact shape of the piece but the stripper plate is made with uniform openings at both ends as determined by the largest end area. The limitation as to handling conical objects is the maximum allowable distance between the stripper plate and the die as against the stroke of the machine.

Likewise periphery locations offer extreme flexibility. Contrary to the first impression, it is not necessary that the punches be exactly in line with the 30-degree spacing of the shafts around the circumference of the work for them to operate satisfactorily.

Since, however, the 12 eccentric shafts are spaced equally around the 360-degree periphery or 30 degrees apart, it might be inferred that holes can only be placed 30 degrees apart on an object. But this is not the case. Various size punch holders are available on which it is possible to mount a punch off center. Whereas the center line of the punch might be adjusted on a straight line toward the die, the punch itself is off the line. Also it is possible to have the punch enter the die at a slight angle where specifications for piercing may allow it. Too, it is often desirable to offset holes. By these two methods, it is thus possible to pierce holes anywhere around the periphery of an object.

With 12 eccentric shafts equally spaced around the object, it is easy to punch 1, 2, 3, 4, 6 or 12 evenly spaced rows of holes at one stroke. Various other combinations of rows of holes can be pierced in two or three strokes at one handling of the piece using a ball-bearing indexing device in the die. After the first stroke, the piece is turned until the ball bearing locks in one of the holes just pierced. This positions the work for the second stroke. In this way, eight rows of holes can be done using only four rows

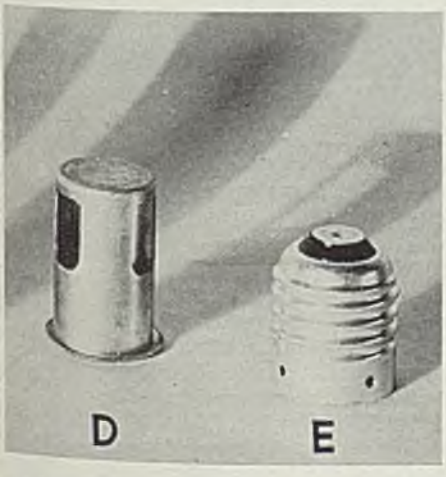


Fig. 1—Some objects easily punched by the method described here. Low tool cost is evident as time for one toolmaker to make dies and punches for these jobs: A, 30 hours; B, 35 hours; C, 40 hours; D, 45 hours; E, 20 hours

of punches, and in just two strokes.

Flexibility thus is seen to be possibly the greatest single advantage of this method of punching in addition to other economies such as the low tool cost and speed of operation.

Low tool cost is illustrated well in Fig. 1, which shows a few representative pieces. A has 12 holes and required 30 hours time of one toolmaker. B has 10 holes and needed 35 hours, C has 8 holes and took 40 hours, the 3 holes for D required 45 hours and the 6 holes at E required 20 hours. Of course odd-shaped holes usually require slightly more time than round holes, and that accounts for the difference between the number of holes as against the number of work hours required for the various pieces. To compute tooling cost, simply multiply the number of hours against the cost per toolmaker-work-hour in your vicinity. The number of work-hours given includes the making of the punches.

Low setup time also is an advantage since it is extremely simple to change over from one job to another. If the same die is used and only the punches changed, it is but a matter of a few minutes. To change all punches and dies usually requires about 30 minutes.

Speed and simplicity of operation are important advantages. Experienced operators are not required. Since most pieces will fit freely in the die, the speed obtainable depends only on how fast the operator can insert and remove the work. With smaller pieces, a quantity can be held in one hand and naturally fed faster than larger pieces which must be picked up and fed one at a time. Production speeds from 1000 to 1600 pieces per hour are common, with 1800 for an expert.

For extremely small pieces that cannot be gripped by the operator for removal after insertion into the die, a simple ring lever can be attached to permit the operator to disengage the work from the die. Such an arrangement rarely decreases the hourly production.

Where the location of holes is such that the stripper plate can be cut away at the front end to leave a portion of the piece exposed, production will be speeded. Naturally as much of a grip as possible should be provided for the operator.

Safety to the operator is inherent in this type of work since the punches at all times are engaged in the punch guide, making it impossible for an operator to place fingers under the punches.

Burrs are always a problem in piercing. However, this method involves no greater difficulty than any other type of piercing. The amount of burr on the inside of the piece depends solely on how accurately the die is made. Accurate dies, stripper plates and punches will produce clean pieces. On soft materials, it may be possible to eliminate burrs entirely on the outside surface by putting a slight radius on the punches, causing the edges immediately surrounding the holes to be depressed.

Punches can be set at any point on periphery of object and any position lengthwise the tubular object. Starting with 12 eccentric punch shafts equally spaced around the object, it is easy to punch 1, 2, 3, 4, 6 or 12 evenly spaced rows of holes at one stroke—other combinations in two or three strokes. As many as 180 holes are punched at one stroke

Applications of this piercing method are almost unlimited. A brass primer shell which formerly had 46 holes drilled into it now has all holes pierced at one time to afford a most significant saving in production costs. A square aluminum shield can for a radio, requiring more than one hole on each of its four long sides, has all sides and all holes pierced simultaneously.

A steel strainer tube with four rows of holes and four holes in each row is pierced at one stroke. A cardboard tube used in the thread-dyeing industry has 180 holes punched in a single operation. A plastic fountain pen cap has a slot for the pen clip and two air vent holes done instantly. A small bakelite radio tube receives 48 holes at one time.

A flanged brass tube used as a housing, for an automobile cigaret lighter has three large irregularly shaped holes pierced at the same time. Production on all these jobs runs as rapidly as the operator can insert and remove the pieces from a free-fitting die.

Limitations of this method of piercing depend on a number of interrelated factors which make it hard to give a definite answer to a question such as, "What is maximum thickness that can be punched in steel?" The diameter of the piece, number of holes to be pierced, their shape, their location and hardness of the stock—all influence maximum wall thickness that can be punched.

The larger the diameter of the piece, the shorter will be the distance between the outside surface of the die and the eccentric shafts. Naturally the shorter this distance, the greater is the strength of the punches and punch holders for a given machine, and the thicker the material that can be handled. Of course it is possible to build special machines in addition to the standard sizes now available.

Likewise the number and shape of holes determine the possibility of piercing. As far as locations of the holes are concerned, better work can be done if the pieces are located diametrically opposite each other since all punches enter the pieces at the same time.

While it is possible to have all holes on one side of the work, some means of supporting the die on the other side might be needed in piercing hard tubing.

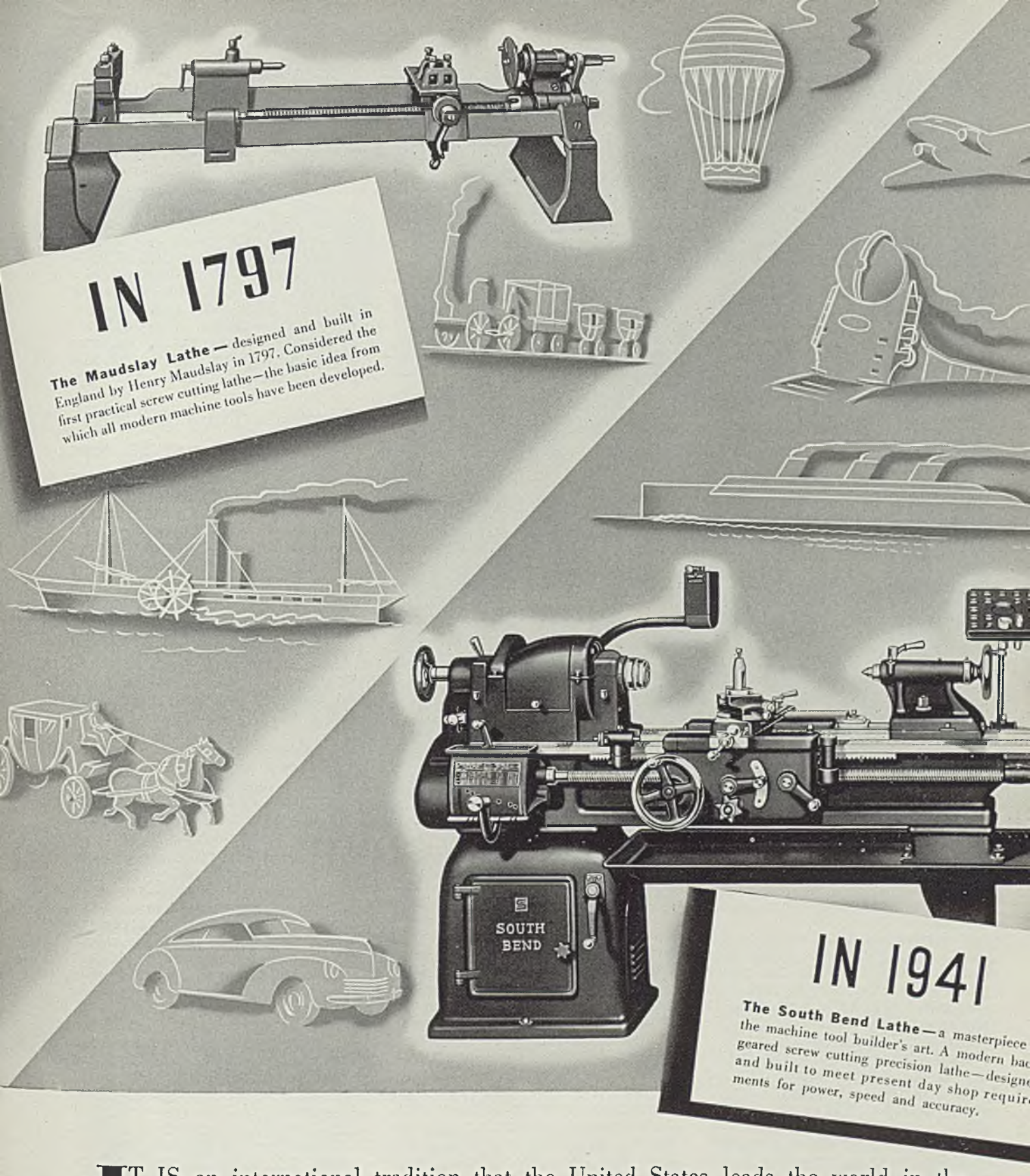
Materials that can be handled include almost anything not too hard. Already work has been done in aluminum, zinc, copper, tin, hard rubber, bakelite, various plastics, paper, fiber as well as work in sheet steel of various analyses. All these materials including thin-wall steel usually are handled easily on the smallest machine.

Maximum size of object is limited only by the size of the machine used.

Minimum size of object which can be handled is somewhat difficult to determine since a number of variable factors must be considered. The smallest piece is that which allows insertion of a die inside of it with a die-wall thickness sufficient to stand up in operation, yet providing an opening in the center big enough for the ejection of slugs. For example, if a piece has a wall thickness of 0.020-inch where none of the holes is diametrically opposite another, a clearance of 0.025-inch inside the die normally would be sufficient for removing slugs. If it is found that a die-wall thickness of 0.050-inch is sufficient for the particular job, the inside diameter of the piece can be as small as approximately 0.125-inch or twice the wall thickness of the die plus the center clearance for the slug ejection.

Where two holes are diametrically opposite each other, still using the foregoing example, the inside diameter of the piece can be as small as approximately 0.150-inch or twice the wall thickness of the die plus slightly more than twice the thickness of the piece for slug ejection. This is necessary since the opening at the center of the die must be slightly larger than the thickness of the combined slugs or they will bind and not eject freely.

Length of the piece does not mean anything—the limitation is the distance from the open end of the piece to the hole furthest away. Machines now available accommodate distances from 5 to 8 inches. Naturally, it is possible to handle much longer jobs providing the holes fall within these distances. The only factor



IT IS an international tradition that the United States leads the world in the production of fine machinery. This enviable American accomplishment may be attributed to efficient management, capable engineering and *modern machine tools.* We take pride in presenting the new Series "S" South Bend Lathe for 1941—our contribution to American Industry—a *modern machine tool.*

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Fig. 2—Machine setup to punch by the method described. Note the 12 eccentric shafts evenly spaced around the object and carrying the punches. Note operator cannot get fingers under punches

that determines this distance is the length of the eccentric shafts and steel sleeves to which the punch holders are attached. In fact, it is a simple job to build a machine to accommodate almost any reasonable dimension.

Wall thickness of the piece is limited by the strength of the dies and punches and by the length of stroke of the machine. Strokes now in use range from 3/16 to 5/16-inch, but of course larger strokes can be made available easily by providing larger eccentric shafts.

Hole size limitations are similar to those encountered with other piercing methods. The size of hole is affected by the type of material handled. The minimum size hole should not be less than the wall thickness of the piece. There apparently is no limit to maximum size of any hole except that after the hole is made in the die, enough material must be left in the die to hold up during operation. It must be remembered that since all punches converge toward the exact center and holes are made in the die perpendicular to its surface, holes come closer together on the inside of the die than on the outside. However, this limitation is not serious in work usually encountered.

From the above it is seen that this method of piercing holes offers exceptional advantages for much work. It is already experiencing rapid expansion in a wide variety of industries and for much different work as is illustrated in Fig. 1.

As seen in Fig. 2, the actual machine is quite a simple proposition, requires little floor space and affords exceptionally high production rates as mentioned above.

Trademarks Frits To Accomodate Users

■ Porcelain Enamel & Mfg. Co., Baltimore, reported recently the introduction of eight trademarked porcelain enamel frits covering a wide range of uses. The idea behind the trademarks is to enable users to ask for the particular frit needed for their work without involving costly experimentation.

According to the report, there has been a definite trend in the porcelain enamel industry to reduce the large number of frits, many of which were developed to fulfill almost identical requirements. Therefore, the announcement of this line of frits is in line with the company's policy to continue to reduce the number of items and, at the same time, increase the quality of the frits for specific needs.

Domestic Tungsten May Supplant Former Sources

■ Since war abroad may cut off foreign sources of high-grade tungsten ore used in the preparation of incandescent lamp filaments, manufacturing and laboratory experiments in the Westinghouse Lamp division research laboratories are now being speeded to test domestic and South American ores. Analyses of samples of domestic ores by W. C. Lilliendahl of Westinghouse show that wolframite from the states of Washington, South Dakota, Idaho, Arizona and other localities may yield satisfactory tungsten.

Ores from Argentina, in addition to domestic ores, are being tried. These compare favorably with Australian, and several tons are now being used on an experimental basis in lamp manufacturing.

Average yield of tungstic oxide from various domestic ores was found to be roughly 95 per cent, based upon the oxide content of the ore. Should it become necessary to use domestic or South American ore, refining processes would not have to be changed fundamentally. The presence of more impurities, however, may make it more difficult to produce pure tungsten. In the production of tungsten for lamp filaments, great care and accuracy must be exercised. The high melting point of the metal—about 6080 degrees Fahr. (3360 degrees Cent.)—prohibits melting it in crucibles, because there is no crucible material having a higher melting point.

Only about 6 per cent of all tungsten on the market during a year's time is purchased for lamp manufacturing. During the 2-year period 1938-1939 a total of 824 tons of tungsten ore was imported in this country, as compared with 1883 tons in 1936, and 2848 in 1937. In 1939 the United States produced 3603 tons of ore, very little of which found its way into incandescent lamps.

Dump Truck

■ Service Caster & Truck Co., 640 North Brownswood avenue, Albion, Mich., is now offering a new dump truck for handling any material that can be dumped, such as coal,

sand, gravel, small castings, scrap borings and turnings. Its outstanding feature is its maneuverability. It uses giant swivel casters in front, having an overall height of 19 inches, with 16 x 4-inch rubber-tired wheels. Its rear wheels also rubber-tired are 18 x 5 inches. The truck's frame is of continuous 4-inch channel, 85⅜ inches long by 36 inches wide. The hopper is of 3/16-inch steel plate measuring 45 x 78 inches, having a capacity of 1¼ cubic yards. It can be made water tight (on special order) if oil, compound, chemicals, or other liquids are to be conveyed. The dumping operation is entirely automatic.

Diesel Engine

■ Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, announces a new type 16 CP 4-cycle diesel engine incorporating the latest developments in construction, design and combustion control. It is of the direct injection type, designed for continuous duty. The engine's base is heavily ribbed under the bearings and a deep section at each side imparts longitudinal stiffness. Crankshaft journals and crankpins are large to prevent difficulties from torsional vibration. A silent chain

drive is mounted at the flywheel end giving a quiet drive for the camshaft and auxiliaries. All wearing parts of the diesel are completely enclosed and an automatic lubrication system provides lubricant to all vital parts. An engine-driven gear pump in the base draws the oil from the supply sump, forcing it through a filter and oil cooler and then into the main supply pipe cast into the base. Oil is carried to the main bearings through drilled passages and from there to the crankshaft to the crankpin bearings to the connecting rods and to the piston pins. The fuel transfer pump draws fuel from the storage tank and forces it through a filter to the individual fuel pumps. Short lines connect the pump to nozzle. A simple starting valve in each cylinder head, connected to a timing valve above the camshaft, insures positive starting at any temperature. Direct injection contributes to the ease of starting under all conditions.

All-Metal Switch

■ Durakool Inc., 1010 North Main street, Elkhart, Ind., announces a new all-metal Tipit mercury switch which has a capacity of ½ ampere at 24 volts to 4 ampere at 6 volts. It is used wherever infrequent operation of a low-watt circuit is desired. It also is ideal for use in

explosive atmospheres and on electrical machinery. The switch is mounted in a small holder with screw stakes for terminal connection. This assembly is attached to door, lid, or other movable member—the movement actuating the switch.

Backing Rings

■ Wedge Protectors Inc., 9522 Richmond avenue, Cleveland, has placed on the market two new products. A backing ring for pressure piping in sizes up to 8 inches and a light gage protector which keeps out weather and sand. The former assists in the welding of pipe joints assuring the welding operator of penetration of weld metal inside the pipe. Thus the width of the joint is exact at all times due to the spacing bead in the center of the backing ring. This also standardizes the amount of welding electrodes to be used on each joint and consequently always leaves the inside of the joint smooth.

The light gage wedge protector is easy to start and locks on pipes without the aid of a wrench, locking automatically when spun to a stop. It also is capable of standing a great deal of abuse.

Industrial Equipment

Fork Truck

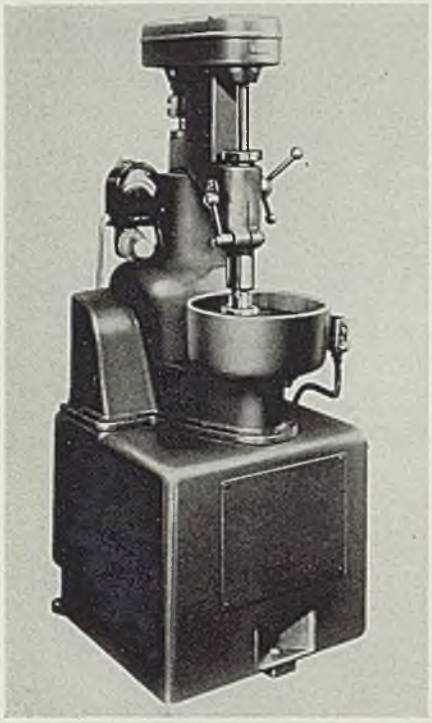
■ Baker Industrial Truck division, Baker-Raulang Co., 2168 West Twenty-fifth street, Cleveland, announces a new type JOM center-control fork truck available in 2000 and 3000-pound capacities for operation in narrow aisles and congested areas. Its maneuverability in close quarters is due to its compactness, combined with the short turning axle. It also incorporates features that allow the operator to be comfortable, at the same time assuring safe and speedy handling of material. A high capacity, mill type, safety contactor electrically interlocked with the controller and the operator's seat relieves the controller of arcing, and automatically opens the circuit when the operator leaves his seat. The travel circuit closes only with the operator in position and controller in first speed position. All controls of the truck

are grouped conveniently in a control panel at the operator's left. Control of hoisting and tilting operations are provided in the hydraulic system. A motor-driven gear pump supplies oil to the hoist-

ing and tilting cylinders through metering valves, the excess being by-passed through unloading valves to the reservoir. The 2000-pound capacity truck handles loads up to 60 inches in length and the 3000-pound capacity model is for loads up to 42 inches in length. The standard lift is 72 inches and 119 inches is the standard telescoping lift. The truck's frame is of high tensile steel and the main sills are deep section flange plate members running from end to end. Upright guides are formed steel channel sections. The fork carriage travels on ball bearing rollers, the power being supplied by a single hydraulic jack. The drive tires are 22 x 6 and trail tires are 15 x 5.

Lapping Machine

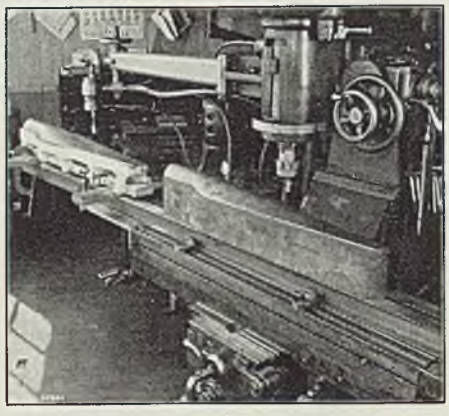
■ Ultra-Lap Machine Co., 267 McDougall avenue, Detroit, has introduced a lapping machine which increases production by as much as 700 per cent and over as compared to hand lapping. Any metal or materials, or any combination of such materials, whether hard or soft, can



be used on it. Its makers guarantee precision as to flatness of less than one light band—that is, twelve millionths of an inch and under—and as to smoothness one microinch and under. They also claim a uniformity of finished parts.

Duplicating Machine

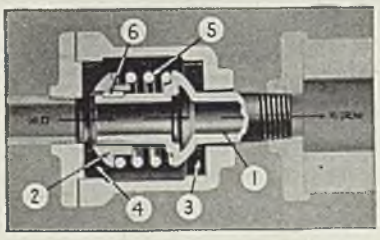
■ National Purchasing Co., 405 Boulevard building, Detroit, announces a Turchan follower machine or duplicator for precision duplicating of dies, molds, patterns, rolls, form cutters, etc. It is an attachment to, and made an integral part of standard mills, boring mills, lathes, planers, increasing the capacity and range of such machines without impairing the original function of the machines to which it is attached. It simply follows the pattern (either hard or



soft originals) it is required to copy, transmitting and transferring to the cutting tools, the control of the form to be cut. It traces the contour of the original die, pattern, mold or templet, and holds the cutting tools to the exact tolerances of the original.

Rotary Pressure Joint

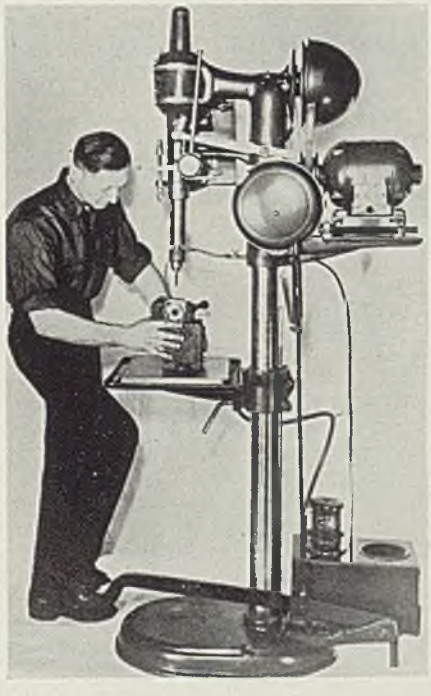
■ Johnson Corp., Three Rivers, Mich., announces new type R larger size rotary pressure joint with renewable wearing plates for use in paper and textile mills, chemical plants, food processing industries or wherever steam or liquids under pressure must be admitted into rotating rolls. Because of the slower speeds and higher pressures at which the larger joints operate, full advantage cannot be taken of the wiping action on the sealing surfaces that occurs with the average smaller joint installations. Leaks, caused by dirt and scale accumulating under the sealing ring, may steam cut the casting. In the type R, the end plate subject to this wear is made as a separate casting and can be refaced. In addition, all metal parts which are subject to any wear are now made separate and renewable. Consequently, they can be furnished of bronze to pro-



vide the equivalent of all-bronze construction. Sealing is accomplished by a carbon-graphite ring. The joint also compensates in its design for misalignment—both lateral and angular. This new design is offered in all the various styles carried in the 3, 4, 5 and 6-inch sizes. All are rated for 150 pounds maximum pressure.

Tapping Machine

■ Cleveland Tapping Machine Co., 1725 Superior avenue, Cleveland, offers a new model C tapping machine capable of tapping holes of different depths without changing the stop gage. This is done by means of a spacer hinged on the housing made to contact the reversing lever. The machine is 90 per cent automatic. Its rigid spindle is mounted on ball bearings and controlled either by hand or foot lever. Driven by a 1-horsepower motor through a V-belt drive on a 4-speed pulley, the unit taps from ¼ to ½-inch in standard steel at high speed. An important feature is that its spindle automatical-



ly stops revolving forward, having split-second reverse. After reversing, the spindle then raises and starts revolving forward, ready for the next operation. This leaves the operator's hands free to handle the work. The tapping unit is applicable to any service where drilling also is essential.

Frequency Meter

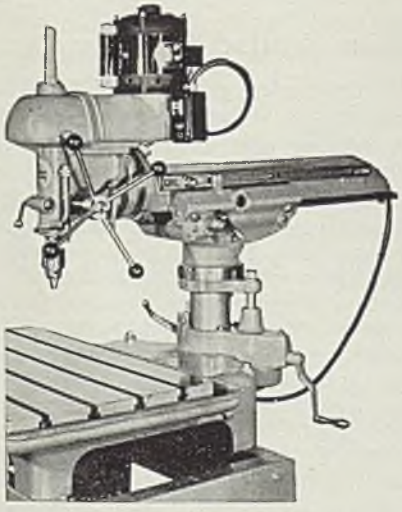
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new vibration frequency meter, weighing only eight ounces, to aid the engineer in ferreting out causes of machine vibrations. It is capable of indicating what frequencies between 500 and 20,000 cycles per min-

ute are present in a vibrating body. It is built around the principle of the vibrating-reed and consists of a thin spring steel vibrator clamped at one end between a set of steel rollers. A knurled knob connected to the rollers permits their rotation, and moves the steel reed in or out, changing its frequency of vibration. A sliding pointer on the back end of the steel reed indicates the vibrating frequency which is read off the calibrated scale on the frame of the

instrument. To use the meter, its head is held against the vibrating body and the adjusting knob rotated until the vibrator reed moves to and fro at maximum amplitude. If more than one vibrating frequency exists, there will be a point of maximum amplitude for each, and vibrations in differing planes may be detected by changing the axis of the meter. The meter will indicate a vibration whose double amplitude is one ten-thousandth of an inch or greater.

Radial Drill

■ Walker-Turner Co. Inc., Plainfield, N. J., announces a new radial drill for performing light duty operations. It is suited for use in the aircraft industry for stack-drilling sheets, spars, etc., by toolmakers for

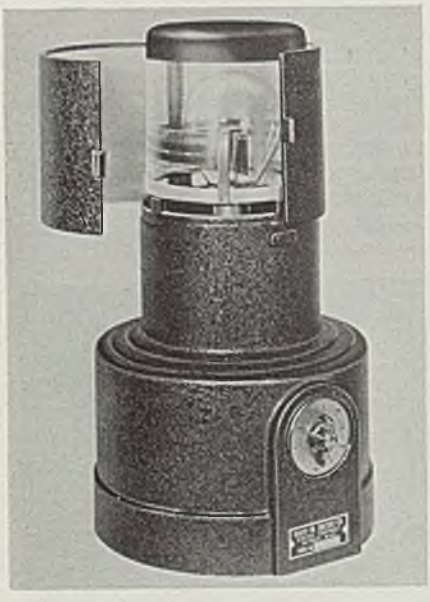


drilling in jigs and fixtures and for patternmaking; by shipbuilders for drilling metal plates and sheets. The unit's drill head is mounted on a heavy cast-iron ram which rides back and forth in a supporting "cradle" on eight ball bearings. This permits rapid movement, forward or back, and reduces lost motion. The ram can be locked quickly in any position with the clamp lock. The drill head, ram and cradle swing easily right and left on a collar mounted on the top of the raising and lowering column. The drill head ram and cradle are raised and lowered by a crank-operated screw mechanism mounted on the side of the supporting column. Capacity of the drill is large, drilling to the center of a 62-inch circle. Its ram travel is 18 inches and maximum distance of chuck to table is 13½ inches. Vertical movement of drill head is 8½ inches and spindle travel is 3¾ inches. Capacity of the Jacobs chuck is ½-inch. The machine is 72 inches high, 31 inches wide and has a depth front to back of 38 inches. The drill head can be tilted up to 45 degrees either right or left.

Film Dryer

■ Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, announces an infra-red film dryer for use in conjunction with spectrographic analysis equipment. It will dry a 16-inch length of 35 millimeter film

in 50 seconds without curling the film. The wet film is merely stretched around a glass form as shown in the accompanying illustration. The infra-red lamp is embodied inside the glass form. A motor-driven fan in the base of the



dryer forces warm air around the outside of this form. In this manner, the film is dried, both by infra-red rays and by the current of warm air. The operator has access to the glass form holding the film by opening two doors. The air used by the dryer is filtered to avoid dust getting in contact with the emulsion of the film. An electric timer starts and stops the blower, and cuts off the current to the infra-red lamp after a predetermined time.

Spectifier

■ Eastern Machine Screw Corp., New Haven, Conn., announces a new H & G spectifier for standard-

izing visual inspection of screw machine parts and similar work. It provides a fast method of inspecting the finish and other details on parts up to about 3 inches in diameter. Its lens gives almost instant focus on both large and small fields and flat and curved surfaces. The wide diameter of the lens allows the use of both eyes, and critical inspection can be made from all angles and at casual distances from the lens. The light source of the unit provides a highly efficient and uniform degree of illumination. Also this combination of uniform lighting and magnification overcomes the variances which occur when one man uses a high-powered jewelers' glass, another uses a low-powered reading glass and another relies on "good eyesight". The device has no focusing devices and no holders are required for material being inspected.

Floodlight

■ Birdseye Lamp Sales division, Wabash Appliance Corp., 334 Carroll street, Brooklyn, N. Y., has introduced a new Floodlite for general lighting purposes. It delivers a concentrated flood of light in a medium beam that is especially effective in applications requiring intense illumination for exacting

work. Essentially, it is an incandescent filament bulb with a lining of pure silver sealed inside to form a reflecting surface that cannot be dulled or tarnished by dust or fumes. For localized lighting to supplement general illumination, a detachable swivel socket focuses the light exactly where needed. The unit is made in the RE short bulb, in four sizes and four separate voltages, from 100 to 300 watts, and 110 to 125 volts.

Light Armor Plate

(*Concluded from Page* 69)

The company's original equipment capacity has been contracted for and they are now increasing their capacity 150 per cent.

In making seat shields for airplanes, the plate as received from the mill is cut to desired dimensions. Curved section for the seat back is formed to shape on a press. Parts then are subjected to a cleaning and processing bath before immersion in the heat-treating furnace. Temperature of the latter is controlled automatically, maximum variation during the heating cycle being held within 2 degrees of the predetermined setting. Temperature is approximately the same as that employed in conventional pack carburization work.

From the furnace, the plates are moved by overhead crane to an adjacent oil quenching tank. After quenching and cooling, the plates are tested for hardness on a special brinell machine built by Detroit Testing Machine Co. Said to be the largest of its type, this machine somewhat resembles a planer in appearance. The bed, waist high, is fixed but equipped with rollers over which the plates to be tested may be moved easily. The testing instrument, mounted on a cross head, is motor-driven for vertical or horizontal travel so it may be spotted over any part of the plate's surface.

It often is desirable to weld armor plate. But usual welding procedure draws the temper of the hardened plate, thereby reducing its resistance to gun fire. However, welding parts together to provide a pilot seat assembly is accomplished without difficulty by a procedure developed by this company. Ballistic properties of the welds are said to be close to those of the plate itself and well within government requirements.

Hardness testing of the plates is supplemented by another and more informative check—exposure to actual service conditions by gun fire. The company's testing laboratory in this case is an enclosed firing range, completely equipped with rifles, machine guns, chronograph for recording the velocity of the armor piercing bullets, similar to the small armor proving range employed by government agencies.

♦

Thin Walled Tubing

(*Concluded from Page* 78)

compressive resistance as compared to reducing a solid bar of comparable outside diameter.

Due to light work loads the life of bearings will be extremely long. During 1937, 1938, 1939 these mills operated a total of 13,348 hours, and of this time it is estimated that brasses were in the mill for 4004 hours. In other words, the charges for brasses amounted to $0.3426 per hour of operation, as during these 4004 hours there was a charge of $1372 for brasses and machine work on these brasses.

It is also evident that considerable saving in lubricant has been effected since applying tapered roller bearings to this mill, but just what this amounts to cannot be determined from available records.

Many All-Time Records Established in Steel

March in normal times is often record month. Percentage for defense increases constantly. Seasonal demands are soaring.

MARKET IN TABLOID ★

Demand
Increasing.

Prices
Extras rising.

Production
Unchanged at 99½.

■ ESTABLISHMENT of new records in several departments of the steel industry still is being accomplished, particularly as regards production, sales volume and shipments. March is of course normally a month for records. More recently sales records on more seasonal items have been established. Thus on line pipe for oil and gas new all-time high totals have piled up, with emphasis on long lines in the 100-mile class and with large diameters, involving large steel tonnages. Moreover sales of casings are best since March, 1937.

More companies are planning to follow the lead of the Inland Steel Co. in announcing definite sales policies which limit bookings to 1941, leaning more and more to purely defense projects. In the rare instances where steel consumers have been compelled to shut down for a few days because of lack of steel they are non-defense plants. Many steelmakers state that their deliveries to consumers are on such a refined schedule that the least upset might cause a short shutdown of consumers, but such close scheduling is for the benefit of the majority.

Substituting becomes ever more prevalent. Several users of brass and copper pipe and tubing, unable to get supplies, turn to steel pipe. In turn, users of galvanized pipe are often compelled to use black pipe which is satisfactory for less permanent construction such as cantonments.

Some half dozen galvanized sheet manufacturers have stopped production of that product because of zinc shortage and because raw steel is needed more urgently elsewhere. Output has fallen 11 points in a week to 63 per cent of capacity. Though stainless steel is difficult for the civilian to buy because of nickel shortage the government still gets good service as witnessed by the purchase of a large tonnage of stainless strip for fabrication into food trays, with delivery of four weeks promised.

Consumers, in numerous cases, have been advised to expect increased extras on sheets and strip for second quarter but so far no definite increases have been announced. Consumers of wasters and rejects have offered to pay premiums over prime materials to get these descriptions which are now scarce.

Orders for defense are increasing rapidly and comprise a much higher percentage than a month ago. In the case of fabricated structural steel the shortage is rather in structural engineers than in plain material. So many defense plants are ultra-modern, perhaps windowless, with artificial ventilation and lighting, that special problems of design delay plans.

An especial hardship is being suffered by steelmakers who have spent millions of dollars, perhaps, to manufacture and advertise some special kind of steel, they now finding it difficult to supply it and fearing that from substitutions they may lose much of their markets.

Prospects of rising costs of manufacture persistently plague steelmakers. Among the latest is the ruling that southern metal miners are to be paid on the basis of span between arriving at and leaving the work station in the mine rather than on the portal basis. This change would mean a pay increase of about 10 per cent.

Producers often send questionnaires to consumers to find out their exact present stocks and descriptions and probable consumption in the future to guide producers in future shipments. In many cases consumers reveal delivery ahead of schedule on some descriptions and delays on others, all of which is useful information for producers.

Youngstown Sheet & Tube Co. and American Rolling Mill Co. will furnish 19,000 tons of 18-inch steel pipe for the naval station at Key West, Fla.

After a slump for several weeks awards of fabricated structurals and reinforcing bars bulk larger.

Scheduled automobile production for the week ended March 29 is 124,405 units, a drop of 400 for the week, comparing with 103,370 in the like 1940 week.

Steel ingot production last week was unchanged at 99½ per cent of capacity. Advances took place in the following districts: Cincinnati 4 points to 97½, Detroit 6 points to 95, Pittsburgh 1½ points to 103, Cleveland 1½ points to 99½. New England dropped 15 points to 85 per cent. Unchanged were the following: Chicago at 101½, Birmingham at 90, St. Louis at 99, Wheeling at 88, Buffalo at 93, eastern Pennsylvania at 96 and Youngstown at 97.

STEEL's three composite price groups were unchanged, iron and steel at $38.29, finished steel at $56.60 and steelworks scrap at $20.12.

COMPOSITE MARKET AVERAGES

	Mar. 29	Mar. 22	Mar. 15	One Month Ago Feb., 1941	Three Months Ago Dec., 1940	One Year Ago Mar., 1940	Five Years Ago Mar., 1936
Iron and Steel	$38.29	$38.29	$38.29	$38.22	$38.30	$37.07	$33.20
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	52.32
Steelworks Scrap..	20.12	20.12	20.08	19.95	21.37	16.47	14.48

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Mar. 29 1941	Feb. 1941	Dec. 1940	Mar. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.25
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.225	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to 9/32-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Mar. 29, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.95	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.84	24.34
No. 2 fdry., del. Pgh., N. & S. Sides	24.69	24.69	23.69	23.69
No. 2 foundry, Chicago	24.00	24.00	23.75	23.00
Southern No. 2, Birmingham	20.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	24.06	23.56	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.715	25.215
Malleable, Valley	24.00	24.00	23.60	23.00
Malleable, Chicago	24.00	24.00	23.75	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.17	23.35	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt, steel, Pitts.	$20.75	$20.75	$22.75	$17.05
Heavy melt, steel, No. 2, E. Pa.	18.75	18.50	19.75	15.90
Heavy melting steel, Chicago	20.00	19.25	20.70	15.50
Rails for rolling, Chicago	24.25	23.75	25.00	18.25
Railroad steel specialties, Chicago	23.75	23.55	23.95	18.40

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$5.50	$4.75
Connellsville, foundry, ovens	6.00	6.00	6.00	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	59
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., 5/8 and 5/8 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
9/16-1-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
7/16-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

	Blk.	Galv.
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

¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	...
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2½"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to 9/32-inch incl. (per 100 lbs.)	$2.00
Do., over 9/32 to 11/64-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 *tons of one size, open hearth*

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell. prem. fdry.	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	24.00
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	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
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	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27 00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots. 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c

88% chrome, cont. tons. 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	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	3.40	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.75	4.25	6.00	3.75	3.75	5.60	3.75	6.40	5.40	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	17.00
New Eng. del. No. 1	18.25-18.75
Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	20.00
Chicago, auto, no alloy	19.00
Cincinnati, dealers	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†17.00-17.50
Detroit, No. 2	†16.00-16.50
Eastern Pa., No. 1	20.00
Eastern Pa., No. 2	18.50-19.00
Federal, Ill., No. 2	16.75-17.25
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	17.25-18.25
St. Louis, No. 2	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1	15.00
Toronto, dirs., No. 1	12.25-12.50
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	19.00-19.50
Chicago, factory	19.00-19.50
Chicago, dealers	18.50-19.00
Cincinnati, dealers	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.50-18.00
E. Pa., new mat.	20.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	15.00-15.50
San Francisco, net	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.50-18.00
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	13.00-13.50
Toronto, dealers	10.00-10.50

SHEET CLIPPINGS, LOOSE

Chicago	15.50-16.00
Cincinnati, dealers	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	16.00
Buffalo, No. 1	19.00-19.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1 deal.	14.25-14.75
Cincin., No. 2 deal.	7.75- 8.25
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	†16.50-17.00
Valleys, new, No. 1.	20.50-21.00
Toronto, dealers	7.00- 7.50

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	14.50-15.00
Cincinnati, dealers	10.00-10.50
Cleveland, no alloy	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	15.50-16.00
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	16.00-16.50
St. Louis	12.00-12.50
San Francisco	5.00
Toronto, dealers	†8.75- 9.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	16.00-16.50
Cleveland	14.50-15.00
Chicago, specl, anal.	16.25-16.75
Detroit	†12.50-13.00
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.50
Buffalo	14.50-15.00
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Eastern Pa.	14.50
Detroit	†12.50-13.00
New York	†11.00-11.50
Pittsburgh	17.00-17.50
Toronto, dealers	†8.75- 9.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†12.50-13.00
Chicago, elec. fur.	20.00-20.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	15.50-16.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†11.25-11.50
Buffalo	14.50-15.00
Chicago	15.50-16.00
Cincinnati, dealers	9.25- 9.75
Cleveland	16.00-16.50
Detroit	†12.50-13.00
E. Pa., chemical	17.50-18.00
New York	†11.50-12.00
St. Louis	10.75-11.25
Toronto, dealers	†8.75- 9.00

RAILROAD SPECIALTIES

Chicago	23.50-24.00

ANGLE BARS—STEEL

Chicago	23.50-24.00
St. Louis	21.50-22.00

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	24.75-25.25
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	26.75-27.25
St. Louis	23.25-23.75

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	27.00-27.50
Chicago (3 ft.)	24.00-24.50
Chicago (2 ft.)	24.50-25.00
Cincinnati, dealers	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	26.75-27.25
St. L. 2 ft. & less	24.00-24.50

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00
Buffalo	22.00-22.50
Chicago	20.00
Cleveland	24.00
Pittsburgh	22.00 (nom.)
St. Louis	20.00-20.50
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.50-15.00
Cincinnati, dealers	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	14.00-14.50
Cincinnati, dealers	12.75-13.25
Eastern Pa.	20.50-21.00
New York	†13.00-13.50
St. Louis	15.00-15.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	14.25-14.75
St. Louis, No. 2	16.50-17.00

FORGE FLASHINGS

Boston district	†13.50-14.00
Buffalo	19.00-19.50
Cleveland	18.50-19.00
Detroit	†16.50-17.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	24.00-24.50

LOW PHOSPHORUS

Buffalo, plates	26.00-26.50
Cleveland, crops	26.00-26.50
Detroit, thin gage	†19.00-19.50
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50
Toronto, dealers	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	24.00-24.50
Cleveland	22.00-22.50
Eastern Pa.	25.50-26.00
Pittsburgh	26.50-27.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	20.00
Boston	†18.50-19.00
Chicago	24.00-24.50
New York	†19.00-19.50
Eastern Pa.	26.00-26.50
St. Louis	22.50-23.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	26.00-26.50
Eastern Pa.	27.50-28.00
St. Louis	25.50-26.00

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	20.00-20.50

SHAFTING

Boston district	†19.75-20.00
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	19.75-20.25

CAR WHEELS

Birmingham iron	18.00
Boston dist., iron	†16.50-17.00
Buffalo, steel	24.50-25.00
Buffalo iron	21.50-22.00
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.00-23.50
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.50-24.00
Eastern Pa., steel	26.50-27.00
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	26.75-27.25
St. Louis iron	21.75-22.25
St. Louis, steel	22.50-23.00

NO. 1 CAST SCRAP

Birmingham	19.50
Boston, No. 1 mach.	†19.00-19.50
N. Eng., del. No. 2	19.25-19.50
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.50-23.00
Chicago, agri. net	19.75-20.25
Chicago, auto net	19.50-20.00
Chicago, railr'd net	20.00-20.50
Chicago, mach. net	21.50-22.00
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†19.00-19.50
Eastern Pa., cupola	26.00-26.50
E. Pa., No. 2	23.00-23.50
E. Pa., yard fdry.	23.00-23.50
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.	20.00-20.50
St. L., No. 1 mach.	22.00-22.50
Toronto No. 1 mach., net dealers	†21.50-22.00

HEAVY CAST

Boston dist. break.	†18.00-18.25
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†19.50-20.00
Detroit, break.	†17.50-18.00
Eastern Pa.	24.00
Los Ang., auto, net	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†15.50
Buffalo	18.00-18.50
Chicago, net	14.50-15.00
Cincinnati, dealers	13.00-13.50
Detroit, net	†13.00-13.50
Eastern Pa.	20.50-21.00
New York fdry.	†17.50
St. Louis	17.00-17.50
Toronto dealers, net	†17.50-18.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	24.50-25.00
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	26.00-26.50
St. Louis, R. R.	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe, 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	...
So. African, 48%	65.00-67.00
Brazilian, 46%	60.00-62.00
Chilean, 47%	65.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 90, 91

Sheet and strip buying in March was substantially greater than in February, also a good month. Some producers report March the best month in history and no lessening in demand is foreseen. High rate of automobile production is a sustaining factor. While most consumers appear to have sufficient stocks for current requirements, a growing number find reserves depleted and pressure is growing to get orders on mill books, even though deliveries are delayed for months. Prices are a secondary matter. Most buyers assume that steel prices will show no sharp increase this year. That mills are well sold far ahead is indicated by the fact that only one mill bid was received on 6000 tons of sheets for the navy's regular six-months requirements.

An important sheet producer last week requested certain customers to supply schedules of sheets actually needed and dates they are required each month. This is an effort to prevent deliveries of material not needed for several weeks while urgently needed sheets are delayed.

Inventories of industrial fabricators, including stamping shops and secondary distributors, are being lowered and some are close to the danger line. Deliveries of hot-rolled, cold-rolled and galvanized sheets have retreated from 6-8 months to 8-9 months and narrow strip from 4-5 months to 5-6 months. Mills generally are booking third and fourth quarter tonnage and occasionally a specification can be delivered in July.

Sales policies are irregular. One maker will sell only on government preferential rating, others will book for regular customers in moderate tonnage. Several galvanized sheet producers have discontinued their production because of difficulty in obtaining zinc. Stainless steel sheets and strip feel the effect of short nickel supplies and consumers not protected early find themselves pinched. Galvanized sheet production has dropped 11 points to 63 per cent as a national rate.

An unusual sale recently involved a round tonnage of 17-inch stainless strip for manufacture of meal trays for the army, delivery in four weeks.

Some consumers of sheets and strip have been advised by producers' representatives to expect advances in extras effective on second quarter shipments. While no definite information has been given out it is understood by consumers that the inereases will apply particularly to the lighter gages. Most producers, incidentally, report they are sold out on 19 gage and lighter practi-

cally for the remainder of the year.

A manufacturer of composite sheets in which aluminum and zinc are used has curtailed production because of inability to obtain sufficient supplies and is substituting other metals.

Plates

Plate Prices, Page 90

Plate demand shows no slackening and mill backlogs are mounting, with prospects for an even tighter situation. As a rule commercial users can not obtain shipment before late in the year and usually in reduced quantity. Only consumers with highest preference rating can do much under five to six months. Preference ratings are being scrutinized closely to serve defense most efficiently.

Some inquiries for 1942 are being received but for most part are not being entertained. A number of mills are adopting the plan announced by Inland Steel Co. of not accepting orders for next year until first quarter books are formally opened. In most cases tonnages offered district sales offices must be referred to mills for acceptance.

Shipbuilding and carbuilding needs are heavy and account for much of recent bookings. The latter is meeting some difficulty getting steel as its preference rating is low, in contrast to the situation during first World war. Plate shipments have been started for South Portland, Me., shipyard, which is building 30 cargo ships for Great Britain. Barge builders in the Pittsburgh district are receiving larger supplies under government protection. Dravo Corp., with a contract for submarine chasers, expects to participate in the increased merchant vessel tonnage, fabrication being done at its shops and assembly at Atlantic coast points.

Quarter-inch plates are slow in New England, September-October delivery being the best offered. Floor plates are an exception, delivery being four to five weeks. Semi-fabricated work, heads and flanges can be delivered in six to eight weeks in some cases in that district.

Southern mills are pressed for plate delivery, shipbuilding and freight car construction being large factors in demand.

Plate Contracts Placed

750 tons, Bunts road water main, 24-28 inch pipe, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, navy yard, Mare Island, Calif., schedule 5234, to Worth Steel Co., Claymont, Del., $12,252.70, f.o.b. mill.

Plate Contracts Pending

400 tons, two coast guard cutters, hull steel construction; bids April 9, Washington; also three 327-foot cutters bids April 7.

Bars

Bar Prices, Page 90

Steel bar deliveries are receding under heavy demand. Carbon bars on current orders are obtainable in four to six months. Alloy bars are still more extended and some makers of open-hearth alloy steel have little to offer under 38 to 40 weeks; electric alloy steel is difficult to obtain earlier than 50 to 52 weeks. In some districts practically all alloy steel bars are for defense use.

Sales to jobbers in many instances are made only after proof that steel is to replace sales into defense work. Limitation is also being placed on sales by jobbers for export.

Forging steel producers have taken a stiffer stand on bars and billets, the $34 reroller price on billets now being largely replaced by $40, the quoted price on forging billets, on four inches or larger. On smaller billets the bar card applies, including all extras.

Orders so far placed by automotive users for 1942 models indicate no change in analyses. Tonnage appears about equal to 1941 requirements. Buick is understood to have placed about one-third of its requirements, indicating a 380,000-car year. High-manganese steel is used by this builder for many parts and will not be affected by nickel shortage. Chevrolet has placed part of its needs and while nickel steels are specified it is said provision has been made to shift to other alloys if necessary.

Bar users unable to obtain material from usual mill sources are turning to warehouses and in some instances are substituting other sections for those usually bought, squares or rounds instead of hexagons, as an example.

A recently organized company, which has acquired a plant in Northern New Jersey, has placed about 2500 tons of bars for shell work with an eastern Ohio producer and is now inquiring for 5000 tons of 1 9/16-inch rounds.

Requirements for small arms, rifle barrels included, are large and the Springfield, Mass., arsenal continues to buy, although covered on part of needs through the year. An additional tonnage has been placed with Republic Steel Corp., Massillon, O.

Manufacturers of cutting tools with cemented carbide tips, are concerned at the outlook for a continuing supply of alloy steel shanks. So far they have been obtaining shanks in needed quantities but delivery is getting tighter. Possibilities of a real pinch are foreseen. In England it now is quite customary, under war conditions, for users to return used tools to makers for re-tipping. American toolmakers do not believe such practice will be necessary here. They believe it more efficient for users to install equipment for re-tipping.

Pipe

Pipe Prices, Page 91

Because of heavy orders for aircraft and ship tubing, makers of cold-drawn seamless mechanical tubing have considerable difficulty meeting customers' increasing requirements. As the situation now presents itself defense needs will be met but as airplane and other demands increase little capacity will be left open for non-defense purposes.

Production of aircraft tubing involves complicated processing and requires much more time than other tubing. As this tonnage carries top priorities and is reaching mills in large volume, other users are being overshadowed. Production is being increased as rapidly as possible, considerable equipment having been put in service in 1940 and more is being installed this year. Comparison of capacity is practically impossible, due to wide variation in tube specifications. Production in 1939 was 84,045 net tons and estimates for 1940 indicate a 20 per cent increase, with a larger gain this year. An estimate for 1941 is placed at 130,000 tons.

Sellers are examining all orders, with special reference to the use for which the material is intended and actual date needed to prevent delays. This is to prevent overshipment to some users while others lack supply.

No serious delay is met in obtaining hot-rolled material as capacity for the latter is ample, subject to other defense demand. Alloy steel rounds have been scarce but under priority shipments have been sufficient. Material lower on the priority list, particularly nickel alloys, is difficult to obtain. In general, hot-rolled bar stock, both carbon and alloy, is sufficient. Current facilities available for non-defense purposes is small, but is increasing as more drawing equipment is installed and also because in some instances defense orders are being filled more rapidly than others. The aircraft program is well in hand and fuselage tubing supply is larger than other kinds, allowing some other varieties to be drawn.

When the airplane program

reaches top speed this will not be true but it is hoped by that time added facilities will be sufficient to meet demand for defense and allow some capacity for commercial buyers.

Seasonal improvement in cast iron pipe buying is developing, many blanket annual contracts being entered, to be specified later. Cast pipe foundries are operating generally five days a week.

Line pipe sales are at a high rate, several jobs involving 100 miles or more usually large diameter. Casing sales are most active since March, 1937. Much seamless tube capacity is devoted to shells. With brass and copper pipe devoted largely to defense use more steel pipe is needed.

Youngstown Sheet & Tube Co., Youngstown, O., and American Rolling Mill Co., Middletown, O., have contracts for approximately 19,000 tons, 18-inch steel pipe for the mainland water system, Florida Keys Aqueduct Commission, in connection with the water system at the naval air station, Key West, Fla. The Youngstown mill will furnish the major tonnage at $1,093,020 f.o.b. works and the balance goes to American Rolling Mill Co. at $315,786.90. The contracts were allocated by the navy department, yards and docks, under the opening of Mar. 4. Respective lengths are 433,000 feet and 187,000 feet, with deliveries at Key West and Florida City, Fla. This tonnage includes fittings, Dresser couplings to be used. Brinkerhoff, Klapp & Douglas, New York, are engineers for the project.

Steel Pipe Placed

19,000 tons with fittings, 18-inch, main land water system and naval base, Key West, Fla., Florida Keys Aqueduct commission, Dade county, Fla., divided, Youngstown Sheet & Tube Co., Youngstown, O., and American Rolling Mill Co., Middletown, O., bulk to former through navy department, yards and docks, bids March 4.

200 tons, 24-inch, water division, Metropolitan District commission, Boston, for Arlington, Mass., to Walsh-Holyoke Steam Boiler Works, Holyoke, Mass.

Cast Pipe Placed

275 tons, 8-inch, Boston, to Warren Pipe Co., Everett, Mass.

110 tons, 6 and 8-inch, Leominster, Mass., to Warren Pipe Co., Everett, Mass.

Wire

Wire Prices, Page 91

With wire production at full capacity and orders being booked in excess of output, deliveries vary as between products, from 6 or 8 weeks to 25 weeks. While lack of zinc restricts galvanized output capacity is utilized for other products. Manufacturers' wire is in

strong demand with shortage of alloys, particularly nickel, causing some trouble. Some users are experimenting to find other analyses that will serve as well.

Agricultural suppliers are well stocked with farm material for spring demand, which is now being felt in southern areas.

Wire rope demand is unusually heavy for re-equipping Great Lakes cargo carriers and deliveries now are delayed two months. At the beginning of the year it was available for immediate shipment. Unusual demand results from efforts to have all bulk carriers in best possible condition for a heavy season.

Tin Plate

Tin Plate Prices, Page 90

Tin plate producers are revising upward their earlier estimates of this year's movement. Opinion is gaining ground that shipments will be the heaviest in several years. A large factor is growing demand for export, to make up for the shortage in British production, other needs for steel having curtailed supplies to tin mills. Not only is shipment of canned foods to Great Britain increasing but heavy inquiries are being received from Australia, New Zealand, India and South Africa, which formerly obtained their supplies from Great Britain. It is estimated that Australia normally has taken 300,000 to 500,000 base boxes annually, much of which now must come from American mills.

Requirements for American military forces at present are confined largely to canned soups, milk and meat, fresh vegetables being served as far as possible.

However, domestic users are buying heavily to assure themselves of supplies in case export demand begins to crowd producers. Production now is at 80 per cent of national capacity, with practically all available capacity filled. No plans have been made yet for starting mills now idle.

The army will call on canners this year to supply 9,000,000 to 10,000,000 cases of canned goods, an increase of about 60 per cent over 1940, according to John Baxter, special advisor on the OPM Subsistence branch.

Rails, Cars

Track Material Prices, Page 91

Further business is appearing for car builders, led by the Illinois Central inquiry for 2400 cars of various types. The Reading Co. is reported to have awarded 500 steel gondolas to its own shops. The same company opened bids March 27 on eight 660-horsepower and two 1000-horsepower diesel locomotives.

The Pennsylvania railroad is reported seeking steel coverage for an additional car building program of unstated extent.

Locomotives Placed

Navy, three 300-horsepower diesel-electric switching locomotives, to H. K. Porter Co., Pittsburgh.

Locomotives Pending

Navy, yards and docks, two electrically operated Diesel locomotives and spares, delivery, Boston, Whitcomb Locomotive Co., Rochelle, Ill., low, $49,830, bids March 25, sch. 5828.

Reading Co., eight 660-horsepower and two 1000-horsepower diesel-electric locomotives; bids March 27.

Car Orders Placed

Chesapeake & Ohio, 1000 fifty-ton all-steel hoppers; 400 to American Car & Foundry Co., Huntington, W. Va., shops; 300 to Pullman-Standard Car Mfg. Co., Butler, Pa., shops; 300 to General American Transportation Co., East Chicago, Ill., shops.

Phelps Dodge Corp., 80 air-dump cars, to Differential Steel Car Co., Findlay, O.

Reading Co., 500 steel gondolas, to own shops, Reading, Pa.

Union Pacific, 30 chair cars, 30 baggage cars and 10 baggage-mail cars, lightweight construction, to Pullman-Standard Car Mfg. Co., Chicago.

Wabash, 150 automobile cars, 50 mill-

type gondolas and 15 caboose cars, to its own shops.

Car Orders Pending

Chicago, Indianapolis, Louisville, nine baggage cars and one mail-baggage car; contemplated.

Illinois Central, 2400 cars, including refrigerator, box, hopper and flat cars; bids asked.

Kansas City Southern, two rail motor cars; contemplated.

South African Railways and Harbors, Johannesburg, South Africa, 21 motor coaches; bids asked.

Buses Booked

A.c.f. Motors Co., New York: Ten 26-passenger for San Francisco Municipal Railway, San Francisco; ten 31-passenger for Montreal Tramways Co., Montreal, Que.; nine 39-passenger for Eastern Massachusetts Street Railway Co., Boston; six 34-passenger for Penobscot Transportation Co., Bangor, Me.; six 33-passenger for Bowen Motor Coaches, Fort Worth, Tex.; three 31-passenger for South Carolina Electric & Gas Co., Columbia, S. C.; two 34-passenger for Williamsport Transportation Co., Williamsport, Pa.

Twin Coach Co., Kent, O.: Sixty-three 31-passenger for Rochester Transit Corp., Rochester, N. Y.; twenty-five 41-passenger for Capital Transit Co., Washington; four 27-passenger for Arkansas Power & Light Co., Pine Bluff, Ark.; two 33-passenger for South Suburban SafeWay Lines, Harvey, Ill.

Shapes

Structural Shape Prices, Page 90

Orders for fabricated structural steel in February totaled 159,815 tons against 266,594 tons in January, according to the American Institute of Steel Construction, which concludes that defense orders are slackening. Shipments in February were 146,642 tons as against 154,234 tons in January. February shipments were 65 per cent of the basic period of 1923 to 1925 inclusive. The industry has on hand, available for fabrication within the next four months, a total of 624,201 tons.

Business has slowed down somewhat because of a shortage of structural engineers and not because of lack of plain material. In one case a fabricator has a large number of cars of plain structurals earmarked for defense jobs awaiting unloading but design work has prevented their use. For many of the contemplated defense projects experience is lacking, particularly windowless and blackout plants, and planning takes longer than usual.

It is expected that some recently built defense plants will have to be expanded. Pittsburgh notes that in some cases steel is piling up in fabricators' yards and workmen are idle because specifications on these jobs have not come through when promised. One of the largest fabricated awards of the week is 4000 tons for a welding and loft shop for the Fore River shipbuilding division of Bethlehem Steel Co.

Shape Contracts Placed

6000 tons, steel bearing piles, pier, navy yard, South Boston, Mass., divided, Carnegie-Illinois Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.; J. F. Fitzgerald Construction Co., Boston, contractor.

4000 tons, welding and loft shop, Fore River shipbuilding division, Bethlehem Steel Co., Quincy, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

3750 tons, two swing bridges and viaduct approach over Miraflores locks, Panama, schedule 4650, to U. S. Steel Export Co., New York, total $992,145, bids March 12; work also includes 195 tons

Shape Awards Compared

	Tons
Week ended March 29	35,067
Week ended March 22	14,839
Week ended March 15	14,526
This week, 1940	9,917
Weekly average, 1941	34,436
Weekly average, 1940	28,414
Weekly average, Feb.	27,743
Total to date, 1940	242,902
Total to date, 1941	447,670

Includes awards of 100 tons or more.

machinery, 12,700 square feet roadway grating, 2400 square feet sidewalk grating, signal and traffic control system and counterweights; four bidders.

2100 tons, addition, Huntley station, Buffalo-Niagara Electric Corp., Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.

2000 tons, press building No. 3, Midvale Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

2000 tons, steel plant, American Rolling Mill Co., Houston, Tex., to Stupp Bros. Bridge & Iron Co., St. Louis; 800 tons still pending.

1400 tons, ramps, shell-loading plant, Burlington, Iowa, war department, A. Guthrie & Co., St. Paul and Al Johnson Construction Co., Minneapolis, joint contractors, to Illinois Steel Bridge Co., Jacksonville, Ill.

1100 tons, building, General Electric Co., Schenectady, N. Y., to Ingalls Iron Works, Birmingham, Ala.

1050 tons, grade crossing elimination, contract 6, Long Island railroad, Rockaway, N. Y., to Harris Structural Steel Co., New York, through Charles Vachris Co., New York.

1000 tons, aeronautical materials storehouse, Oakland, Calif., for navy, to American Bridge Co., Pittsburgh.

900 tons, crane girders, Charleston, W. Va., for navy, to American Bridge Co., Pittsburgh.

875 tons, building 18, navy yard, South Boston, Mass., to American Bridge Co., Pittsburgh; Sawyer Construction Co., Boston, contractor.

867 tons, plant, General Electric Co., Bucyrus, O., to Ingalls Iron Works, Birmingham, Ala.

800 tons, boiler house, quartermaster depot, Philadelphia, to Bethlehem Fabricators Inc., Bethlehem, Pa.

675 tons, army buildings, Lewes, Del., to American Bridge Co., Pittsburgh, through White Construction Co., New York, contractor.

625 tons, girder renewal, Sixty-third street, Chicago Rapid Transit Co., Chicago, to Hansell-Elcock Co., Chicago.

600 tons, bridge, Grand Central Parkway, Queens, N. Y., Department of Parks project, to Bethlehem Steel Co., Bethlehem, Pa., through Laurence J. Rice, New York, contractor.

550 tons, bridge 238.89, Loop, Pa., Baltimore & Ohio railroad, to American Bridge Co., Pittsburgh.

460 tons, addition, Atlantic Basin Iron Works, Brooklyn, N. Y., to American Bridge Co., Pittsburgh.

400 tons, including machinery, gantry crane, Coulee dam, to Star Iron & Steel Co., Tacoma, Wash.

384 tons, Bluff street subway, FAGM-450-C (1), Janesville, Wis., for state, to American Bridge Co., Pittsburgh, through Jutton-Kelly Co., Milwaukee, contractor.

370 tons, crane runway, Bullard Co., Bridgeport, Conn., to Joseph T. Ryerson & Son Inc., through Turner Construction Co., New York, contractor.

365 tons, addition, National Folding Box Co., New Haven, Conn., to American Bridge Co., Pittsburgh; Fletcher-Thompson Inc., Bridgeport, Conn., contractor.

360 tons, gluing building, National Folding Box Co., New Haven, Conn., to American Bridge Co., Pittsburgh.

350 tons, building 5, Chemical Construction Corp., Wallingford, Conn., to American Bridge Co., Pittsburgh.

300 tons, building addition, National Aniline & Chemical Co., Buffalo, to Ernst Iron Works Inc., Buffalo.

300 tons, army aircorps hangar, Camp Boley, Brownwood, Tex., to J. B. Klein Iron and Foundry Co., Oklahoma City, Okla.

286 tons, dried sludge building, West-Southwest sewage treatment works, division G, Stickney, Ill., for sanitary district of Chicago, Marsch Construction Co., Chicago, contractor, to American Bridge Co., Pittsburgh.

270 tons, state bridge, contract 2126, Wheatland, Ind., to Central States Bridge & Structural Co., Indianapolis; reported previously as 130 tons.

180 tons, service building and boiler house, University of Delaware, Newark, Del., to Max Corchin Inc., Philadelphia.

160 tons, navy hangar doors, Sitka, Alaska, project, to Truscon Steel Co., Youngstown, O.

150 tons, extension and alterations, steel erecting shop, Clifton, N. J., Magor Car Corp., to American Bridge Co., Pittsburgh.

130 tons, plant, Hinde Dauch Paper Co., Cleveland, to Klein Structural Steel Co., Fremont, O.

125 tons, addition, South Chicago community hospital, Chicago, to Reuter Bros., Chicago, Paul H. Schwendener, Chicago, contractor; bids Nov. 14.

100 tons, bridge, Danbury, N. H., to American Bridge Co., Pittsburgh.

100 tons, Bonneville project substation, Alcoa, Wash., to Lehigh Structural Steel Co., Allentown, Pa.

Unstated, three 160-foot steel radio towers, air station, Lakehurst, N. J. to Harry Hershson Co. Inc., New York, spec. 10264; bids March 5 to Bureau of Yards and Docks, Washington.

Shape Contracts Pending

5500 tons, buildings, Western Cartridge Co., St. Louis.

5300 tons, brass plant, Bridgeport Brass Co., Indianapolis.

5000 tons, tremie trusses, drydock, Bay-

onne, N. J.; bids being taken by contractors.

4800 tons, hangars and shops, Gravelly Point, Va., for government.

2200 tons, Pennsylvania state bridges; 1900 tons in Allegheny county, 160 tons in Washington county, 140 tons in Clinton county; bids at Harrisburg, April 4.

1500 tons, truss and girder spans, Northern Pacific railway, Washington.

1200 tons, lamp works, General Electric Co., Bucyrus, O.

1000 tons, plant, Lukenweld Inc., Coatesville, Pa.; Day & Zimmermann, Philadelphia, general contractors.

885 tons, bridge, Hamilton county, Ohio.

800 tons, steel piling, Oaklanden reservoir, City of Indianapolis; bids March 31.

700 tons, state highway bridge LR-149, Avon, Pa.

600 tons, addition, Millard Fillmore hospital, Buffalo.

600 tons, launchway gates, etc., New York Shipbuilding Corp., Camden, N. J.

575 tons, bridge, Southern Pacific Co., Lothrop, Calif.

465 tons, roof beams, etc., Point Judith and Little Compton, R. I., for army engineers.

450 tons, new elevator, G. L. F. Mills Inc., Buffalo.

450 tons, addition, new patients' building, Methodist hospital, Brooklyn, N. Y.

375 tons, Trumbull county, Ohio, bridge; Horvitz Co., Cleveland, low.

350 tons, grade crossing elimination, West Shore branch New York Central, Buffalo, bids April 3.

300 tons, plant, Ridge Tool Co., Elyria, O.

300 tons, dry dock crane, Hunters Point, Calif., for government.

275 tons, state bridge, Panther creek, Daviess county, Kentucky.

250 tons, state highway bridge, Frankenmuth, Mich.

232 tons, steel piling, substructure, North State street bridge, Chicago; bids March 20; Fitzsimmons & Connell Dredge & Dock Co., Chicago, low.

225 tons, bridge 1696, Hoovers, Ind., Chesapeake & Ohio railway.

200 tons, overhead crossing, FAGH-282-B (2), Sterling, N. Dak., for state.

190 tons, buildings, Sandusky, O., for government.

175 tons, state bridge, Escanaba, Mich.

165 tons, Lincoln Court project, Cincinnati, for Cincinnati Housing authority.

155 tons, addition to building 3, Worthington Pump Co., Harrison, N. J.

155 tons, overpass bridge, Washington county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 4.

150 tons, trash racks, Pickwick units 3 and 4; bids April 10, Tennessee Valley Authority, Knoxville, Tenn.

140 tons, I-beam bridge, Clinton county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 4.

133 tons, bridge, route 6, section 21A, Denville relocation, Morris county, New Jersey; bids April 9, E. Donald Sterner, state highway commissioner, Trenton.

120 tons, ROTC drill hall, New York, for College City of New York.

Unstated, 125-ton traveling crane, Bonneville project; bids April 7, spec. 1807.

Unstated tonnage, five hangars, Langley Field, Va.; bids April 10, pro. 174, U. S. engineer, Norfolk, Va.

Unstated, Reynolds Metal Co. plant, Longview, Wash.; bids soon to The Austin Co., Seattle, contractor.

Unstated, Union Carbide & Carbon Co. proposed plant, at Portland, Oreg.; bids soon.

Unstated, hangar boiler house, Boise, Ida.; bids opened by U. S. engineer, Portland, March 25.

Unstated, four underslung cranes and hoists; bids in at Puget Sound navy yard.

Reinforcing

Reinforcing Bar Prices, Page 91

With approach of spring weather comes increasing demand for highway construction. Current projects are not conspicuous in tonnages and in some cases are falling off. Probably national defense takes at least half the current tonnage sold. Mills are well booked and shipments are running well according to schedules. Prices are the firmest in several years. In the New England territory housing projects at Providence are the principal outlets.

New York finds quotations generally firm, with chief exceptions on miscellaneous lots offered by the procurement division, treasury department, for WPA work, for which bids are closing March 31.

There are at least two new inquiries for 5000 tons or more, one for an army shelter project in Oregon and the other for a quarter-

master depot warehouse at Philadelphia.

Reinforcing Steel Awards

5000 tons, Ft. Green houses, Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Fireproof Products Corp. and Corbetta Construction Co.

2000 tons, Navy yard drydock, Philadelphia, to Jones & Laughlin Steel Corp., Pittsburgh; Dry Dock Associates, contractor.

1067 tons, Bureau of Reclamation, invitation 32992-A, Tucumcari, N. M., to Sheffield Steel Corp., Kansas City, Mo., through Capitol Steel & Iron Co., Oklahoma City, Okla.

721 tons, Panama, schedule 4881; bids March 11, to Capitol Steel Corp., New York, $42,429; previously announced as going to another bidder.

420 tons, bridge, Grand Central Parkway, Queens, N. Y., Department of Parks project, to Bethlehem Steel Co., Bethlehem, Pa., through Laurence J. Rice, New York, contractor.

400 tons, feed mill, Cooperative Mills Inc., Hamilton county, Ohio, divided equally among Bethlehem, Ryerson and Truscon companies; Ferro Concrete Construction Co., contractor.

368 tons, bomber assembly plant, American Aviation Corp., Kansas City, Kans., G. L. Tarlton, contractor, to Ceco Steel Products Corp., Omaha, Neb.

350 tons, power plant, Detroit Edison Co., Marysville, Mich., to Truscon Steel Co., Youngstown, O.

328 tons, warehouse, Schuster's Stores, Milwaukee, Selzer-Ornst Co., Milwaukee, contractor, to Ceco Steel Products Corp., Milwaukee; bids March 18.

214 tons, psychiatric hospital, Sisters of Mercy, Hammond, Ind., Walter Butler Co., St. Paul, contractor, to Olney J. Dean Steel Co., Cicero, Ill.

200 tons, addition, E. I. Du Pont de Nemours & Co., Niagara Falls, N. Y., to Truscon Steel Co., Buffalo.

200 tons, sewage disposal plant, Ft. Benjamin Harrison, Indianapolis, for war department, Leslie Colvin, Indianapolis, contractor, to Truscon Steel Co., Youngstown, O.

200 tons, store and garage, VanBuren and Sherman streets, Chicago, to Joseph T. Ryerson & Son Inc.; Gerhardt F. Meyne, Chicago, contractor; bids Jan. 15.

190 tons, school, Garretts Ford, Pa., to Taylor Davis Inc., Philadelphia.

160 tons, buildings, live poultry market, Brooklyn, to Igoe Bros., Newark; Lieb Construction Co., New York, contractor.

150 tons, shop, navy yard, Brooklyn, N. Y. to Igoe Bros., Newark; J. G. White Engineering Co., New York, contractor.

123 tons, coal storage building, Emge Packing Co., Ft. Branch, Ind., W. L. Yokom Construction Co. Inc., Dubuque, Iowa, to Ceco Steel Products Corp., Chicago.

119 tons, state highway bridge 2128, Rush county, Indiana, William Scheirer, Frankfort, Ind., contractor, to W. J. Holliday & Co., Indianapolis.

108 tons, highway project, FAS-40-A(1), Ballard county, Kentucky, to Laclede Steel Co., St. Louis.

100 tons, factory, Kraft Cheese Co., Plymouth, Wis., to Ceco Steel Products Corp., Chicago.

100 tons, WPA project, Chicago, for treasury department, to Truscon Steel Co., Youngstown, O.

100 tons, state school tunnels, Willowbrook, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Caye Construction Co., contractor.

Reinforcing Steel Pending

6000 tons, ammunition depot, Ft. Wingate, N. Mex.; Allisch-Smith-Fellows & Armstrong, contractors.

5750 tons, also 1,370,000 sq. ft. wire mesh, for army shelter project, Hermiston, Oreg.; bids in to J. A. Terteling & Sons, contractor.

3500 tons, bomber assembly plant, operated by Glenn L. Martin Co., Omaha, Neb., Peter Kiewit Sons Co. and George W. Condon Co., Omaha, Neb., and Woods Bros. Construction Co., Lincoln, Neb., joint contractors; bids April 1.

1500 tons, five hangars, Gravelly Point airport, Washington, D. C.

1500 tons, refinery, Socony-Vacuum Oil Co., East Chicago, Ind.; Lummus Co., contractor.

1500 tons, naval supply depot, Bayonne, N. J.; Mahoney Troast Co. and Wigton Abbott Co., New York, joint contractors.

938 tons, two pumping stations, Huntington, W. Va., U. S. engineer.

750 tons, aluminum plant, Longview, Wash., Reynolds Metal Co.; bids soon; the Austin Co., Seattle, contractor.

560 tons, superstructure, airplane engine

Concrete Bars Compared

	Tons
Week ended March 29	12,628
Week ended March 22	11,889
Week ended March 15	7,706
This week, 1940	11,495
Weekly average, 1941	10,686
Weekly average, 1940	9,661
Weekly average, Feb.	9,402
Total to date, 1940	98,264
Total to date, 1941	138,912

Includes awards of 100 tons or more.

parts plant, Studebaker Corp., Ft. Wayne, Ind.; bids March 28.

500 tons, addition, Huntley station, Buffalo Niagara Electric Corporation, Tonawanda Township, N. Y.

500 tons, estimated, defense housing project, Bridgeport, Conn.; bids early in April.

420 tons, bridge, Grand Central Parkway extension, Queens, N. Y.; Laurence J. Rice, Forest Hills, N. Y., low, $424,986; bids March 21, Department of Parks, New York.

275 tons, highway program, including bridge, route 4, section 1B, South Amboy to Cheesequake, Middlesex county, New Jersey, also 85 tons structural steel; bids April 9, E. Donald Sterner, state highway commissioner, Trenton.

265 tons, highway project, including bridge, route 6, section 21A, Denville relocation, Morris county, New Jersey; bids April 9, E. Donald Sterner, state highway commissioner, Trenton.

250 tons, U. S. Arsenal shop, Rock Island, Ill.

250 tons, aero factory, Warminister Corp., Hatsboro, Pa.; George A. Fuller Co.

207 tons, dynamometer building, airplane engine plant, Buick Motor Division, General Motors Corp., Chicago; bids March 28.

200 tons, Oaklanden reservoir, Indianapolis.

196 tons, Lake county, Ohio, project; Horvitz Co., Cleveland, low.

150 tons, Washington state highway projects; bids at Olympia, April 1.

128 tons, Trumbull county, Ohio, project; Horvitz Co., Cleveland, low.

120 tons, highway project, Wethersfield-Hartford, Conn.; bids March 31, Hartford.

115 tons, bridge, Allegheny county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 4.

113 tons, including gates, unit of Roza irrigation project; bids to Reclamation Bureau, Yakima, Wash., April 11.

100 tons, addition, Bayside station, Wisconsin Public Service Corp., Green Bay, Wis.

Unstated, three Oregon highway bridges; bids at Portland, April 3 and 4.

Unstated, 500,000 gallon concrete water storage tank, Camas, Wash.; E. E. Settergren, Portland, contractor.

Unstated, concrete water reservoir, Waterville, Wash.; R. A. Geary, Yakima, Wash., contractor.

Pig Iron

Pig Iron Prices, Page 92

Many pig iron producers find March shipments the heaviest of the year, or perhaps longer, as the effort has been to ship as much first quarter bookings as possible and to distribute tonnage in proportion to need. It is believed, however, that in many cases some tonnage is being carried over to second quarter. Generally speaking, melters are comfortably supplied for the present, particularly larger users who anticipated their needs better. Some are said to have enough on hand or contracted to last most of second quarter. Furnace stocks are being slowly depleted in spite of capacity production.

Numerous consumers seek to place tonnage for second quarter and later but producers have been slow to accept additional business, even on the basis of price in effect at time of delivery. It is generally expected second quarter tonnage will be entered at present prices, although a sharp advance in bituminous coal prices would be reflected to some degree in pig iron.

Melt is heavy and many consumers have increased output. An example is a Providence, R. I., interest rated at 8000 tons per year which is now melting at the rate of 11,000 tons a year, which is believed fairly representative. The New England blast furnace continues active and probably will be kept in until relining becomes necessary. This is its longest run in recent years.

In spite of increased needs there has been no distress and rationing by sellers has prevented actual shortages, though stocks at times have been close to exhaustion.

A number of consumers of pig iron have been virtually guaranteed a base price of $24 per ton, Cleveland, through April. This enables them to quote with greater cer-

Behind the Scenes with STEEL

The Winners

■ Definitions of *lallygagging* spread all over the lot, but to Jo Benz of Palmer-Bee and S. Rosenthal of San Francisco go the decision of the judges and a slightly dried-out two-bit cigar. Mr. B. tells us lallygagging is a derivation of these words from the dark days of 1941:

Lallygagging
Always in wrong
Listless
Lazy
Your obsession
Goofy
Addle-brained
Giving excuses
Goat getter
Indifferent
Nobody's friend
Getting nowhere

The column of first letters is the answer, of course, in case you missed it. Mr. R. on the other hand completely baffled us and our lexicographic friends with this one: *Lallygagging is a soporiferous, lethargic, torpescent bouleversement germinating from claudication of ratiocination—applies specifically to C(I)Ommunists!*

West Coast Friends

■ Much pleased were we this last week to hear from the graduate school of engineering at the University of Southern California that STEEL had been selected as the outstanding publication in its field—and properly honored in an important display they are building.

Life At Shelby

■ Our one and only active private to date gives us this on-the-scenes report from Camp Shelby, Miss. "With 40-pound packs we go by foot twenty to thirty miles from camp, set up our guns and go into action. Each squad has its own area and is kept concealed by camouflage. After three days of digging holes it gets slightly monotonous, then off we go to some other spot—always marching at night so no one will see us which is all right with me. The most interesting thing is trying to keep in touch with the kitchen and most of the time we are walking five miles to eat!" Shucks, and they put us in 3A.

Scanning The Ads

■ We were pretty young when *Monarch's* old flivver was in action (p. 16) but we don't remember any such knees in those days—wonder if there's a job open at *Bower Roller Bearing* (p. 11)—attention getters for sure are *Lee Spring* (p. 37) and *Revere* (p. 57).

Saving England

■ The cancellation stamp on a letter from our London office this morning read: *Save Waste Paper, Metals, Bones and Rags.*

Poem Dept.

■ We tried to get the advertising department to run this but they thought it might be better back here behind the scenes where no one will possibly see it:

The codfish lays a million eggs,
The little hen but one,
But the codfish doesn't cackle
To tell us what she's done;
So we despise the codfish, and
The little hen we prize—
Which indicates to thoughtful minds
"It pays to advertise."

The Nervous Law

■ Big time last week up in Detroit at the Tool Engineers' show which went over with a bang. Saw a lot of friends and made a lot of others. Walking along the aisle one day we joined the crowd watching Ohio Crankshaft's Tocco hardener in operation and found ourselves side by side with one of Detroit's finest. It is fascinating to watch and everyone leaned over intently throughout the entire operation—that is, everyone except our copper friend. When they put the quench on, he almost literally jumped back out of his shoes, looked around sheepishly, fingered his service pistol in sudden defiance and walked on down toward the nearest exit.

SHRDLU.

tainty on prices of castings. In all cases, however, April iron still is being sold on a "price in effect" contract. Incidentally, where some pig iron only recently was being shipped at $23, Cleveland, little now is heard at less than the $24 market price.

Scrap

Scrap Prices, Page 94

Principal interest in the steel and iron scrap market is in the expected announcement from Washington of price differentials from the Pittsburgh base. Delay in promulgation of this schedule has kept the market in uncertainty and buyers and sellers are marking time. It is believed a number of prices will be different from those in the proposed list issued several weeks ago. Consideration by scrap interests in various areas has developed relations somewhat at variance with the original figures.

Steelmaking grades continue practically unchanged but heavy demand for cast grades has caused some upward changes. Some melters have bid several dollars above pig iron prices for cupola cast but have not been able to obtain as much as they require.

Some additional supplies will be available as soon as the lake navigation season opens. A leading consumer at Pittsburgh has closed on about 30,000 tons in the Southwest, to be shipped by barge from New Orleans and Houston, Tex.

Strike interruption at Bethlehem, Pa., plants of Bethlehem Steel Co. last week caused diversion of scrap shipments to other plants of that company.

Growing demand is heard from consumers that the government should allow scrap prices to remain at existing levels. A reduction would have the effect of discouraging scrap collection. In fact, a number of scrap collectors already have been lured away from their regular business to take jobs in defense plants or military cantonments at high pay.

High bidders on navy yard scrap at Washington last week were: Nassau Smelting & Refining Co., Tottenville, N. Y., 8.25c per pound on 75,000 pounds brass turnings, 14.34c on 175,000 pounds red bronze turnings, 10.64c on 175,000 pounds brass cartridge scrap; Ajax Metal Co., Philadelphia, 8.12 cents per pound on 55,000 pounds manganese bronze turnings; Bay State Smelting Co., Cambridge, Mass., 3.46c on 10,000 pounds tool steel scrap, 3.32c on 8000 pounds tool steel turnings; United Iron & Metal Co., Baltimore, $6.34 per ton on 75 tons ladle skull and tip scrap; Hyatt Iron &

Metal Co., Arlington, Va., $11.88 per ton on 100 tons miscellaneous scrap pipe.

Pacific Coast

Seattle—Conditions are tight in most rolled products, especially plates, and shipyards are pressing for deliveries. Much construction has been sublet and small jobs involve considerable tonnage. United States engineer has opened bids on five oil storage tanks for Boise, Idaho, cantonment and Tumwater, Wash., will open tenders April 8 on a 100,000-gallon steel tank on tower.

Plans are in preparation by the Austin Co., general contractor, for the aluminum plant at Longview, Wash., for the Reynolds Metals Co., tonnage unstated and for the proposed plant for Union Carbide & Carbon Corp. at Portland, Oreg.

Rolling mills are bending every effort to complete current commitments for reinforcing bars. Contractors meet difficulty in placing orders. No large jobs have been placed recently but April business includes several fairly large tonnages.

Important cast iron pipe tonnages are to be bid in April and agencies expect an active second quarter. Awards are still pending for 1375 tons 4 to 10-inch pipe for projects at Eugene and Portland, Oreg.

The scrap market is somewhat confused and uncertain. Mills are still paying $15 per gross ton for No. 1 steel but it has been suggested that differentials be imposed which would lower the price to about $12. Cast scrap is firm, foundry consumption having greatly increased in recent months.

Dealers have no word of higher prices for second quarter pig iron and Columbia iron still is quoted at $22, base. Foundries are busy and consumption is probably five times that of a year ago. Demand for coke is also strong, foundries buying both eastern domestic and Fernie, B. C., coke, some using a 50-50 mixture. Eastern coke is quoted at $10.50, f.o.b. English coke has been out of the market for more than a year.

Cold-Finished Steel

Cold Finished Prices, Page 91

Cold-finished steel demand is increasing and bookings now are at mill convenience. Hot-rolled bars for cold drawing are plentiful at the moment, with some shortage of alloy steels. Larger sizes are more difficult because of demand for shell steel. Non-integrated cold drawers fear supplies will be short later in the year, as deliveries are being extended. Direct defense material with priority is causing some commercial orders to be delayed. British buying is heavier. New equipment for cold drawing and heat treating are being installed and may relieve the situation somewhat.

Ferroalloys

Ferroalloy Prices, Page 92

New York—Ferroalloy shipments continue to move as fast as producers can turn out the material. Compared with a year ago capacity is larger, but expansion at the moment is at a stage where it has had little bearing on shipments since the beginning of the year. Prices are unchanged, ferromanganese holding at $120, duty paid, Atlantic and Gulf ports, and 19 to 21 per cent spiegeleisen, at $36, Palmerton, Pa.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 91

Orders for bolts and nuts continue to gain, as for several months, with increasing proportion for defense work, placed indirectly, such as tanks and gun mounts. Sales this

month are the largest in ten years.

For delivery at Philadelphia and Norfolk, navy department closes April 1 on 1000 tons steel rivets, under schedule 5963, bureau of supplies and accounts; also March 28, schedule 5929, on 125 tons black strip steel for cable hangers, Brooklyn.

Canada

Toronto, Ont.—Heavy buying by automotive interests, electric equipment makers and miscellaneous consumers is reflected in larger sheet backlogs. Canadian mills are well booked into third and fourth quarter.

Opening of the new plate mill at Hamilton, Ont., has created much interest and orders have been booked which will absorb output for several months. Large orders still are going to the United States and imports are about 10,000 tons monthly. Larger buying is expected soon for shipbuilding.

Merchant bar demand is brisk and delivery on current orders is about three months. Carbon and alloy bar demand is well in excess of production. Restriction on structural steel for private use is intended to make available larger tonnage for war industries. Fabricators are booked almost to the end of the year, with awards last week about 12,000 tons and pending defense projects at least 25,000.

Melters are making heavier demands on pig iron producers, to offset cast scrap shortage. Books have been opened for second quarter and much tonnage is being taken, indicating record sales for that delivery.

While most dealers quote $25.50 to $26 per net ton for machinery cast some sales have been made at lower prices. Consumers are bidding a top of $21.50 but dealers are said to decline such offers. Steel scrap demand continues heavy from mills and electric furnace operators. Supplies have been slow, with offerings small. Larger tonnages have begun to appear from automobile wreckers, in cast and steelmaking grades.

Iron Ore

Iron Ore Prices, Page 94

New York — While shipments against contracts are being made, little buying of manganese ore is reported, and prices generally are nominal. This has long been true of Caucasian ore, as no sales have been reported in many weeks. The situation in Indian ore is now so beclouded that it is next to impossible to quote a representative figure.

Little African ore is being bought. Ships are scarce and ocean rates are up, but 48 per cent material, it is believed, could be obtained at about 65.00c to 67.00c per unit before duty, Atlantic ports.

Brazilian ore, 46 per cent standard minimum, is believed available at around 60.00c to 62.00c per unit before duty, and some small sales of 47 per cent Chilean ore have been reported recently at 65.00c. In the absence of important sales over recent weeks high grade Cuban ore prices are nominal.

Despite the lack of new business Cuban manganese production is being increased, and much is required to meet commitments against contracts booked some time ago. The Cuban American Manganese Corp. placed its new mill in operation last month and is believed likely to turn out about 130,000 tons of high grade concentrates this year.

According to reliable estimates, Cuban manganese ore production will amount to at least 165,000 tons; or perhaps as much as 175,000 tons. This compares with approximately 130,000 tons last year and 100,000 tons the year before.

Meanwhile, most ferromanganese consumers have fair stocks on hand or under contract. These, with government purchases, should be sufficient to meet requirements for the next year and a half or longer, it is estimated.

Ore Shippers Ready for Early Season Opening

Marquette, Mich.—Quick start began several days ago in loading iron ore at mines at this area against expected early arrival of cargo carriers. Ice-breaking at the Soo and in the Straits of Mackinaw is now believed likely to be completed in a few days, allowing vessels to reach loading ports here and at Escanaba, Mich.

At the Cambria-Jackson mine of Republic Steel Corp. and at the Negaunee, Athens and Maas mines of Cleveland-Cliffs Iron Co. railroad cars began to be loaded Monday, followed a couple of days later by loading at the Mary-Charlotte mine of North Range Mining Co.

Loadings were from pockets and continued to increase through the week. Cars are to be loaded from stock piles as soon as tracks are cleared and preparations made at Marquette to handle them. The Lake Superior & Ishpeming railroad and the South Shore & Atlantic railroad are preparing for what promises to be the earliest opening in Marquette shipping history. The record is

April 6, a mark set in 1902. The L. S. & I. plans for possible opening in the first week of April, repairing cars, tracks and loading equipment in its own shops. The South Shore is doing likewise.

Following breaking of ice in St. Mary's river and the Straits, the carferry SAINTE MARIE will work in Whitefish bay after passing the locks about Tuesday and will be turned over to the coast guard to aid the cutter TAHOMA to open up the icebound passage to Lake Superior. Meanwhile the cutter is working from DeTour, Mich., toward another icebreaker, ESCANABA, through the Straits.

Last year the first ship loaded at Marquette was the P.D. BLOCK of Inland Steel Co., April 22.

Steel in Europe

Foreign Steel Prices, Page 93

London — (*By Cable*) — Second quarter contract negotiations are active in Great Britain, mainly on war requirements. Improved deliveries are expected, owing to severe restrictions on ordinary commercial users. Most urgent priority demand is from shipyards, boiler makers and tank makers and also for black sheets and merchant steel. Semifinished steel supply is satisfactory, owing to large supplies from the United States. Tin plate export trade continues severely limited.

Coke Oven By-Products

Coke By-Product Prices, Page 91

New York — Phenol shipments are heavy, current buying absorbing high capacity output. While practically all industrial users of phenol are increasing consumption, demand by producers of plastics is outstanding. Naphthalene is seasonally active, jobbers taking substantial shipments for the household trade and industrial needs are heavier. In addition to heavy releases against contracts at $29 per ton f.o.b. port, in bulk, considerable spot buying of sulphate of ammonia is being done with indications that requirements for the fertilizer trade will carry through into April. No stocks of distillates are being accumulated and supplies on some are becoming tight, including toluol. Consumers of the latter in some cases are turning to xylol, although stocks of the latter are limited for spot needs. Coke oven by-product prices are unchanged and firm.

Authorized and proposed government expenditures for defense total $39,177,800,000, according to a compilation issued last week by the Office of Production Management.

OPM Purchasing Division Now in Six Major Branches

(*Concluded from Page 29*)

foods section. Industrial, strategic materials branch: C. E. Bertrand, assistant purchasing agent, Pan American Airways, New York, special advisor on oil and gas.

In the equipment and supplies branch: J. B. Davis, vice president and general co-ordinator of purchasing, Inter-Chemical Corp., New York, special advisor on paint; Lewis A. Jones, Benche Printing Co., Schenectady, N. Y., special advisor on electrical supplies.

In the clothing and equipage branch: Harold Florsheim, first vice president and secretary, Florsheim Shoe Co., Chicago, special advisor on shoes and leather.

For consultation and assistance on special problems there has been set up an advisory committee: Albert J. Browning, former deputy director of the division of purchases, and president, United Wall Paper Factories, Chicago; Frank M. Folsom, executive vice president, Goldblatt Brothers department store, Chicago; Elmo Roper, marketing consultant, New York; R. T. Stevens, specialist on textiles; A. W. Zelomek, of the International Statistical Bureau, New York.

Professor Gragg serves as secretary of this committee, and the various sections of the National Defense Advisory Commission are represented on it as follows: Transportation—Karl Fischer; warehousing, H. D. Crooks; labor, Isador Lubin; price stabilization, J. P. Davis; agriculture, S. H. Sabin; consumers, H. B. Rowe.

Scrap Steel Exports Up; Pig Iron Is Reduced

■ Iron and steel scrap exports increased in February to 72,666 tons, valued at $1,347,855, compared with 43,467 tons in January. The United Kingdom took 67,873 tons and Canada, 3037 tons. Pig iron exports were almost reduced by half, 46,843 tons, valued at $1,403,063 against 80,322 tons exported in January. Of this total United Kingdom took 42,381 tons, valued at $1,267,180; Union of South Africa, 3298 tons, valued at $100,960, and Canada 529 tons, valued at $14,186.

Non-alloy ingots, blooms and billets were also off sharply, 114,652 tons being exported in February, valued at $4,520,050, compared with 201,883 tons exported in January. Of the total the United Kingdom

took 94,058 tons, valued at $3,573,416; Canada, 11,349 tons, valued at $583,573; Japan, 999 tons, valued at $44,433 and Union of South Africa, 7109 tons, valued at $263,531.

Exports of alloy ingots, billets and blooms, including stainless, totaled 40,568 tons, valued at $1,802,499 against 55,191 tons in January. Of this total Greece bought 4161 tons, valued at $126,983, while the bulk of the remainder went to the United Kingdom and Canada, the former taking 36,233 tons, valued at $1,641,994.

Republic Backlog at Peak; Facilities Improved

■ Republic Steel Corp., Cleveland, had the largest backlog of orders in its history at the close of 1940, according to its annual report to stockholders, signed jointly by T. M. Girdler, chairman, and R. J. Wysor, president.

Sales and operating revenue last year amounted to $305,293,356, compared with $232,014,074 in 1939. Operations averaged 78 per cent of capacity, with a production of 6,111,678 tons of ingots, an increase of 27 per cent over 1939.

Stressing the importance of complete co-operation with the defense program, the report points out that among the defense materials being produced by the corporation are: Electric furnace alloy steels for aircraft parts and light armor plate; light armor plate itself; cold-drawn and heat-treated bars for antiaircraft projectiles, hot-rolled bars and billets for shell forgings; and special steels for large gun forgings, marine crankshafts for naval vessels, and other products.

Pay rolls amounted to $97,570,848 and taxes to $16,034,921. Provision for federal income taxes amounted to $8,000,000, and social security taxes to $3,763,000. At the close of 1940 the corporation had 62,093 employes on its pay roll.

Net income was $21,113,507 as compared to $10,671,343 in 1939.

During 1940 the corporation's working capital increased $16,000,000, and at the end of the year was $10,000,000 in excess of its funded debt. Total debt at the end of the year amounted to $95,829,105.

Corporation's capital expenditures for property account amounted to $17,032,625. Included in the major expansions were the installation of three additional 50-ton electric furnaces, which are being augmented by two similar units; increased open-hearth ingot capacity at Warren, O., Buffalo, Chicago, Cleveland and Gadsden, Ala.; increased blast furnace capacity at Cleveland and Birmingham, Ala., and the purchase of a blast furnace at Troy, N. Y.; the lease of the Clyde coal mines in western Pennsylvania, giving the corporation approximately 40,000,000 tons of high-grade coal for its by-product coke ovens; and the installation of a new plant at its Lake Erie Limestone Co. properties in Lawrence county, Pennsylvania.

Otis Steel Co.'s 1940 Profit $717,007; Taxes, $1,097,431

Otis Steel Co., Cleveland, earned $717,007 in 1940, compared with $214,965 in 1939, acording to company's pamphlet report. In 1938, a deficit of $1,230,297 was incured, while in 1937 net profit was $2,320,031.

Taxes last year totaled $1,097,431, against $887,703 in 1939. Expenditures for maintenance of machinery and equipment aggregated $2,520,880, against $2,169,866 in the preceding year.

California Company To Build Ohio Branch

■ National Motor Bearing Co. Inc., Oakland, Calif., will build a new factory in Van Wert, O., where a seven-acre site has been obtained, it was announced last week. The company manufactures oil and fluid seals and shims for many kinds of machinery, including aircraft, automobiles, machine tools and farm implements.

Building and equipment for the new factory and warehouse will cost about $225,000. It will employ approximately 125 men and women.

Seek Clarification of Aluminum Rulings

■ Clarification of orders issued last week on secondary aluminum prices and supplies will be sought immediately, it was stated following a meeting of the Aluminum Research Institute in Cleveland. The Institute represents leading producers of secondary aluminum.

It was pointed out that neither the price stabilization nor priorities divisions in Washington have any intention of working hardships on the scrap trade, secondary smelters or consuming industries. That the government agencies will be receptive to revisions in their rulings was indicated in the original drafts.

As a result of the proposed clarification of the priorities ruling especially, the hope was expressed that the supply situation will be greatly eased for non-defense consumers of secondary ingot, since a considerable proportion of the tonnage produced is not suitable for defense purposes.

Although a number of consumers have expressed apprehension over aluminum supplies, no serious hold-ups on production have been reported so far. In fact, the secondary trade has made up at least part of the deficiency resulting from inability to obtain virgin metal.

Despite talk about changeovers from aluminum to cast iron pistons in the automotive trade, fabricators are reported still supplied with material. A maker of heaters is booked ahead on castings for the next month or two. Another company producing utensils is operating full time.

Nonferrous Metals

New York — Formal priorities were placed on secondary aluminum by the priorities division, Office of Production Management and this order was followed almost immediately by another order from Leon Henderson of the price stabilization division covering secondary aluminum ingot and scrap prices. On Friday Mr. Henderson asked brass ingot makers to withhold any advance in ingot prices pending a meeting of representatives in his offices during the week ending April 5. Defense officials are considering a plan to accumulate a supply of zinc concentrates as well as a schedule of maximum prices for zinc scrap.

Copper—Allocations of the Metals Reserve Co.'s April copper are to be announced shortly. With this metal going freely to fabricators, producers who have been oversold for so long can let daily sales drop below daily production while they replenish reserves. Electrolytic ingot prices remained firm last week with the mine producer asking 12.00c, Connecticut, custom smelters 12.50c and brokers 13.00c.

Lead—Sales last week were large, including substantial tonnages for May delivery as well as for March and April. Prices advanced 10 points on Wednesday to the basis of 5.85c, New York. The advance was made in order to permit larger tonnages of foreign refined metal to enter the domestic market but available shipping space is increasingly difficult to obtain.

Zinc—Upwards of 3400 tons of domestic zinc should be available in April for distribution to defense bottlenecks through OPM, which is to have five per cent of the estimated domestic zinc output.

Tin—Sales to domestic consumers last week were large, although a delay of one to two days in receipt of Far Eastern cables reduced somewhat offers here. Reflecting heavy demand in all principal markets, prices continued firm to strong. Straits spot closed at the week's high of 52.62½c.

Canada Restricts Structural Steel Use

(*Continued from Page 46*)

Canada Ltd., Windsor, Ont., $27,505.

Aircraft: Air Ministry, England, $70,000; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $124,479; Walter Kidde & Co., Montreal, $20,467; Noorduyn Aviation Ltd., $39,017; MacDonald Bros. Aircraft Ltd., Ottawa, $13,958; Link Mfg. Co. Ltd., Gananoque, Ont., $704,815; DeHavilland Aircraft of Canada Ltd., Toronto, $767,765; Cockshutt Plow Co. Ltd., Brantford, Ont., $172,584; MacKenzie Air Service Ltd., Edmonton, Alta, $45,927.

Shipbuilding: Minett-Shields Ltd., Bracebridge, Ont., $170,000; Star Shipyard (Mercer's) Ltd., New Westminster, B. C., $152,000; A. C. Benson Shipyard, Vancouver, B. C., $152,000.

Dockyard supplies: Canadian National Railways, Montreal, $17,879.

Miscellaneous: General Steel Wares Ltd., Toronto, $175,282; Gurney Foundry Co. Ltd., Vancouver, B. C., $8361; Acme Office Supplies Ltd., Ottawa, $16,867; Federal Typewriter Co. Ltd., Ottawa, $16,867; Ottawa Typewriter Co. Ltd., Ottawa, $16,426; Underwood Elliott Fisher Ltd., Ottawa, $23,460; Dominion Rubber Co. Ltd., Ottawa, $26,477; La France Fire Engine & Foamite Ltd., Toronto,

Nonferrous Metal Prices

	Copper			Straits Tin, New York								
Mar.	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
22	12.00	12.00	12.25	52.62½	51.87½	5.75	5.60	7.25	17.00	14.00	35.00
24	12.00	12.00	12.25	52.50	51.75	5.75	5.60	7.25	17.00	14.00	35.00
25	12.00	12.00	12.25	52.50	51.75	5.75	5.60	7.25	17.00	14.00	35.00
26	12.00	12.00	12.25	52.62½	51.87½	5.85	5.70	7.25	17.00	14.00	35.00
27	12.00	12.00	12.25	52.62½	52.00	5.85	5.70	7.25	17.00	14.00	35.00
28	12.00	12.00	12.25	52.62½	52.00	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
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	9.00-9.25
Cleveland	10.00
Chicago	9.12½-9.37½
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	11.00
Chicago, No. 1	10.25-10.50
St. Louis	10.25

Composition Brass Turnings

New York	8.75-9.00

Light Copper

New York	8.00-8.25
Cleveland	8.75
Chicago	8.25-8.50
St. Louis	8.25

Light Brass

Cleveland	6.00
Chicago	6.12½-6.37½
St. Louis	5.75

Lead

New York	4.85-5.00
Cleveland	4.50-4.75
Chicago	4.62½-4.87½
St. Louis	4.50

Zinc

New York	7.50-8.00
Cleveland	5.50-6.00
St. Louis	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.	13.75-14.00
Standard No. 12 aluminum	16.00

$5670; Empire Brass Mfg. Co. Ltd., Vancouver, B. C., $8371; Enterprise Foundry Co. Ltd., Saskville, N. S., $5603; Canadian Comstock Co. Ltd., $38,500; Iron Fireman Mfg. Co. of Canada Ltd., Toronto, $31,013; Horton Steel Works Ltd., Ft. Erie, Ont., $14,640; E. Leonard & Sons Ltd., London, Ont., $16,994; Gurney Foundry Co. Ltd., Toronto, $14,000; Atlantic Construction Co., Halifax, N. S., $23,000; John Flood & Sons, St. John, N. B., $59.000; B. J. Miller & Co. Ltd., Toronto, $88,000.

War construction projects: A. W. Robertson Ltd., addition to DeHavilland Aircraft of Canada Ltd., Toronto, $200,000; M. A. Condon, Kentville, N. S., $126,000; James N. Kenney, Truro, N. S., $106,257; M. H. McManus Ltd., Halifax, N. S., $95,015; Page Equipment & Construction Co. Ltd., Three Rivers, Que., $47,864; E. G. M. Cape & Co., Montreal, $41,077; Ontario Construction Co. Ltd., St. Catharines, Ont., $362,615; Armstrong Bros. Construction Co., Brampton, $89,456; Carter-Halls-Aldinger Co. Ltd., Vancouver, B. C., $55,268.

Equipment

Boston — Retooling for defense contracts and plant expansions continues to materialize in large machine tool orders to equipment builders in this district, also installations in government shops. Inquiry for the latter are heavier; also buying with preferential ratings now effective on practically all new business. Demand for gages and parts continues heavy. New contracts for the Watertown, Mass., arsenal include a four-head adjustable rail milling machine to Ingersoll Milling Machine Co., Rockford, Ill., $175,500, and a double housing planer, Consolidated Machine Tool Corp., Rochester, N. Y., $167,470.

Seattle—Demand is strong and steady especially for electrical and automotive machinery. General Electric Co. is low at $278,000 for improving the distribution system at Puget Sound navy yard. Westinghouse is low to Tacoma, $53,298, for furnishing three 12,000-kva transformers. Denver has called bids April 11 for two pumping units for Buffalo Rapids project, Montana. NePage Electric Co., Seattle, is low to Bonneville project for service cubicles for substations. Tacoma has opened bids for voltage regulator and 60 pedestal traffic type signals, nine 15-kv circuit breakers and two 46-kv breakers. United States engineer, Portland, will open tenders April 3 for four 4000-kva transformers.

Construction and Enterprise

Ohio

CINCINNATI — General Machinery Corp. will build a machine shop at its North Third street plant for erecting and testing diesel engines, for which it has orders totaling $18,000,000.

CINCINNATI—Eastern Machinery Co., 1000 Tennessee avenue, plans a plant addition costing $125,000.

CLEVELAND—Cleveland Tractor Co., Euclid avenue and East 193rd street, has plans for an addition 100 x 250 feet to house manufacture of new high-speed tractor when government approval is obtained.

CLEVELAND—Vichek Tool Co., 3001 East Eighty-seventh street, Donald B. Wilson, secretary, will build addition 70 x 120 feet to its plant at Middlefield, O. General contract has been given to Alger-Rau Inc., 12434 Cedar road.

CLEVELAND—Harshaw Chemical Co., 1000 Harvard avenue, is building additional storage space, 80 x 260 feet, costing $50,000. H. L. Vokes Co., 5300 Chester avenue, has general contract.

CLEVELAND—Kirk Welding Co., 10410 Madison avenue, has been incorporated, by Roy G. Kirkland, proprietor of its predecessor, Kirk Welding Service, and William M. Grumney. Equipment will be installed to handle heavier welding work.

CLEVELAND—Allyne-Ryan Foundry Co., Aetna road and East Ninety-first street, is considering plant additions to accommodate enlarged production needs.

CLEVELAND—Steel & Tubes division, Republic Steel Corp., 224 East 131st street, is taking bids for one-story plant addition 83 x 450 feet, through C. A. Thayer, chief engineer, Republic building.

DOVER, O.—Shenango-Penn Mold Co., H. S. Ream, plant superintendent, is enlarging manufacturing space by a three-bay addition to its machine shop and further additions are in prospect.

FREDERICKTOWN, O. — Edwards Sheet Metal Works, in business for some time as a partnership, has been incorporated with $75,000 capital by W. M. James and associates.

ORRVILLE, O.—Village council, F. R. Smucker, clerk, is considering new boiler in municipal light plant to replace two now in service. H. R. Hadlow, 700 Prospect avenue, Cleveland, will prepare specifications.

SHELBY, O.—Ohio Seamless Tube Co., E. W. Mitchell, secretary-treasurer, will enlarge its machine shop, contract to be awarded soon.

Connecticut

BRIDGEPORT, CONN. — Remington Arms Co. Inc., Barnum avenue, is taking bids on a one-story 96 x 340 plant addition to cost about $110,000.

WATERBURY, CONN.—Street, sewer and water department is having plans drawn for a waterworks system, extension of high pressure mains and reservoir, costing $2,000,000.

New York

BUFFALO—Sterling Engine Co., 1270 Niagara street, Addison F. Vars, president, is building an addition covering 75,000 square feet for assembling and testing engines for small military craft. It will be three stories, 440 feet long and 40 to 82 feet wide. Robert E. Williams & Sons Co. Inc., Buffalo, is contractor. (Noted Feb. 17.)

DUNKIRK, N. Y.—Marsh Valve Co., Dunkirk, will build a one-story foundry addition to cost over $50,000, with equipment.

DUNKIRK, N. Y.—Allegheny Ludlum Steel Corp., Howard avenue, will let contract soon for two 80 x 100-foot plant additions. L. H. Bettner is in charge.

ILION, N. Y.—Remington-Rand Inc., 465 Washington street, Buffalo, will take

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 100 and Reinforcing Bars Pending on page 102 in this issue.

bids soon on a four-story 50 x 160-foot addition costing $125,000. Haskell & Considine, Hulett building, Elmira, N. Y., are architects. (Noted March 3.)

JAMESTOWN, N. Y.—Art Metal Construction Co., Jones and Gifford avenues, is having plans made by O. R. Johnson, 610 Fenton building, for a one-story 40 x 70-foot addition to plant No. 2, on Taylor street, costing about $40,000.

POUGHKEEPSIE, N. Y. — Department of public works, city hall, plans construction of a sewage disposal plant costing $900,000. G. D. Holmes, Syracuse building, Syracuse, N. Y., is engineer.

POUGHKEEPSIE, N. Y.—International Business Machines Corp., 590 Madison avenue, New York, plans erection of a plant to manufacture airplane cannon, at cost of $500,000.

New Jersey

HARRISON, N. J.—Crucible Steel Co. of America, South Fourth street, will build a machine shop group, 200 x 560 feet, 80 x 560 feet and 130 x 170 feet, costing $500,000. J. Bajusz, South Fourth street, is engineer.

Pennsylvania

BETHLEHEM, PA.—City, R. L. Fox, 37 East Broad street, city engineer, is seeking federal aid for a sewage disposal plant to cost about $2,000,000.

EMPORIUM, PA.—Boro council plans construction of a sewage disposal plant and appurtenances, costing $25,000. C. Barwis, Warren, Pa., is engineer.

TITUSVILLE, PA.—M. Anderson, Warren, Pa., is developing 700-acre crude oil property near Shamburg, Pa., including 20 or more deep wells, pressure and pumping plants, pipelines and steel tanks, costing $45,000 to $50,000.

WILKES-BARRE, PA.—Barnard Aviation Equipment Co., Waller street, plans additions and alterations to cost about $75,000.

Michigan

BIRMINGHAM, MICH.—Buehler Mfg. Co. Inc., has been incorporated with $50,000 capital to manufacture tools and dies by Edward A. Buehler, rural route 2, Birmingham.

DETROIT—Bryant & Detwiler, 2304 Penobscot building, has general contract for $12,000,000 defense plant in Macomb county for Hudson Motor Co., Detroit.

DETROIT—Autocraft Tool & Mfg. Co., 6442 Epworth boulevard, has been incorporated with $10,000 capital by Bessie Edelman, 2250 South LaSalle Gardens, Detroit.

JACKSON, MICH.—Frost Gear & Forge division, Clark Equipment Co., A. S. Bonner, executive vice president, Jackson, has given general contract to the Austin Co., Curtis building, Detroit, for a one-story 150 x 300-foot machine shop and manufacturing building.

MENOMINEE, MICH.—Prescott Co., manufacturer of sawmill and pumping equipment, has given general contract to John Salen & Son for a one-story plant addition.

Illinois

CHICAGO HEIGHTS, ILL. — Victor Chemical Works, 141 West Jackson boulevard, has plans by Lovell & Lovell, 664 North Michigan avenue, Chicago, for a four-story 60 x 70-foot plant costing $50,000.

CHICAGO—United Screw & Bolt Co., 2313 West Cullerton street, manufacturer of bolts, nuts, screws, etc., is building a plant addition 90 x 125 feet.

CHICAGO—National Bearing Metals Corp., 5331 West Sixty-sixth street, manufacturer of brass and bronze alloy castings for steel mill maintenance will build an addition covering 5200 square feet, adding 30 per cent to its area and will install furnaces to double melting capacity.

GRANITE CITY, ILL.—Granite City Iron & Machinery Co., 1700 Madison street, has been incorporated to conduct a scrap steel and iron business by S. Rubinstein and Gilbert Rosch.

Indiana

ELKHART, IND.—Strom Brass Foundry, 2646 South Main street, is building a foundry addition 42 x 42 feet, to cost about $3000. Will house melting furnace room and core room.

Alabama

MUSCLE SHOALS, ALA.—Tennessee valley authority, Knoxville, Tenn., will increase phosphate production here by 50 per cent, including installation of new furnace. Improvements will cost about $1,000,000 and increase output from 100,000 to 150,000 tons annually.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids as follows: April 4, schedule 6057, three motor-driven engine lathes for Newport, R. I.; schedule 6063, two motor-driven heavy-duty thread milling machines for Brooklyn, N. Y.; April 8, schedule 5994, four motor-driven open-side shaper-planers for San Pedro, Calif.; schedule 6012, motor-driven turret lathe for Mare Island, Calif.; schedule 6019, two motor-driven bench-type lathes for San Pedro, Calif.; schedule 6052, four motor-driven medium heavy duty engine lathes for San Pedro, Calif.; schedule 6041, three motor-driven turret punching machines for Wickford, R. I., Jacksonville, Fla., and Corpus Christi, Tex.; schedule 6042, four motor-driven radial drills for San Pedro, Calif.; schedule 6074, hydraulic-feed surface grinder for Brooklyn, N. Y.; schedule 6098, 22 motor-driven precision bench lathes for Newport, R. I.; April 10, schedule 6033, portable drills, grinders and hammers; schedule 6038, dies, taps, diestocks, threading sets and tap wrenches.

Tennessee

ROCKWOOD, TENN.—Tennessee Products Corp., American National Bank building, Nashville, Tenn., has bought properties of Roane Iron & Coal Co. at Rockwood, including 14,000 acres of iron ore and coal lands and two blast furnaces. Ferromanganese will be produced.

West Virginia

ALLOY, W. VA.—Electro Metallurgical Co., Niagara Falls, N. Y., will let contract soon for a one-story plant 20 x 300 feet for manufacture of alloys. Cost will be over $50,000, with equipment.

Virginia

NEW CASTLE, VA.—New company being formed probably will be called Blue Ridge Manganese Corp., will be headed by R. W. Arms, Evanston, Ill., as president, to develop manganese deposits in the Paint Bank section of Craig county. Mr. Arms is consulting engineer for American Zinc, Lead & Smelting Co., St. Louis.

Missouri

ST. LOUIS—Seco Sales Corp., 5206 South Thirty-eighth street, has let contract to L. O. Stocker Co., Arcade building, St. Louis, for one-story 60 x 100-foot warehouse addition, third extension in past year. R. V. McCann, 1047 Big Bend boulevard, Richmond Heights, is architect.

ST. LOUIS—Union Electric Co. of Missouri has let general contract to Vernon Higbee Construction Co., 6504 Nashville avenue, for a one-story addition 70 x 77 feet to its motor shop building at 1918 Locust street, and for remodeling old shop.

ST. LOUIS—Production Tool & Supply Co., 2832 Weston avenue, is building a plant addition of 5000 square feet costing about $12,000. Edward Kelley, St. Louis, is architect.

ST. LOUIS—Banner Iron Works, 4630 Shaw avenue, has given contract to Fruin-Colnon Contracting Co., 408 Olive street, for repairs to its plant, damaged

by fire, at estimated cost of $10,000.

Wisconsin

CUDAHY, WIS.—Ladish Drop Forge Co., manufacturer of automobile forgings, will award contracts soon for a boilerhouse addition 40 x 42 feet and for additional boiler plant equipment. Battey & Childs, 231 South LaSalle street, Chicago, are engineers.

BELOIT, WIS.—Fairbanks, Morse & Co., manufacturer of diesel engines, pumps and scales, has given general contract to Cunningham Bros. for a one-story heat treating plant 46 x 98 feet and one-story pump factory 100 x 230 feet. W. Fred Dolke, Merchandise Mart, Chicago, is architect.

GRAFTON, WIS.—Grob Bros., manufacturers of filing machines and band saws, will soon start construction of a one-story plant addition.

MILWAUKEE—Milwaukee Gas Specialty Co., manufacturer of gas stoves and cigar lighters, plans construction of a one-story plant addition. Lawrence E. Peterson, 312 East Wisconsin avenue, is engineer.

WEST ALLIS, WIS.—Gerlinger Brass & Aluminum Foundry Co. has plans for a one-story foundry addition.

Minnesota

LUVERNE, MINN.—A. R. Wood Mfg. Co. has been incorporated with $65,000 capital to manufacture mechanical appliances by A. R. Wood, C. L. Sherman and E. O. Olson.

MINNEAPOLIS — Pioneer Engineering Works Inc., manufacturer of sand, gravel and rock crushing and screening equipment, has given general contract to Dean L. Witcher for a one-story machine shop addition 60 x 120 feet. E. R. Ludwig, Essex building, is architect.

MOORHEAD, MINN.—Red River Valley Canning Co. has been organized with A. C. Schey, St. Cloud, Minn., manager, and will build a main factory 60 x 160 feet, boilerhouse 30 x 40 feet and warehouse 80 x 160 feet.

Texas

HOUSTON, TEX.—Sheffield Steel Corp., Kansas City, Mo., R. L. Gray, president, will install three open-hearth furnaces in steel plant to be built on Houston Ship channel near Irish bend, on 593-acre site. (Noted Feb. 17.)

HOUSTON, TEX.—Houston Shipbuilding Corp. has let general contract to Rust Engineering Co., Clark building, Pittsburgh, for 12 steel frame buildings at its shipyard on Irish island, to house machine shops, layout building, storehouses and paint shop.

North Dakota

PARK RIVER, N. DAK.—City, Harold King, city clerk, plans purchase of a 450-horsepower diesel engine for the municipal light and power plant.

South Dakota

ABERDEEN, S. DAK.—K. O. Lee & Son Inc., manufacturer of automotive equipment and special machinery, plans one-story plant 120 x 220 feet. Kenneth Fullerton, Anchor building, St. Paul, is architect.

Iowa

LAKE MILLS, IOWA—L. L. Waggoner, superintendent of light and power plant is taking bids to April 22 for power plant building 22 x 40 feet, 18 feet high, and installation of diesel engine generating unit. Cost estimated at $40,000.

MAQUOKETA, IOWA — City has awarded contract for additional generating unit for municipal light and power plant to Busch-Sulzer Bros. Diesel Engine Co., 3300 South Second street, St. Louis, at $131,948.

SIOUX CITY, IOWA—American Lubra-Gas Corp. has given a contract to H. S. Holtze Construction Co., 2121 East Fourth street, for erection of first unit of an oil refinery. This unit will cost about $100,000. James Darst, Rockford, Ill., is engineer.

California

BURBANK, CALIF.—General Controls Co., 801 Allen street, is building a shop 60 x 99 feet at 1320 South Flower street, at cost of $3500.

BURBANK, CALIF.—Lockheed Aircraft Corp., 1705 Victory place, will build a steel and concrete addition to cost $62,000.

HUNTINGTON PARK, CALIF.—Pacific Pump Works, 5716 Bickett street, is building an addition costing about $8000.

LONG BEACH, CALIF.—Junction Pipe & Supply Co., 2711 Atlantic avenue, has been formed by George H. Pilling and J. Fern Pilling.

LOS ANGELES—Thermador Co., 5119 Riverside drive, Maywood, a suburb, is building an addition 32 x 115 feet, costing about $6500.

LOS ANGELES—Metal Engineering Co., 115 East Elmyra street, has been organized by F. J. Tigner and Emil Magliocco.

LOS ANGELES — Security Pattern Works, 1646 Tarleton street, has been formed by Rex D. Barnett and William A. Herring.

LOS ANGELES—Industrial Shipbuilding & Engineering Co. has been formed by Sumner H. Bullock and Clyde C. McCune.

LOS ANGELES—Airco Tool Co. has been incorporated with $100,000 capital by James W. Sheehan and C. F. Smith, Santa Monica, Calif., and H. W. Meister of West Los Angeles.

LOS ANGELES—Norris Stamping & Mfg. Co., 960 East Sixty-first street, is having plans drawn by Webber & Co., 709 Hollingsworth building, Los Angeles, for an additional building covering 100,000 square feet and an addition to an existing building covering 60,000 square feet.

LOS ANGELES—American Stamping & Mfg. Co. has been incorporated with $15,000 capital by Richard G. King, Glendale, Calif., and associates. Joseph F. Rank, 649 South Olive street, Los Angeles, is representative.

LOS ANGELES—Southwest Steel Rolling Mill Inc. has been incorporated with 20,000 shares no par value, by E. Fisher, 629 South Hill street, and associates.

LOS ANGELES—California Aircraft Tool Co., 1337 South Flower street, has been organized by Abner G. Hogue, Theodore Perrine and M. N. Hale.

TAFT, CALIF.—Dennis Welding & Machine Co. has been formed by Douglas B. Dennis and associates and will establish plant on State highway No. 33, near Taft.

Washington

SEATTLE — Doran Co., 63 Horton street, manufacturer of steamship propellers, plans a machine shop addition.

Canada

SUSSEX, N. B.—Department of munitions and supply, Ottawa, Ont., C. D. Howe, minister, has let general contract to John Flood & Sons Ltd., 111 Princess street, St. John, N. B., for workshop here to cost about $50,000.

LONDON, ONT.—Kelvinator Co. of Canada Ltd., Dundas street East, manufacturer of electric refrigerators will build a one-story addition 35 x 200 feet, to cost about $75,000.

TORONTO, ONT.—Link-Belt Co., Eastern avenue, plans immediate addition to its plant, to cost $40,000.

TORONTO, ONT.—Metal & Alloys Ltd., Wiltshire avenue, will build an addition and make alterations to its foundry here at cost of about $35,000.

TORONTO, ONT.—Toronto Foundry Co. Ltd., Lansdowne avenue and Davenport road, will build plant addition costing $15,000, exclusive of equipment.

SASKATOON, SASK. — Saskatchewan power commission plans an addition to power plant here and installation of additional equipment, at cost of about $350,000. A. L. Cole is superintendent.

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400 HP G. E., type TS, form AL, 3 phase, 60 cycle, 440 volt, 300 RPM synch. motor, serial No. 5280820, 230 volts excitation equipped with G. E. control panel and instruments.

Excellent condition—Immediate delivery

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NEW SHEPARD HOIST

5 ton capacity, with motor driven double monorail trolley, maximum lift 22', trolley speed 350 F.P.M. Form 1-2PS, Class B-10, 220-volt, DC. Immediate shipment. Attractive price.

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STAINLESS STEEL STRIP
12 to 14% Chrome
1.10% Max. Carbon
Size: .5625 wide x .063 thick 95" long

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1 only 1917—#12 Baley Flexiform Fan, in good condition, quote price.

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HYDRAULIC PRESS, 250 to 500 ton opening between columns, from 30" to 48" to 42" x 84" stroke 30" to 48", daylight 48" to 84" preferred self contained, with motorized pump.

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Motor Generator Set—500 AMP. Chalmes, 125 V. DC Compound. Motor 75 HP—900 RPM—220 V. A.C. 3 phase.
5 ton Whitcomb Gas Locomotive 36" gauge.
Goulds Water Pump—5" x 8" geared with 10 HP Motor, D. C.

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DIE SINKERS. E-3 and E-4 Keller, M.D.
GEAR PLANERS, 54" Gleason, bevel, M.D. (2)
GEAR CUTTER, 84" Newark, M.D.
LEVELLER, Plate, 84" Bertsch, 7 Rolls, M. D.
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PLATE SHEAR, 10' x 3/8" United, M.D.

LANG MACHINERY COMPANY
28th St. & A. V. R.R. Pittsburgh, Pa.

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.

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CLASSIFIED

Positions Wanted

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.

CONSTRUCTION ENGINEER.—PLANT Supt. 24 years on industrial construction as field and office executive for contractors and owners. Well rounded experience includes supervision and expediting ship construction, erection and maintenance of structural, architectural, and mechanical plant; layout; production; inspection; cost analysis; purchasing and personnel management. Registered Engineer, age 42, excellent habits, active and with ability to meet people and obtain results. Can furnish responsible references. With present employer 10 years. Desire connection with a growing industry. Address Box 440, STEEL, Penton Building, Cleveland, Ohio.

COMMISSION SALES AGENT FOR MANY years representing several steel mills in the Ohio territory finds himself embarrassed due to the inability of the mills to accept further tonnage except for extremely deferred deliveries. I am looking for lines selling to the steel consuming trade and on which deliveries can be made. Mine is an established business with successful record. I have wide acquaintance throughout all of Ohio. Correspondence invited. Address Box 446, STEEL, Penton Bldg., Cleveland.

SALES REPRESENTATIVE FOR CHICAGO area. Desires to handle one or more lines—structural steel, fabrications, forgings, castings. Acquainted with contractors, industrials, railroads. Has thorough knowledge of Federal, State, Municipal purchasing. Address Box 447, STEEL, Penton Bldg., Cleveland.

ENGINEERING EXECUTIVE—MECHANIcal Engineer, 20 years' experience in steel and other industries, design, production, special projects, economic studies, etc. Address Box 445, STEEL, Penton Bldg., Cleveland.

Help Wanted

LOCOMOTIVE (USED) SALESMAN. AC-quainted more with Steel Plants and other Industries than Railroads although latter acquaintance naturally that much more desirable. Railway Car experience, similarly. Fixed, so extensive traveling and home absence positively no handicap because entire country his field or market. Drawing account and participation. Obviously, exceptional opportunity for man having positive confidence in his own ability. Others should not waste their time applying because we are capable of judging all applicants' abilities. Replies inviolably confidential. State entire history and advance necessary. Temperate habits prime requisite. Gentile company. Reply Box 435, STEEL, Penton Bldg., Cleveland.

LARGE STRUCTURAL STEEL PLANT REQUIRES SHOP SUPERINTENDENT
An exceptional opportunity for a man who is probably now employed as superintendent or assistant where local conditions promise no early advancement. He must have intimate knowledge of fabricating machines and methods and be especially alert as to cost control and department coordination.
We would consider his bringing with him, if available, an operation-scheduler or time-study man.
Detailed experience record should be given and preferably a recent snapshot. References will not be approached without specific authority. Reply Box 448, STEEL, Penton Bldg., Cleveland.

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.

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.

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THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

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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.

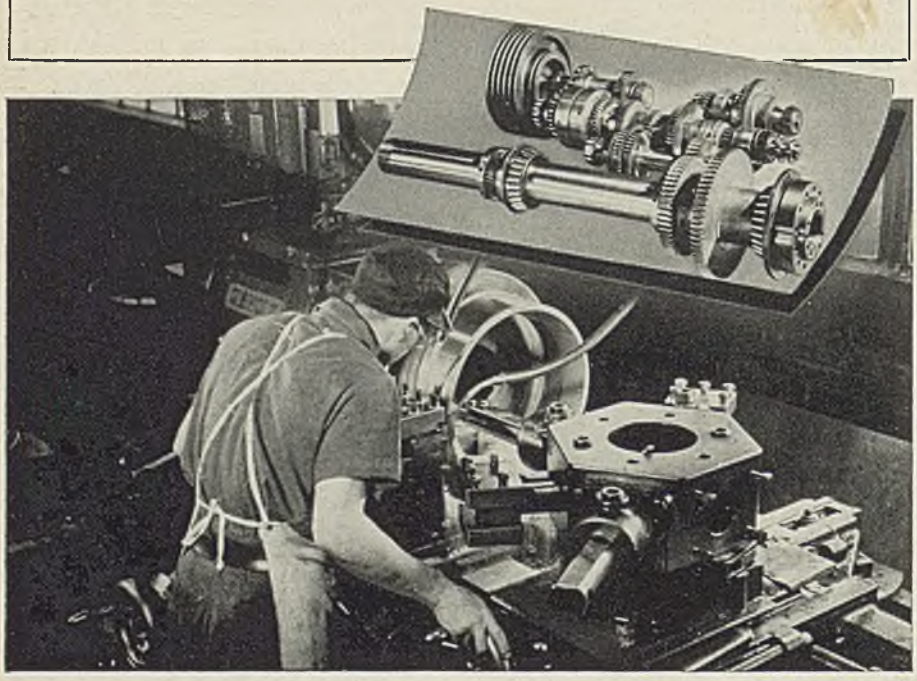
ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

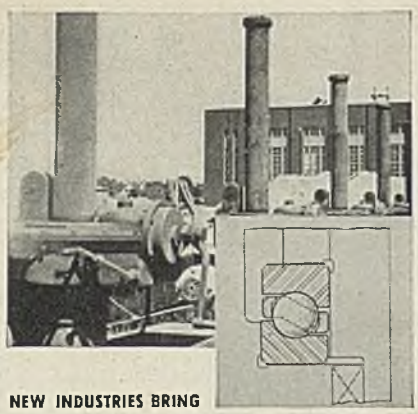
ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

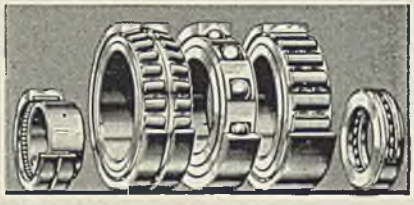
In the News
WITH BANTAM BEARINGS



FAST, ACCURATE PRODUCTION, always essential in machine tools, is more important than ever today. Turret lathes built by Gisholt Machine Company are designed throughout to meet these requirements—and Gisholt employs Bantam Ultra-Precision Tapered Roller Bearings on the spindle of many of its High Production Lathes to maintain the high degree of accuracy necessary in turret lathes. This is an outstanding example of Bantam service to machine tool builders and users.

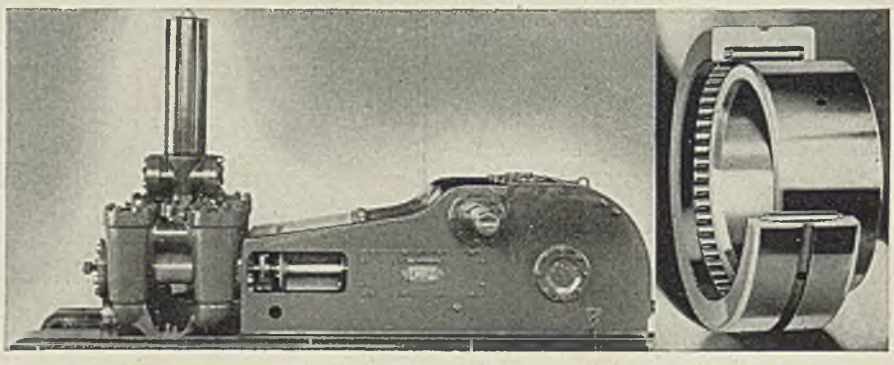


NEW INDUSTRIES BRING NEW PROBLEMS, and Bantam engineers are contributing their skill to the field of sewage treatment. For sluice gates like those shown here, built by The Filer & Stowell Co., Bantam designed special angular contact bearings that take thrust load from both directions, and radial loads also.



EVERY MAJOR TYPE OF ANTI-FRICTION BEARING is included in Bantam's line—straight roller, tapered roller, needle, and ball. Bantam engineers, with their broad background of experience in bearing design and application, can recommend the type that best suits *your* needs—or can design special bearings to meet special conditions. If you have difficult bearing problems, TURN TO BANTAM.

THIS GIANT ROLLER THRUST BEARING, 47½" O.D. by 5" thick, incorporates a split race engineered by Bantam to facilitate accurate positioning in assembly. Bearing was used by S. Morgan Smith Company to support a load of 456,000 pounds in assembling turbine equipment at Bonneville Dam—a typical instance of Bantam's skill in designing special bearings to meet unusual requirements.



LIGHT WEIGHT AND HIGH EFFICIENCY are outstanding advantages of the slush pumps built by Emsco Derrick & Equipment Company. Bantam Quill Bearings, used on the crosshead, contribute to weight reductions through their compact design—to increased efficiency through their low coefficient of friction and little need of service attention, resulting in savings in operating costs. For further information on this unusual bearing, write for Bulletin No. H-104.

BANTAM BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

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