STEEL

ESTABLISHED 1882

Contents

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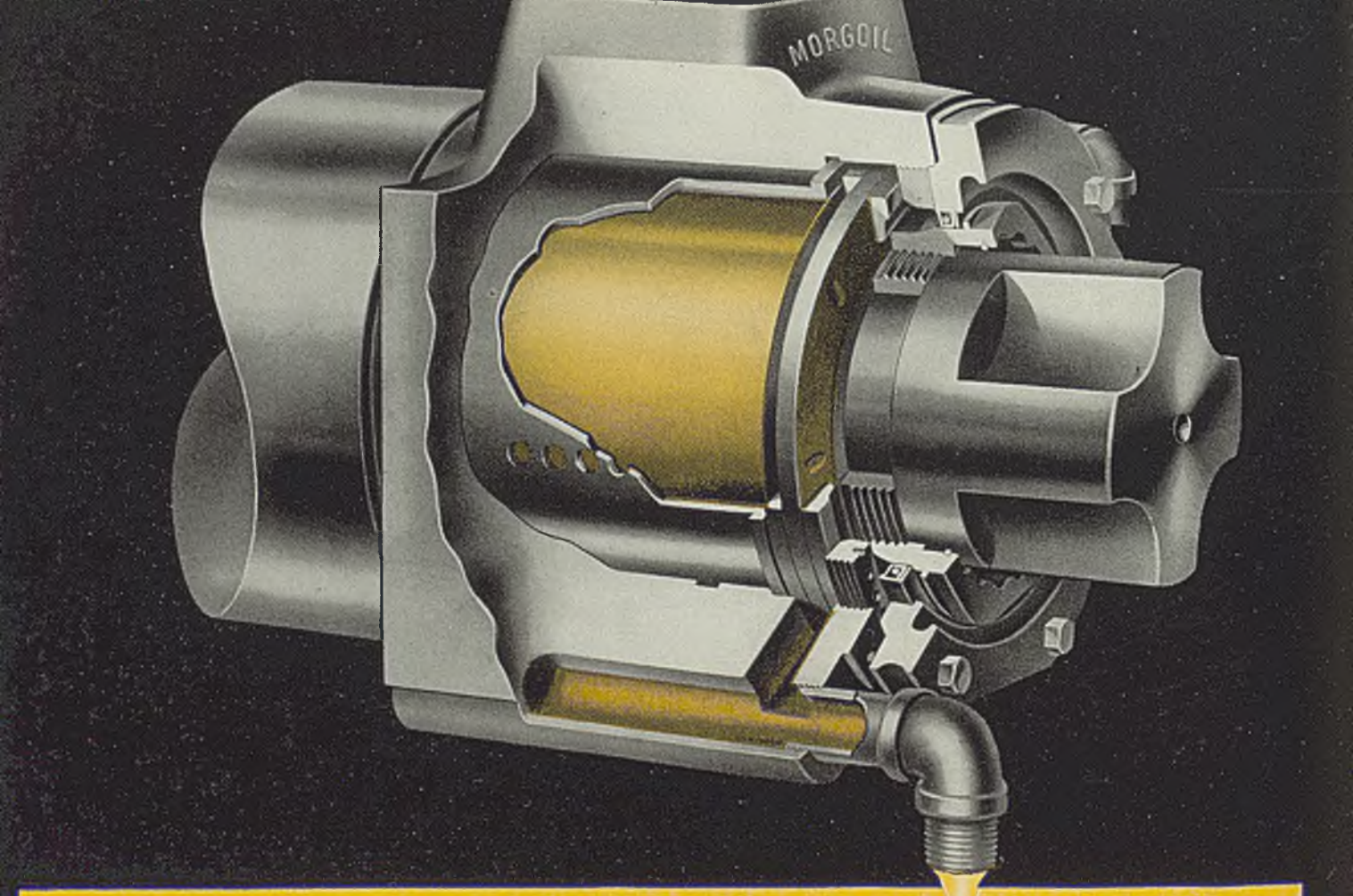
PRODUCTION • PROCESSING • DISTRIBUTION • USE



THEY RIDE ON A FILM OF OIL!

OIL . . . between two highly finished bearing surfaces . . . accounts for the tremendous load-carrying ability of Morgoil Bearings. Since 1932, Morgoil Bearings have been installed on all types of 2-high and 4-high mills, new and old, hot and cold, ferrous and non-ferrous, in the United States and abroad. A large portion of this business has been in existing mills where Morgoils have replaced modern bearings of other types. The Morgoil Bearing is capable of uniformly efficient operation at all speeds, continuous and reversing. It has made possible the development of the high speed temper pass mill.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS

3487 *Bearings Installed*

Since 1932, 3487 MORGOIL Bearings have been installed *or are on order.* Of this number 680 bearings have been installed on 4-high strip mills alone: 40 hot mills and 130 cold mills.

MORGOIL ROLL NECK BEARINGS

HIGHLIGHTING THIS ISSUE OF STEEL

■ LEON HENDERSON trying to stop the rising tide of prices **(pages 30-33)** reminds one of King Canute reproving the disobedient sea. Also, it smacks of typical Washington politics. Because, as the leaders know, you can't have prices-as-usual, while ruling out business-as-usual. They understand, too, that the public will pay completely for the war and the consequences of war, whether an item be a $2000 shell, normally worth its weight as scrap, or a $15 baby buggy, usually half that price. Such diverse immediate costs cannot be separated, though the government is endeavoring to make the public believe they can. It is seeking desperately to allay fear of inflation in the mind of Mr. and Mrs. America, a fear that might be disastrous to defense. Commendable enough, if consistent. But when in this state of unbalance it tries besides to juggle up wages its political play becomes preposterous.

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Friction at Washington

Office of Production Management has been revamped **(p. 23)** to effect savings in time and personnel. About 30 industry advisory committees are being organized, each to be matched with a commodities section. Result will be that any major industry will deal with a single division of OPM instead of having to go in turn to the production, priorities and purchasing divisions. . . . Several more high-ranking members of the defense organization resigned last week **(p. 14)**, giving rise to rumors of friction between New Dealers and businessmen in the OPM. Part of this is said to arise from difference in opinion as to how much plant expansion is actually needed. . . . A leading steel authority assails the government's proposal for widespread increases in that industry's capacity **(p. 13)**. . . . 20,000 more skilled workers are required if the machine tool industry **(p. 43)** is to achieve maximum production. . . .

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Price-Freezing Of Pig Iron

Priority sales of steel are being made at an ever-increasing rate, with some large producers estimating that as high as 70 per cent of current business carries priority ratings **(p. 87)**. This percentage is large partly because most of the civilian needs are taken care of and it is the emergency defense work which affords the bulk of sales now. Sales are still running 135 per cent of capacity or better, meaning that backlogs of orders are building up. Higher prices are creeping into the picture. The new price-freezing order on pig iron allows for more liberal silicon differentials; fire brick has been raised 8 per cent, as of July 1. . . . Steel production last week **(p. 17)** gained ½ point to 99½ per cent.

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Manufacturing Armor-Piercers

A series of 14 illustrations with detailed captions **(p. 48)** show how armor-piercing naval shell is being made by Westinghouse at its Nuttall works. . . . A 100-per cent mechanized setup for metal spraying **(p. 54)** produces unusually uniform product. . . . Harold Lawrence tells **(p. 60)** what to look for in selecting a public or private outside school from which to hire welders, the first of three articles on how to get welding operators in the present emergency. . . . Integrally bonded, alloy-lined plate is now approved by the boiler code committee of the American Society of Mechanical Engineers for use in fusion-welded unfired pressure vessels.

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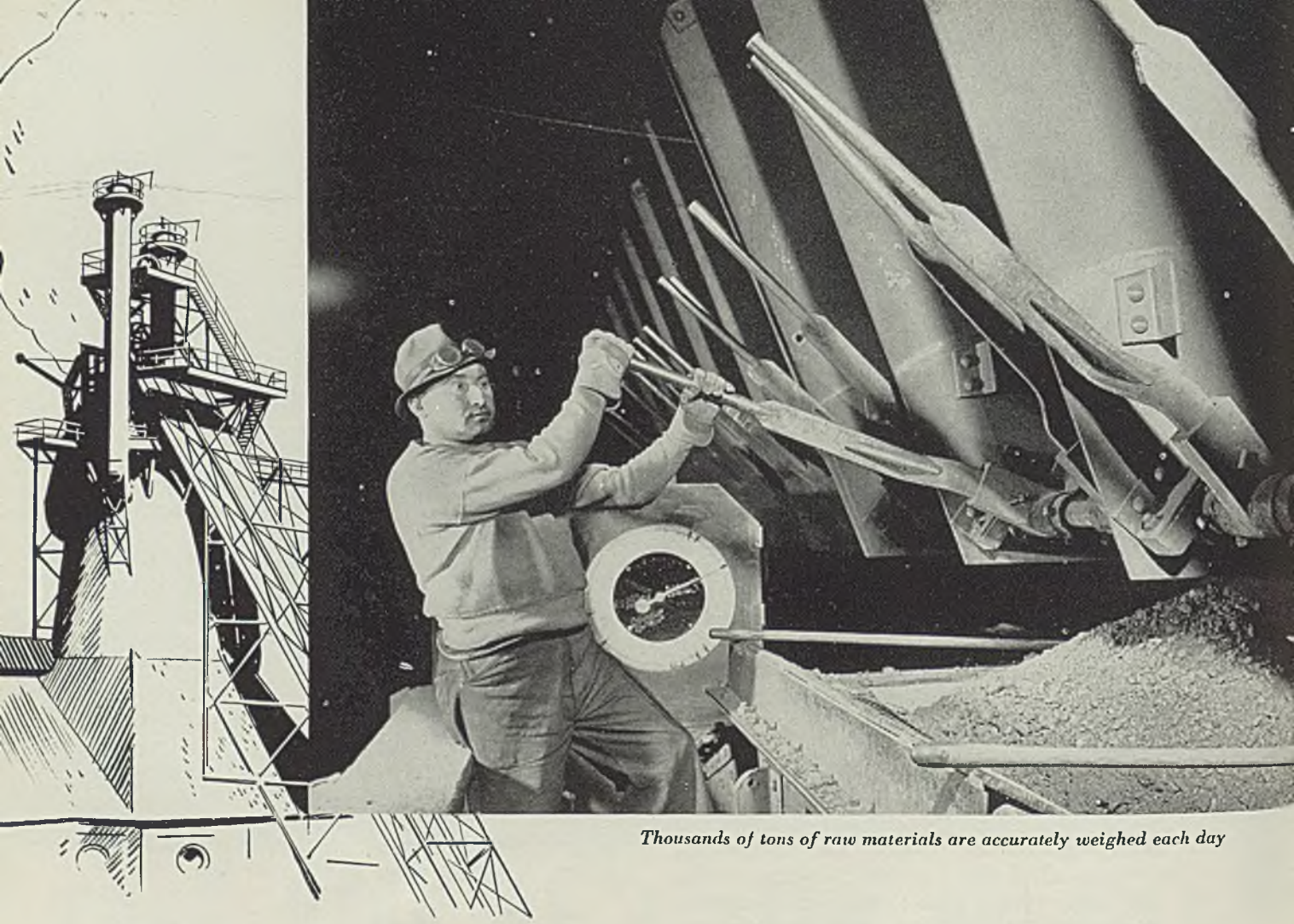
Gas-Fired Open Hearths

M. A. Snell describes **(p. 56)** improved alkali washing equipment and vapor degreasers especially designed for cleaning shell. . . . H. J. Wills starts **(p. 52)** a series of articles on ultra-finish rolls and how to grind them. . . . E. A. Arnold shows **(p. 70)** how metals and their compounds, when used as catalysts, are helping make better gasoline for fighting aircraft and what it means to warplanes. . . . George M. Parker discusses **(p. 66)** the design of gas-fired open-hearth furnaces.



Thousands of tons of raw materials are accurately weighed each day

When 7,840 Pounds = 1 Ton

Large Quantities of Raw Materials — Carefully Selected and Blended — Required to Produce a Ton of Inland Quality Steel

Every ton of steel produced at the Inland Mills requires 7,840 pounds—nearly 4 tons—of selected ore, pure limestone and metallurgical coke. Multiply these requirements by 9,000, an average day's steel output, and you have an idea of the enormous quantities of raw materials used in making Inland Quality Steel.

Long before raw materials are transported to the mill, they are carefully analyzed and blended by experts at Inland owned mines and quarries.

Throughout the shipping season, huge piles of these materials are accumulated at the plant docks. From these piles, Inland metallurgists determine, by check analyses, the grades and proportions to be used. Predetermined blends and formulae then are closely followed by accurately weighing every pound of material fed to the furnaces.

Careful control begins with the selection and blending of raw materials — and continues throughout the entire Inland steelmaking process.

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

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

Carnegie-Illinois To Add 400,000 Tons to Capacity, Costing $85,000,000

Expansion at Homestead and Duquesne approved by Knudsen who asks government to finance project . . . Includes open-hearth and electric furnace steel plants, armor plate facilities

■ PROPOSAL by Carnegie-Illinois Steel Corp. to expand its plants at Homestead and Duquesne, Pa., at a cost of $85,000,000, was approved last week by William S. Knudsen, Director General, Office of Production Management. Mr. Knudsen asked Federal Loan Administrator Jesse Jones to finance the expansion in order to speed up the naval building program.

Expansion at Homestead, which would cost $75,000,000, includes the purchase of additional property, relocation of railroad facilities, construction of an armor forging and machining shop, a new open hearth plant, new slabbing mill and wide plate mill.

The Duquesne program, costing $10,000,000 involves construction of an electric furnace steel plant and an alloy steel heat treating plant.

Company said the new facilities will increase capacity by 400,000 tons annually.

Sixteen Per Cent Reduction in Civilian Use "Would Ease Strain"

Abnormal condition of current inquiries for steel, orders and shipments is to a large degree ascribable to "hysteria among buyers, and the fundamental desire for self-preservation," according to a high authority in the industry.

As partial proof of this he cites current steel inventories which have been estimated to total about 4,000,000 tons, against a normal inventory of approximately 2,000,000.

While some users of steel are operating virtually on a hand-to-mouth basis, many others are known to have as much as 12 months' stock on hand.

Striving to keep up with greatly accelerated demand, the steel industry this year will add 3,700,000 net tons to capacity by pressing marginal facilities into use. This is over and above any new capacity which is being built or planned.

Three methods of financing new steel capacity are available, according to this authority: All funds advanced by the company; part by the company and part by the government; and all funds supplied by the government.

Where individual companies are advancing all or part of necessary money it is the usual practice to ask for and receive certificates of necessity from the government. These certificates comprise nothing more than granting a privilege to the recipient to ask the government for permission to amortize the investment over a five-year period. Whether such permission is granted will be determined later. The certificate of necessity is no guarantee of such permission.

An analysis of maximum needs for "strictly defense steel" for the current year breaks down about as follows:

For American defense industries, 12,400,000 net tons, increasing to 13,200,000 in 1942; British requirements, 11,000,000 tons; Canadian needs, 2,000,000 tons; and miscellaneous, 5,000,000 tons.

So far, because of lack of ships, the British have taken nowhere near 1,000,000 tons a month.

It is "the considered opinion of steel interests" that prospective shortages of steel for defense needs—and the shortages cannot be too serious, because the industry is now producing at a rate of about 90,000,000 tons a year—can be met most judiciously by reducing civilian consumption of steel.

They figure that roughly a 16 per cent reduction of civilian consumption will be ample, but they reason further that such reduction cannot and will not be applied horizontally across all consuming industries.

Large Industries Affected Most

Large industries, such as automotive, will have to assume the major share of the burden, and a reduction of 50 per cent in the amount of steel available to the automobile industry, beginning this summer, appears likely.

Nickel continues to be the "hot spot" in steel production, and despite imports of some 15,000,000 pounds monthly from Canada, there still is not enough to go around. Estimates indicate requirement for 20,000,000 pounds month-

ly at least. Much of this nickel goes into armor plate which, because of its size, takes a lot of nickel per square inch of surface area.

Armor plate for gun turrets of battleships is an example. The gun turret of a 35,000-ton ship is as large as an average-size schoolroom, and is completely armored with steel slabs 10 inches thick, some of them as large as 12 x 12 feet. These huge slabs, weighing something like 35 tons each, are shaped on special forging presses and the edges grooved to permit mortising the slabs together.

Steel officials, this authority went on to say, are unable to see how government price regulation can be made effective as long as wages are permitted to spiral. They also firmly believe in a pay-as-you-go policy as far as it is possible on defense production. They see no objection to a checkoff system for purchase of defense bonds, but believe these bonds should not be redeemable at any time since this could defeat the purpose of issuing them.

Opinion seems to be unanimous that the postwar deflation in industry will be "terrific," and constitutes one of the gravest problems facing the country.

Four OPM Experts Resign as Defense Agency Undergoes Reorganization

WASHINGTON

■ OFFICE of Production Management last week lost the services of four highly qualified experts.

Walter S. Tower, president, American Iron and Steel Institute, tendered his resignation as producers' representative on the iron and steel priorities committee. OPM Director General Knudsen had not accepted it at week's end.

Mr. Tower had offered to resign when OPM adopted a policy of barring trade association executives from positions in the defense agency. OPM officials, however, believed he would not be affected by the new rule as his work with OPM was admittedly as representative of the steel industry.

Mr. Tower's position, however, will be absorbed in the reorganized OPM (p. 23) when the steel industry advisory committee is set up under the new plan. OPM officials, before Mr. Tower's resignation, had expressed the hope he would be nominated by the industry as a member of the advisory committee which will replace the steel industry representatives who have been working with the various OPM divisions.

The Steel institute president left Washington for New York last week end and, if his resignation is accepted, is not expected to return.

R. C. Allen, ferrous minerals consultant in the materials branch of the production division, was granted "an indefinite leave of absence" to return to his position as executive vice president, Oglebay, Norton & Co., Cleveland. Mr. Allen joined the National Defense Advisory Commission as consultant on manganese and chromium soon after the agency was established. Later he became consultant for all ferrous minerals under OPM.

Samuel R. Fuller Jr., chief of the materials branch, resigned to return to the presidency of the North American Rayon Corp., New York. Mr. Fuller joined the defense organization last February as chairman of the production planning board, later was chosen to head the materials branch. He was associated with the defense agencies during the first World war, at which time he was in charge of steel and machine tool procurement for the Navy Department.

R. C. Allen

Walter S. Tower

C. W. Kellogg, president, Edison Electric Institute, quit as consultant on heat, light and power in the production division. The official announcement stated his resignation was in conformity with a new policy of OPM making employes of trade associations ineligible for employment as members of the defense organization.

OPM officials, it was recalled, had repudiated a statement made by Mr. Kellogg at Buffalo recently that there was no shortage of power. The OPM statement said the speech represented only Mr. Kellogg's opinion as an individual and did not represent the views of the defense agency.

Mr. Kellogg joined the staff of the NDAC in June, 1940, and was transferred to OPM when that agency was established.

Appointment of Robert T. Stevens to be co-ordinator of the Defense Contract Service in New York was announced by Robert L. Mehornay, chief of the service.

Fairbanks, Morse Will Award Special Bonuses

■ Fairbanks, Morse & Co., Chicago, will award special bonuses of 10 per cent of monthly wages or salaries to all employes, except officers, who have been with the company six months or longer.

The special bonuses will be in addition to the company's regular profit-sharing plan, said Col. R. H. Morse, president. "While it is extremely difficult to look very far ahead, it is our hope and belief that business will warrant payment of these bonuses for the remaining months of the year."

Russia Reported Third Largest Steel Producer; War To Test Organization

■ NAZI GERMANY'S thrust against Soviet Russia brought into conflict not only the two largest armies in the world, but also the two largest iron and steel producers of the eastern hemisphere.

It is a clash between Europe's most highly industrialized country, on one hand, and the Old World land most richly endowed with natural resources on the other. It was to obtain control of these resources that Hitler hurled his legions against the U. S. S. R. To Nazis, Russia is the "arsenal of totalitarianism."

Russians themselves do not know the full extent of their resources, especially minerals. Some areas have not yet been prospected; many have not been exploited. However, most reliable estimates available follow:

IRON ORE: Reserves are large, rich and scattered. Several years ago, surveyed deposits were estimated to be in excess of three billion tons, while other huge reserves believed to contain from 20 to 40 billion tons are known to exist. Much of the ore mined comes from the Krivoy Rog district in the Ukraine.

COAL: Reserves known to be above 550,000,000,000 tons with many remote regions yet to be prospected. About 84 per cent of the reserves lie in Asia, but more than six-sevenths of that mined is in the European section.

MANGANESE: Production is about 2,200,000 tons annually, or about three-fifths the world's output. Known reserves are estimated at 250,000,000 tons. Most important are the Chiaturi deposits in the Georgian republic, Transcaucasia, where the ore runs 52 to 53 per cent metallic manganese. Second largest deposits are in Ukraine.

Steel Output Near Capacity

IRON, STEEL: Production last year was approximately 21,900,000 net tons of steel and 17,400,000 tons of pig iron. This is believed close to practical capacity.

Russia's steel capacity and production has been increased 300 per cent since 1929, as follows:

RUSSIA'S IRON, STEEL PRODUCTION
(In net tons)

	Steel	Pig Iron
1940	21,900,000	17,400,000
1939	20,720,000	16,800,000
1938	20,328,000	16,216,000
1937	19,592,000	16,002,000
1936	18,009,000	15,778,000
1935	13,798,000	13,900,000
1934	10,541.000	11,505,000
1933	7,605,000	7,935,000
1932	6,608,000	6,833,000
1931	5,973,000	5,356,000
1930	6,283,000	5,510,000
1929	5,407,000	4,763,000

Most of the country's steel plants are of modern design, and were built under direction of American engineers.

COKE: Production facilities were developed to adequately supply needs of expanding iron and steel industry.

OIL: Output is more than 212,000,000 barrels annually, five times the production of Rumania, chief present source for Germany. Russia's reserves are in excess of 40,000,000,000 barrels, with many areas not yet explored.

PEAT: Seventy-five per cent of the world's peat supply lies in Russia, affords a cheap fuel for some industrial purposes.

PRECIOUS METALS: Large reserves of gold, silver and platinum exist.

AGRICULTURE: Produces more wheat than all the Balkan states. Much of this is grown in the Ukraine, the "granary of Europe." Crop is now green and cannot be destroyed.

Cotton production is about 4,000,000 bales. Only United States and India produce more.

Timber resources are the largest in the world.

TRANSPORTATION: Notoriously inadequate a decade ago, the country's railroads have been considerably improved, still constitute a bottleneck in the movement of commodities. Ralph Budd, now head of the Office of Production Management's transportation unit, visited Russia in 1930 at the Soviet's request and made recommendations for improvement of the country's rail system. The Russian government soon afterward employed large numbers of American transportation experts to effect these recommendations.

Water Transportation Undeveloped

Inland waterway transportation is limited by scarcity of vessels, although the rivers are important potential channels of commerce.

Numerous new highways have been built, but still are inadequate. Few are first class roads.

Commercial aviation is fairly well developed.

POWER: Large hydroelectric projects have been developed, with the aid of American engineers.

The Russian "plans" have emphasized the expansion of heavy industries, and remarkable progress has been made. Industrial output increased six-fold in past decade.

State industries account for an estimated 99.97 per cent of all industrial output; only a very few small enterprises are under private management. This form of management and the lack of skilled native technicians have prevented even greater progress in the development of Russian industries.

Much of the industrial expansion

■ Russia's vast supplies of natural resources last week caused the ersatz-weary Germans to renounce nonaggression and trade pacts with the Soviets and send their mechanized war machine across the border from Finland to Rumania. Map above shows locations of major resources. Below is charted Russia's share in world production of raw materials

was engineered by Americans, who were employed by the U. S. S. R. to design steel mills and blast furnaces, to erect power plants, to install modern mining equipment, plan transportation systems and equip all kinds of factories.

Machine tools and electrical equipment made in the United States have been favored, and Russia was an important customer up to the time exports of much of this equipment were restricted.

Events of the past week may cause the ban on exports to Russia to be lifted. The Amtorg Trading Corp., Russian buying agency in New York, was reported to be preparing to step up purchases to an annual rate of $100,000,000 if the restrictions are modified or abandoned. Most needed are repair parts for machine tools, new tools, oil field equipment and other machinery. American action likely will be governed by the apparent ability of the Russians to resist the German invaders.

At week's end it appeared the German drive would be sharpest in the Ukraine. In this section is much of the oil Germany desperately needs, food cereals, the Donbas coal fields, the great dam and power station at Dnepropetrovsk, and four of Russia's greatest manufacturing cities. Deprived of the Ukraine, Russia would become virtually an Asiatic country.

May Household Washer Shipments Total 206,030

■ Factory shipments of household washers in May aggregated 206,030, compared with 118,987 in May, 1940. April shipments totaled 213,611.

Portable ironers shipped in May totaled 10,088, compared with 2999 in the month last year. April deliveries were 11,427. Cabinet-type ironers in May totaled 11,679, against 7591 in the corresponding period in 1940. Cabinet-type total in April was 10,362.

Report England Sells Our Steel in Export

DETROIT

■ Unconfirmed reports are heard here of semifinished steel produced in this country and shipped to England under terms of the lease-lend act reappearing in South American markets in finished form in competition with American finished products.

Specific case mentioned is that of tin plate in Montevideo, Uruguay, where an American company lost business to a British supplier whose product was found to have been processed from the same American company's semifinished steel!

Quit Discouraging SWOC, Board Tells Weirton

■ WEIRTON STEEL CO., Weirton, W. Va., was ordered by the National Labor Relations Board last week to cease discouraging membership in the Steel Workers Organizing Committee (CIO), to disestablish two allegedly company unions, and to reinstate with back pay 17 discharged employes.

A company official said the order was being studied and that an appeal probably would be made. Commenting further, he said:

"It is significant that although the board finds the hearings were fair, several pages are devoted to an attempt to explain biased actions of the board's trial examiners. The board originally charged the company with discriminatory discharges of more than 300 people. The final order admits only 17 of these cases, and of these 17 one is dead and two have recently served jail sentences in connection with Communist election petitions."

Weirton Steel is a subsidiary of National Steel Corp. which recently took the initiative in raising steel wages 10 cents an hour.

The board's decision climaxes five years of conflict between the company and SWOC's attempt to organize "Little Steel."

The board criticized the company for what it called substantiated charges of antiunion activity and intimidation of its employes.

Exhibit Executives Meet in Cleveland

■ Evidence that technical and trade shows are being encouraged by the government to further national defense was cited at the opening of the two-day convention of the Association of Exhibit Managers in Cleveland last Friday.

W. H. Eisenman, president of the association, director of the National Metal Congress and Exposition and secretary of the American Society for Metals, presided.

P. C. McMurrer, assistant to the secretary of the American Mining Congress, spoke on "The Effects of National Defense on Industrial Commercial Exhibits."

He said a survey which he had just completed of 50 major trade show groups in practically every case showed a strong belief on the part of leading government officials and business executives in the high value of technical and trade shows during the present national emergency.

Of the shows held since the start of the national defense program 13 months ago, Mr. McMurrer said most had shown an increase in the amount of exhibit space contracted for, an increase in attendance and a strong desire on the part of the government to co-operate.

Of 31 shows held, or to be held, from Jan. 1, 1941, to May 1, 1942, only two were canceled.

Other speakers were Charles N. Upham, engineer-director and secretary of the American Road Builders Association; C. E. Hoyt, executive vice president of the American Foundrymen's Association.

Eight Thompson Products Trainees Get Diplomas

■ Thompson Products Inc., Cleveland, held the second graduating exercises of its industrial training program at Cleveland, June 28. Eight graduates of the 4-year apprentice training course received diplomas.

Fred C. Crawford, president, welcomed the graduates and the commencement address was delivered by Dr. William E. Wickenden, president, Case School of Applied Science, Cleveland. Roy E. Bender, the company's superintendent of trade training, spoke on "Mastery of Skills." Ray S. Livingstone, director of personnel, discussed "Young Men and the Defense Program."

To become a graduate, the apprentice must serve four terms of approximately 2080 hours each. Subjects taught: Shop mathematics, shop practice, mechanical drawing, tool and machine design, chemistry, metallurgy, electricity and business administration. To enter, one most be a high school graduate.

Nine Months to Switch From Sheets to Plates

■ Ford Motor Co. officials estimate it would require at least nine months to adapt the company's continuous sheet-strip mill to production of plates. A complete new building, with shears, cooling beds and numerous other auxiliaries would be required.

Questionnaire from the OPACS, addressed to 13 steel producers selected as possible additional sources of ship and railroad plates, has been answered by Ford and returned to Washington.

Ford steel plant produces about 60,000 tons of open-hearth ingots monthly, less than half of which is converted into flat-rolled products.

Alan Wood Reconditions Furnace Stack in 51 Days

■ Alan Wood Steel Co., Conshohocken, Pa., recently resumed operation of its No. 3 blast furnace after completing relining and other repairs with noteworthy speed. With an 18-foot hearth, a 21-foot 10-inch bosh, and 85 feet 5 inches high, the stack was repaired in total elapsed time from blast-off to blast-on of 51 days.

Iron remaining in the hearth after the last cast prior to suspension was completely drained into sand beds within six hours after the wind was taken off. Fourteen days were required to remove the old lining down to the foundation. No salamander was left in the furnace, having been tapped out while molten.

Relining of the stack required 20 days, including placing of a bracket to support the stock line and installation of heavy castings in the brick work at the offtakes to anchor the uptakes.

Metal resistance strips were placed in the hearth to accelerate and improve drying of the hearth brick. Coke oven gas burners were used for drying the lining.

Prior to its blowing out April 18, the furnace had been in operation since Dec. 30, 1936.

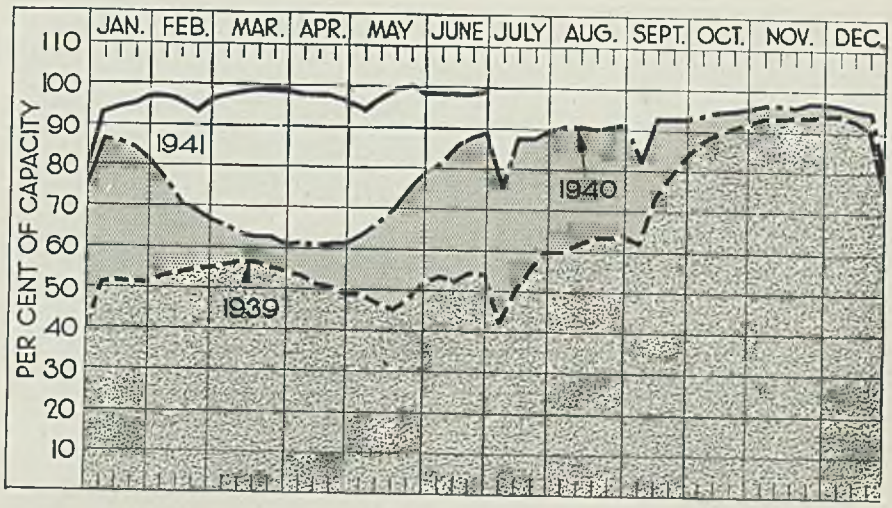
22,127,000 Tons Scrap Consumed in Five Months

■ Domestic consumption of iron and steel scrap by steel mills and foundries in the first five months of 1941 is estimated by the Institute of Scrap Iron and Steel Inc., Washington, at 22,127,000 gross tons, compared with 14,730,000 tons in the corresponding period of 1940.

Consumption in May, 4,609,000 gross tons, represented a substantial increase over April when the melt was 4,406,000 tons. The March total of 4,662,000 tons is the only month in history to exceed the May rate, but if it had not been for the Memorial Day holiday, May would have set an all-time record.

Never before has the scrap trade been called upon to supply material at so high a sustained rate, according to the Institute. Beginning with last October, domestic consumption has exceeded 4,000,000 gross tons for six months and has barely been under 4,000,000 tons in two months. The result has been to drain away available supplies without giving the industry an opportunity to accumulate material.

Exports to Great Britain and Canada have increased slightly, but the average monthly rate of export thus far in 1941 has been only 72,411 tons, compared with a domestic use averaging 4,425,000 tons.



PRODUCTION . . . . Up

■ STEELWORKS operations last week advanced ½ point to 99½ per cent. Five districts reported higher rates, two declined and five were unchanged. A year ago the rate was 89 per cent; two years ago it was 54 per cent.

Central eastern seaboard — Continued at 97 per cent, though threatened shortage of pig iron and scrap may cause early curtailment.

Birmingham, Ala.—Unchanged at 95 per cent, awaiting renewed pig iron supply from relined blast furnace.

Detroit—Gained 2 points to 96 per cent, the highest rate since February, one open hearth being off all week and another idle two days, for repairs.

Chicago—Up ½-point to 102.5 per cent, equaling the all-time high of May. Five of six plants are at 100 per cent or better.

Cincinnati—Dropped 4 points to 91 per cent as open hearth repairs became necessary.

St. Louis—Held at 98 per cent, needed repairs being postponed in the interest of production. At least two open hearths will be taken off early in July for rebuilding.

New England—Advanced 6 points to 100 per cent, repairs being completed on all open hearths.

Pittsburgh—Up 1 point to 100 per cent, only ½-point below the high point in late May and early June.

Wheeling—Necessity for furnace repair caused a drop of 4 points to 84 per cent.

Buffalo—Ninety and one-half per cent for the third consecutive week. Pig iron production is at 100 per cent.

Cleveland—Addition of an open hearth by Republic Steel Corp. and enlarged production at another mill caused an increase of 3 points to 98 per cent. This week probably will bring a further rise of 1 point.

Youngstown, O.—With 75 open hearths and three bessemers in production the rate remained at 98 per cent for the third week. Some plants will work through the Fourth of July. Carnegie-Illinois Steel Corp. will shut down at Farrell, Pa., Friday, for repairs and the Youngstown Sheet & Tube Co. plant at Sharon, Pa., will be down one day.

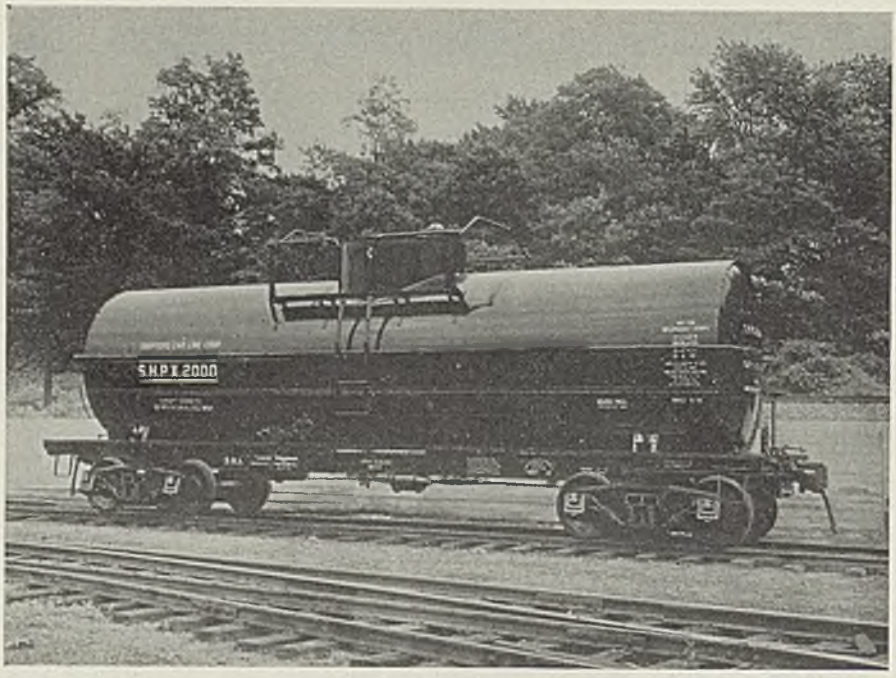
District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 28	Change	Same week 1940	Same week 1939
Pittsburgh	100	+ 1	82	47
Chicago	102.5	+ 0.5	91	51
Eastern Pa. ...	97	None	83	38
Youngstown ..	98	None	80	51
Wheeling	84	— 4	90	79
Cleveland	98	+ 3	85.5	51
Buffalo	90.5	None	90.5	35
Birmingham ..	95	None	88	71
New England..	100	+ 6	85	32
Cincinnati	91	— 4	81	65
St. Louis	98	None	70.5	42
Detroit	96	+ 2	92	57
Average	99.5	+ 0.5	89	54

Report Colonial Iron Co. Sells Stack to U.S. Pipe

■ United States Pipe & Foundry Co., Burlington, N. J., is reported to have acquired the blast furnace of the Colonial Iron Co., Riddlesburg, Pa., with rated capacity of 72,000 tons annually. The furnace has been idle for some time. Plans for rehabilitation are under way and production is expected to start within 60 days. Officials of United States Pipe & Foundry Co. refused comment on the purchase.



■ Finished tank car made of nickel-clad steel at Milton, Pa., plant of American Car & Foundry Co.

Build First All-Welded, Nickel-Clad Steel Tank Cars To Carry Chemicals

■ SEVERAL welding problems were successfully overcome in fabricating the first all-welded tank car made of nickel-clad steel, recently completed by American Car & Foundry Co. at its Milton, Pa., plant. This car is one of five identical units designed specifically for carrying a variety of chemicals and other products whose color and purity must be protected against metallic contamination.

Welded joints and corrosion-resistant material offer the ideal combination for tank cars employed in carrying liquids which are subject to contamination or which may attack plain carbon steel. Former practice was to use carbon steel and apply a protective coating to the tank interior. This coating requires regular renewal, however, and cost of this maintenance largely offsets what saving is shown in material costs compared with a corrosion-resistant metal.

Insulated with Spun Glass

Some tank cars have been built of nickel-clad steel using riveted type of construction. A disadvantage of riveted joints is the possibility of attack by the liquid at the rivet holes as a result of seepage past the rivet heads. In some cases where liquids have been loaded in riveted cars at relatively high temperature—around 600 degrees Fahr.—this heating and cooling cycle has caused loosening of the rivets, requiring that the outer shell and insulation be removed and the loosened rivets replaced.

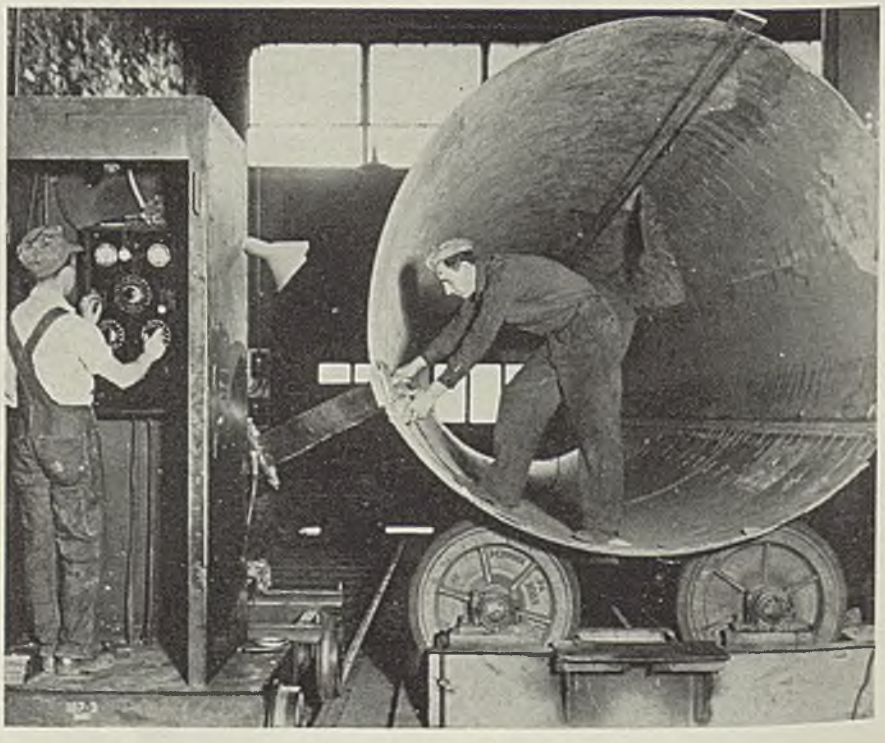
Temperature variations are without harmful effect on welded joints, thereby reducing maintenance costs. In addition, the smooth interior surface is easily cleaned and offers no avenue of corrosive attack by the contents.

Each of these tanks is slightly over 32 feet long, with diameter of 86¼ inches and capacity of 10,000 gallons. Heads are flanged and dished. The tanks are covered with a 6-inch layer of spun glass insulation contained in an outer casing of steel. Steam heating coils buried within this insulation and affixed to the exterior of the tank enable the lading to be heated, if necessary, for easy emptying or for protection in cold weather.

Welded on Both Sides

Welding a composite material such as nickel-clad steel involves a different technique than the joining of homogeneous metal, since it is essential that the composition of the weld approximate that of two different parent metals. This requires that separate welding applications be made on each side of the plate to provide a single seam. Practice employed at the Milton plant was devised through co-operative study by American Car & Foundry Co., International Nickel Co. and Lukens Steel Co. Lukens is furnishing the nickel-clad plates used in building the tanks.

These plates are produced by placing a thin slab of nickel on a thicker slab of steel and then hot rolling. This develops a bond which in tests has proved stronger than either original metal. Relative



■ Making X-ray photographs of welds

thickness of the cladding and its base is determined by the sizes of the slabs used. Plates employed on these tank cars are ½-inch thick, with a minimum nickel thickness of 0.025-inch.

Both manual and mechanical welding are involved in fabricating the tanks. The plate edges first are beveled by an oxyacetylene cutting machine on the steel side for a butt joint. After forming by passing through a set of rolls, the two halves are fitted together and tacked. The initial weld is applied to the steel or outer side by manual electric arc welding of the seams, followed by a second deposition of weld metal by the automatic Unionmelt process.

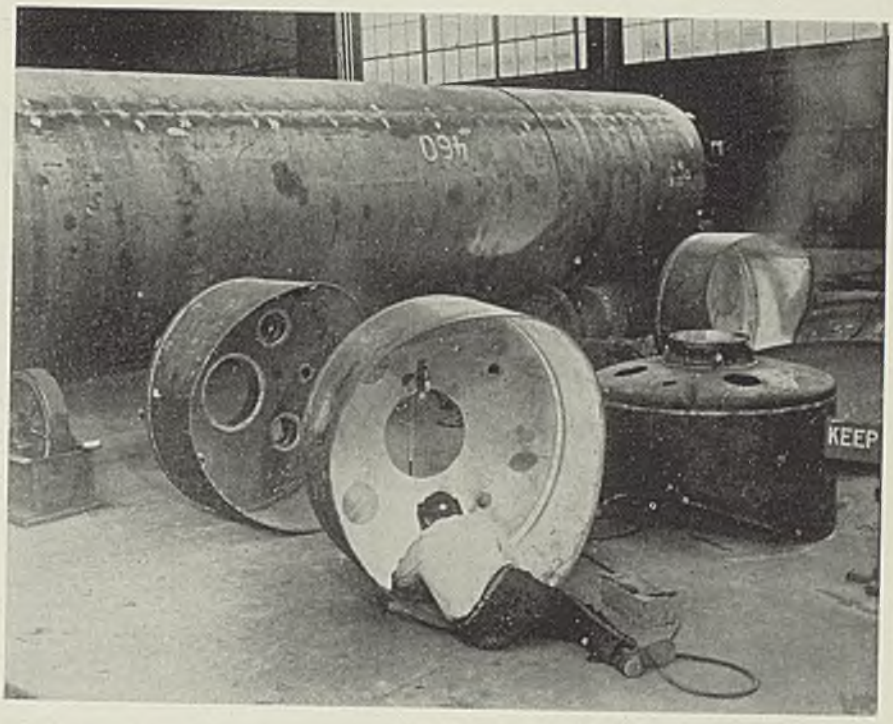
Positioning of the tank for welding is facilitated by locating it on rollers which permit it to be revolved.

Welds Are X-rayed

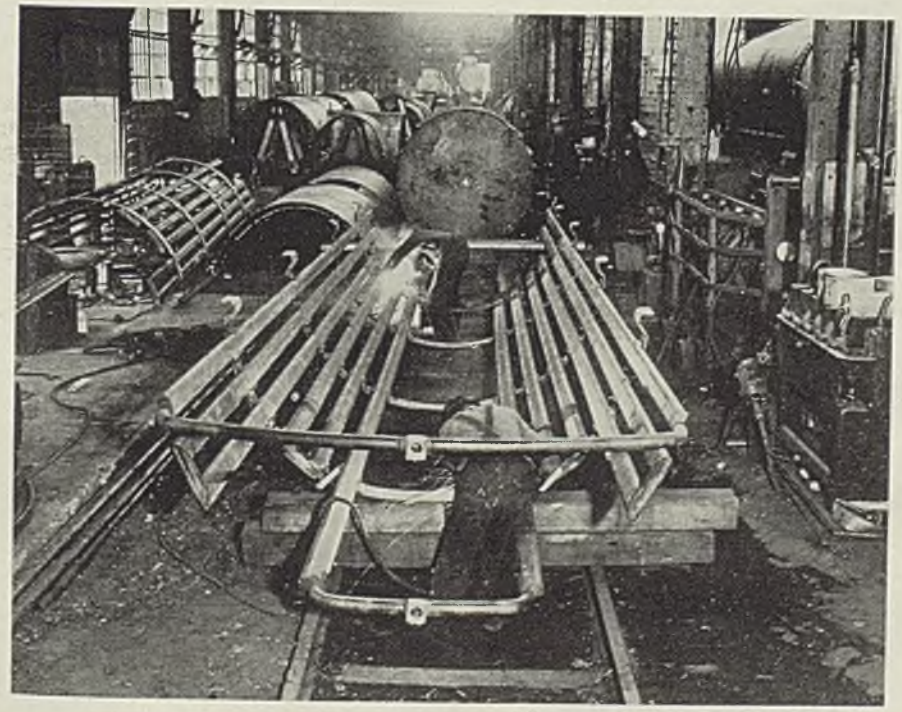
Joints on the nickel side then are chipped to remove any unwelded steel and to obtain a clean uniform groove into which two layers of nickel are deposited by electric arc welding. Tank heads are joined in similar manner. Fittings located in the top opening of the tank are either of pure nickel or are lined with pure nickel sheet.

All welds are closely inspected by X-ray to meet specification of the Interstate Commerce Commission. The X-ray machine is mounted on a track and passes the length of the tank, taking pictures which cover about 18 inches of the seam at a time. These pictures are made both after the steel side of the plate has been welded and after the nickel deposition, involving several hundred views for each tank. Any flaws disclosed are chipped out, rewelded and again X-rayed.

Special furnaces have been built at the Milton plant in which the tanks, before mounting on the trucks, are annealed to relieve stresses incident to the forming and welding. The tanks are anchored to the trucks by welding the two halves of a split I-beam to the under side of the tank and bolting these pieces to the car frame in the center. Wood cradles support the tanks at both ends.



■ Welding the dome. Dome fittings, including manhole, are lined with pure nickel sheet welded at the flanges



■ Welding the heating coils through which live steam from locomotive or plant system can be passed to facilitate unloading of the lading when required. Heating coils are fastened around the bottom of the steel side of the tank. Tanks and coils later are packed with spun glass insulation 6 inches thick except where thickness of coils reduces it to 4 inches. An outer steel jacket is then applied

Pittsburgh River Shipments at New Peak

■ Commerce on the Ohio and Monongahela rivers in the Pittsburgh district in May was at an all-time high. Bolstered by a heavy increase in coal shipments following close of the strike, Monongahela volume was 2,970,700 net tons, 1700 tons above December, 1940, the previous high. On the Ohio, shipments totaled 1,726,900 net tons.

Steel shipments on the rivers increased but did not set new records. Total of steel products transported on the Monongahela was 147,200 tons; on the Ohio, 228,300 tons.

Shipments for the year to date:

TOTAL SHIPMENTS

1941	Ohio	Monongahela	Allegheny
January ...	1,581,300	2,809,800	214,500
February ..	1,424,100	2,532,300	187,300
March	1,587,400	2,906,800	212,900
April	652,900	563,000	186,000
May	1,726,900	2,970,700	309,700

STEEL SHIPMENTS

January ...	227,000	160,000	9,200
February ..	193,000	135,200	4,900
March	252,900	168,500	6,600
April	220,900	131,900	11,100
May	228,300	147,200	13,500

MEN of INDUSTRY

■ **CAMPBELL WOOD** has been appointed manager of Nash-Kelvinator Corp.'s new airplane propeller division, now being established in Lansing, Mich. Until recently Mr. Wood served as assistant to the president of Nash-Kelvinator, with offices in Washington.

E. F. Keller, heretofore master mechanic, Nash Motors division, will become factory manager of the new division. **B. E. Bali** will be production manager. He formerly was production manager, Kelvinator division, Detroit. **W. R. Crossett,** comptroller, Nash-Kelvinator, will also serve as comptroller of the new division. **B. E. Chapman,** formerly plant engineer, Nash Motors division, has been named plant engineer at Lansing, and **O. E. Summers,** formerly employment manager of Kelvinator, has become Lansing employment manager. **D. E. Ellis** will be purchasing agent of the new propeller division.

♦

Clyde DeLong has been named operating manager, mechanical sales division, B. F. Goodrich Co., Akron, O. He has been associated with the company since 1928.

♦

Sherman Barnes, in charge of western New York territory of Ampco Metal Inc., Milwaukee, has established new headquarters at 699 Potomac avenue, Buffalo.

♦

H. G. Stoddard, president, Wyman-Gordon Co., Worcester, Mass., was given an honorary degree of doctor of engineering by Worcester Polytechnic Institute, June 13.

♦

J. R. Spence, associated with Stoody Co., manufacturer of hardfacing metals, Whittier, Calif., over six years, serving as chief metallurgist and industrial sales manager, has been promoted to general sales manager.

♦

Dr. N. E. Woldman, Bendix Aviation Corp., Bendix, N. J., has been elected chairman, Metropolitan New York-New Jersey chapter, American Foundrymen's Association. **Fred C. Sefing,** International Nickel Co., New York, has been named vice chairman; **E. A. De Longe,** International Nickel Co., secretary; and **T. E. Parker,** Climax Molybdenum Co., New York, treasurer.

♦

Frederic V. McArthur, secretary and assistant treasurer, Link-Belt Co., Chicago, will retire June 30 after 49 years with the company. He will be succeeded as secretary by **H. E. Kellogg,** treasurer. **M. P. Anderson,** general accountant, has been named assistant treasurer.

♦

R. L. McIlvaine has joined the engineering staff of National Engineering Co., Chicago. A graduate of the University of Illinois, Mr. McIlvaine has a broad background of foundry experience. He is a member, American Society of Mechanical Engineers and American Foundrymen's Association.

♦

H. C. Merritt, vice president, Allis-Chalmers Mfg. Co., Milwaukee, was awarded the Cyrus Hall McCormick gold medal for "exceptional and meritorious engineering achievement in agriculture" by the American Society of Agricultural Engineers at the group's annual meeting in Knoxville, Tenn., June 23-26.

♦

Dr. C. H. Desch, F.R.S., has been presented the 1941 Institute of Metals (British) platinum medal for distinguished services to nonferrous metallurgy. Dr. Desch has been adviser to the Iron and Steel Research Council of Great Britain and is a past president, Institute of Metals and of the Faraday Society, and a vice president and bessemer medallist of the Iron and Steel Institute.

J. R. Spence

♦

W. I. Brockson, vice president, Commercial Advertising Agency Inc., Chicago, was awarded the degree, Ellis Plan Expert, at the annual convention of the National Council, Ellis Plan Associates, in Chicago recently. The council is a coast-to-coast organization devoted to study and practice of scientific principles of business management.

♦

W. R. Walker and **H. E. Seanor** have been elected vice presidents, Mack International Motor Truck Corp., Long Island City, N. Y. Mr. Walker is a special representative with liaison duties between the Mack home office and the various governmental departments, and has been making his headquarters in Washington. Mr. Seanor is manager of the public works department and also is in charge of all custom-built super duty truck sales.

♦

Ross O. Laub has been appointed plant engineer, sheet and tin mill, Carnegie-Illinois Steel Corp., Gary, Ind., succeeding **Howard J. Stephens,** who has been transferred to the Pittsburgh office. Associated with the sheet and tin mill the past 14 years, Mr. Laub has been assistant plant industrial engineer since last February.

♦

R. F. Horn, divisional superintendent of the Stark Sheet division and the Massillon Armor Plate plant of Republic Steel Corp., has been appointed divisional superintendent of the South Stainless division at Canton in addition to his present duties. **R. S. Lynch,** superintendent of the Stainless division at Canton and the Enduro Stainless plant at Massillon, has been named divisional superintendent of the Massillon Steel division, retaining supervision of the Massillon Stainless division.

♦

Charles H. Mottier has been named chief engineer, Illinois Central rail-

road, Chicago, effective July 1. **Fred L. Thompson,** vice president and present chief engineer, will continue as vice president in charge of the engineering department.

♦

Frank Revell and **Erwin L. Gehrke** have joined the New York staff of sales engineers of Foxboro Co., Foxboro, Mass.

♦

Dr. Theodore M. Switz has been appointed director, export department, Hercules Powder Co., Wilmington, Del. Dr. Switz, formerly assistant director of the department, succeeds **P. W. Meyeringh,** recently elected vice president and member of the executive committee.

230 Attend Philadelphia Steel Club's Golf Party

■ Approximately 230 recently attended the twenty-second annual golf party of the Steel Club of Philadelphia at the Aronimink Golf Club, near Philadelphia.

P. B. Burtis, Bethlehem Steel Co., president of the club, welcomed guests at the dinner and introduced R. D. Dietrick, Rustless Iron & Steel Co., Baltimore, president of the Steel Club of Baltimore; Samuel K. Phillips Sr., president, Aronimink Golf Club, and Joseph I. Kitchen, Lanston Monotype Machine Co., and president of the Philadelphia Purchasing Agents Association.

J. E. Fleming, National Tube Co., chairman, golf committee, presided in distribution of prizes. J. B. Hendrickson, Welding Engineers Inc., received award for the low gross score; Charles Grace, Heintz Mfg. Co., second low gross; C. B. Fenn, Carrier Corp., low net; and F. M. Willis, R. F. Willis & Bro., second low net. A. P. Goldsmith, Taylor Steel & Wire Co., was awarded first prize for the Eight-hole Proximity, and Norman Foy, Republic Steel Corp., second prize. H. F. Jones, E. I. du Pont de Nemours & Co., won first prize for the 17-hole Proximity, and J. W. Geiss, Crane Co., second prize.

First stunt prize was awarded to E. A. Horton, Stacey-Schmidt Co.; second, to R. M. Liversidge, Lehigh Navigation Coal Co.; third, W. A. Clem, Reading Co.; and fourth, J. W. Hudson, Sun Shipbuilding Co.

Chairmen of the various committees included C. H. Stoeckle, Crucible Steel Co., prizes; H. H. Ziesing, Midvale Co., reception; F. P. Norris Jr., Allegheny Ludlum Steel Corp., starting; and H. B. Spackman, Jones & Laughlin Steel Corp., stunts. In addition to Mr. Burtis, president, club officers present were: F. L. Shants, Lukens Steel Co., vice president, and R. H. McCracken, Central Iron & Steel Co., secretary and treasurer.

Activities of Steel Users, Makers

■ WARNER & SWASEY CO., Cleveland, has leased the basement and three floors of the 5100 Prospect building, Cleveland, and the second and third floors of the adjoining 5200 Prospect building, comprising approximately 91,000 square feet of floor space, for storage of parts now being supplied by subcontractors and for overflow manufacturing operations.

♦

Bellingham Iron Works, Bellingham, Wash., has changed its name to Bellingham Retort & Machinery Co.

♦

New Method File Grinders Inc. has moved from 5120 South Halsted street, Chicago, to Route 1, Hartford, Mich.

♦

Industrial Products Co., Philadelphia, has moved from 800 West Somerset street, to larger quarters at 2820 North Fourth street.

♦

Master Mfg. Co. has moved to new quarters at 1200 East Avenue A, Hutchinson, Kans.

♦

Dardelet Threadlock Corp. has moved its operating office from 55 Liberty street, New York, to the Machinery building, 2832 East Grand boulevard, Detroit. Edwin B. Jackson is president, and E. R. Evans, consulting engineer.

♦

Skilsaw Inc., 5033 North Elston avenue, Chicago, has expanded its facilities for the fourth time since its $120,000 plant was built in 1938. Company has just purchased a one-story building on a 80 x 574-foot lot adjacent to its present location.

♦

Fleetwings Inc., Bristol, Pa., has begun construction of its new plant which will be a complete "black-out" structure, and will add 170,000 square feet of floor space to its present plant.

♦

Brainard Steel Corp., Warren, O., has opened an eastern sales office at 15 Park Row, New York, in charge of L. J. Lyons, district sales manager. G. D. Frost, who has represented the company in the metropolitan area a number of years, will continue to be associated with the office.

♦

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will spend approximately $500,000 for further enlargement of its Mansfield, O., plant. An expansion program totaling $1,500,000 has just been completed at the plant. The new project will include a $240,000 addition to the plant's vitreous enameling building and a new enameling furnace, and will bring total floor space of the Mansfield works to 1,332,900 square feet.

♦

B. F. Goodrich Co., Akron, O., has registered the name "Transcord" with the United States Patent Office, and will use the name as a brand to denote use of the company's transverse cord breaker in either cord conveyor or fabric conveyor belting.

♦

Zenith Radio Corp., Chicago, has acquired 112,000 square feet of floor space adjacent to its present plant to provide for expansion of production. Unfilled orders are reported larger than ever before at this time of the year, advance orders for small sets alone exceeding $7,000,000.

DIED:

■ **William H. Braley,** 53, sales engineer, Peter A. Frasse & Co. Inc., New York, June 16. He formerly was associated with National Tube Co. in an engineering capacity at its Ellwood City, Pa., mill.

♦

Maurice I. Weil, founder and president, Chicago Pump Co., Chicago, until his retirement last January, in that city, June 23.

♦

Roy L. Smith, 52, since 1936 superintendent of construction, Engineering and Construction division, Koppers Co., Pittsburgh, at his home in Mt. Lebanon, June 22.

♦

John H. Berryhill, 62, associated with Vulcan Plow Co., Evansville, Ind., 25 years as superintendent and factory manager, until his retirement in 1926, in Evanston, June 15.

♦

Guy A. Barker, 50, manager, public utility and electric products departments, Johns-Manville Corp., New York, June 18, at his home in Scarsdale, N. Y.

♦

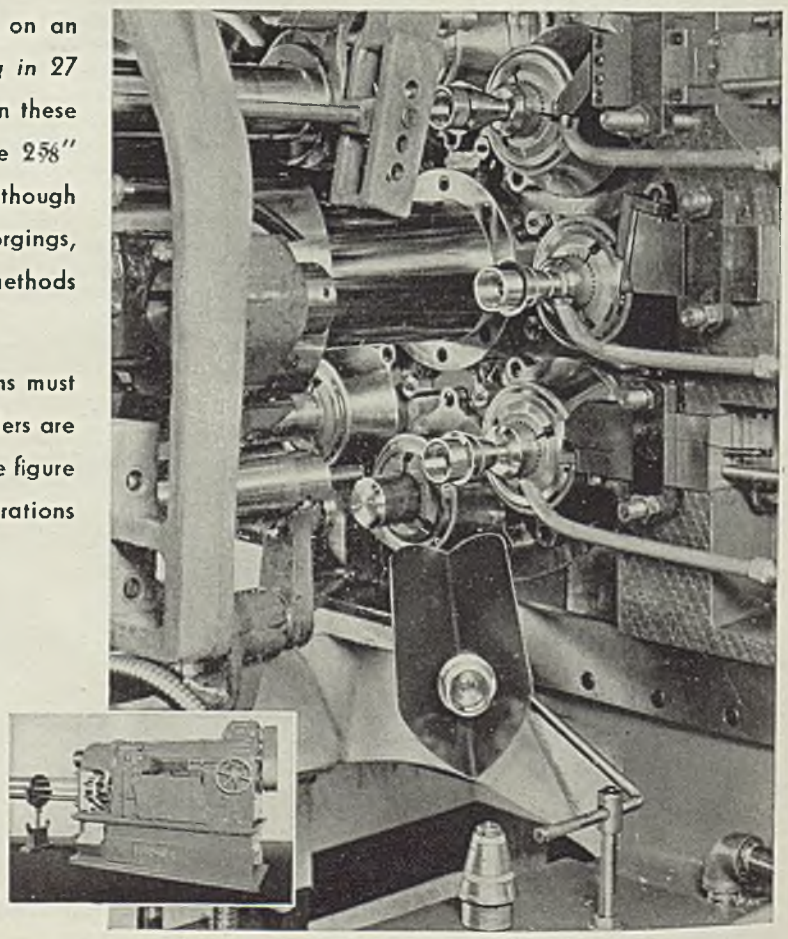
Capt. A. O. Ackard, 75, commodore of the river fleet, Carnegie-Illinois Steel Corp., Pittsburgh, until his retirement in 1936, June 23 in Pittsburgh.

Millions for defense

Millions of accurate, low-cost shell parts are produced on Conomatics

The shell noses shown above are machined on an 8-Spindle Conomatic *complete in one handling in 27 seconds*. This machine performs 17 operations on these parts, and removes 3 pounds of metal from the 2⅝" brass bar stock from which they are made. Although these shell noses were formerly made from brass forgings, the 8-Spindle Conomatic far outstrips older methods both in speed, accuracy, and cost per piece.

The millions of parts needed for defense items must be produced on short order—make sure your orders are filled on time at the lowest possible cost. Let Cone figure exactly what the cost will be after all possible operations have been combined on Conomatics.



CONE AUTOMATIC MACHINE CO., INC.
WINDSOR, VERMONT, U. S. A.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

OPM reorganized to eliminate "red tape", speed defense production. New plan establishes industry advisory committees and commodity sections. Division directors retain original staff positions . . . Rapid progress in defense plant job training reported by Hillman . . . Modified property seizure bill proposed by War Department

WASHINGTON

■ REVAMPING of the Office of Production Management to expedite the defense program was well under way last week. A plan announced by William S. Knudsen, Director General, and Sidney Hillman, Associate Director General, establishes industry advisory committees and commodity sections.

Under this plan each major industry will deal with a single division of the OPM through a commodity section instead of having to go in turn to the Production, Priorities and Purchases Division. The industry advisory committee will enable the OPM to discuss problems of a particular industry with a group elected by that industry to represent it.

Two major objectives are involved: (1) A close and unified working relationship between members of the several divisions concerned with the same commodity or material; and (2) efficient liaison between defense agencies and industry.

Operating responsibilities of OPM will be divided vertically—that is, primary responsibility for all OPM decisions relating to particular commodities will be centralized within the commodity sections under one of the existing division directors.

The industry advisory committees, representing a cross-section of the industries involved, will act in an advisory capacity, in accordance with the policy set forth in a letter of April 29 from Attorney General Robert H. Jackson to John L. O'Brian, OPM general counsel.

A central clearing house for the defense industry advisory committees has been created under Sidney J. Weinberg.

The new commodity sections—one for zinc, one for steel and so on—will be completely centralized units in which all OPM problems relating to the commodities concerned can be handled. For instance, all questions about zinc, whether on priority, production or purchasing problems, will be considered and handled in the zinc section, under the supervision of a commodity section chief.

All defense agencies, as well as the commodity sections, may make use of the defense industry advisory committees to obtain information and advice bearing upon their respective problems and may have representation at the meetings of the commodity sections and their advisory committees.

Division Directors Retain Posts

The new plan leaves the three division directors in their original staff positions, but in addition each will be in charge of a group of commodity sections, in which their special problems are of paramount importance.

Organization and functions of the labor division of OPM will continue as at present, and the division will participate fully under the new system in the formulation of policies through consultants chosen from its staff.

John D. Biggers is to be the head of the commodity sections dealing with steel, aluminum, magnesium, paper, pulp and chemicals. Supervision of the aircraft, ordnance and tools branch, and the ship construction and supply branch, will remain under him in the production division.

Donald M. Nelson will assume primary responsibility for sections where purchasing problems are of paramount importance, such as textiles, food, drugs and clothing.

Edward R. Stettinius Jr. will have charge of commodity sections in which the problems of importation or allocation are most important, such as rubber, copper and zinc.

Thus each has two main responsibilities: First, as director of regular staff functions of his particular division; second, as head of specified commodity sections.

Mr. Stettinius will continue to exercise the statutory powers over priority matters; and all proposed priority actions, wherever they originate in the OPM, will be subject to review, approval and issuance by him.

To illustrate how the new organization will work: Steel will be handled in a commodity section under Mr. Biggers. When any important question on steel, falling within the jurisdiction of the OPM, arises, the chief of the steel commodity section will have the opportunity to consider suggestions and receive advice from the defense industry advisory committee on steel before final decision is reached.

Similarly, OPM decisions relating to copper will be made by the chief of the commodity section dealing with copper, subject to the approval of Mr. Stettinius, since the copper section will be under his supervision.

All OPM decisions concerning textiles, or drugs, or food, will be made by the chief of the section concerned, subject to the approval of Mr. Nelson in his capacity as head of the textile commodity sections.

In other words, all problems over which OPM has supervision, in any one community, will be initiated centrally within the operating unit,

or commodity section, for that material, and decisions will be made by the section chief at that point, subject to approval of the director directly in charge of that section.

Responsibility for overall coordination in the several fields of production, priorities and purchases will, of course, remain with the division directors.

Electrical Industry Names OPM Advisory Committee

Electrical industry advisory committee to speed co-operation between industry and government on defense problems was among the first named. The committee, announced by Donald M. Nelson, will be purely advisory, and will function under the direction of Donald G. Clark, chief of the equipment and supplies branch of the purchasing division, and Lewis A. Jones, special advisor on electrical supplies.

Members of the committee are:

H. E. Blood, president, Norge Division, Borg Warner Corp., Detroit.
C. L. Collens, president, Reliance Electric & Engineering Co., Cleveland.
W. J. Donald, managing director, National Electrical Manufacturers Association, New York.
Fred Elseman, secretary and treasurer, Revere Electric Co., Chicago.
George M. Hessler, general sales manager, Graybar Electric Co., New York.
Leonard Kebler, president, Ward Leonard Electric Co., Mt. Vernon, N. Y.
Ralph Kelly, vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Leslie E. Latham, president, E. B. Latham & Co., New York.
P. W. Magin, president, Square D Co., Detroit.
Robert B. McChesney, president, National Electrical Contractors Association, Washington.
J. W. McNair, electrical engineer, American Standards Association, New York.
Everett Morss, president, Simplex Wire & Cable Co., Cambridge, Mass.
John M. Newton, president, Oakes Electrical Supply Co., Holyoke, Mass.
Matthew Porosky, vice president, Eagle Signal Corp., Boston.
A. C. Prange, supply sales manager, General Electric Supply Co., Bridgeport, Conn.
C. A. Scott, executive vice president, Rome Cable Corp., Rome, N. Y.
J. P. Shelley, president, Metropolitan Electrical Mfg. Co., Long Island City, N. Y.
E. O. Shreve, vice president, General Electric Co., Schenectady, N. Y.
D. M. Simmons, vice president, General Cable Corp., Washington.
Paul J. Smith, American Society for Testing Materials, Philadelphia.
W. E. Sprackling, vice president, Anaconda Wire & Cable Co., New York.
C. E. Swartzbaugh, president, Swartzbaugh Mfg. Co., Toledo, O.
George Thomas Jr., president, The Thomas & Betts Co., Mt. Vernon, N. Y.
Walter Williams, vice president, Westinghouse Electric Supply Co., New York.

Hillman Reports Rapid Progress In Training Workers on Jobs

Rapid progress in overcoming threatened skilled labor shortages through on-the-job training of workers in defense plants is reported by Sidney Hillman, of OPM.

To date, 892 companies working on defense contracts have installed training-within-industry systems in their plants. These companies employ 1,532,000 workers.

Of these, 42 concerns with more than 250,000 employes launched their training programs the week ended June 21, 1941.

"The rapid spread of training within industry is of utmost significance to the defense program," said Mr. Hillman. "It enables defense plants to expand, to increase the number of shifts, and to absorb more and more semi and unskilled workers from the ranks of the unemployed. Further, the plant which trains its own workers is helping the nation to avoid the troublesome problems of labor-pirating and worker-migration."

OPM Asks Coal Users To Buy Fall, Winter Supplies Now

Industrial users of coal were urged by the OPM last week to buy supplies for the fall and winter months now.

"Moving coal during the summer will relieve the peak of coal shipments in the late summer and early fall months when transportation will be strained by the tremendously increased load of defense production that must be moved along the nation's railways, waterways and highways," the agency stated.

Protest Lowering Import Restrictions on Tungsten

Congressmen from tungsten producing states are protesting against lowering the import duty on metal brought in from Argentina and Uruguay, as the committee for reciprocity information concluded hearings on proposed trade agreements with the two nations.

Instead of considering a reduction in the tariff at this time, said Rep. Francis Case, South Dakota, this government should encourage the domestic tungsten industry.

"It is not the price, but shipping facilities that make it difficult to obtain tungsen from abroad," he said. "To lower the duty will not necessarily increase our supplies but it will hamper our industry."

Sufficiency of Motor Truck Supply Will Be Studied

Formation of a central motor truck transportation committee with 16 regional committees to advise on motor truck transportation problems was announced today by Ralph Budd, Transportation Commissioner, Office for Emergency Management.

John Rogers, Interstate Commerce Commissioner, was named chairman of the central committee with H. H. Kelley, safety chief of the Bureau of Motor Carriers of the ICC as executive secretary.

The 16 regional committees will have headquarters in the field directors' offices of the Motor Carrier Division of the ICC, and the field directors will act as regional committee chairmen.

"One of the immediate problems facing the committees," Mr. Budd said, "is that of priority in motor truck production. A survey of the industry is now in progress. The data about trucks and truck operators, when obtained, will be based upon initially by the regional committees, to ascertain whether a shortage of trucks exists."

Rubber To Be Allocated; Far East Imports Limited

Rubber will be distributed to users under the direction of the Office of Price Administration and Civilian Supply. Importation of crude rubber from the Far East by private sources is barred and consumption of crude will be cut from the current 817,000 tons a year to about 600,000 tons.

These developments last week marked a general tightening of government controls in order to build stockpiles of rubber. The OPM emphasized there is no shortage.

Rubber Reserve Corp., Reconstruction Finance Corp. subsidiary, will be the sole purchaser of rubber from the Far East. About 80 per cent of all imports are brought in from that area. RFC officials indicated buyers of the remaining 20 per cent will co-operate closely and distribute stocks to users on the basis of an OPACS allocation program.

A general preference order, issued by the OPM priorities division simultaneously with the allocation order, aims to cut consumption to 600,000 tons a year by the last half of 1941.

May Extend Chromite Production In Stillwater County, Montana

Reconstruction Finance Corp. is investigating possibility of extending chromite production in several sections near the Ben Bow property in Stillwater county, Montana. The Ben Bow claims were taken over by the government to be developed by Anaconda Copper Mining Co. Anaconda will operate the mines and mill for the Metals Reserve Corp. under the arrangement and the concentrate will be set aside in a Metals Reserve Corp. stockpile. The OPM has urged Anaconda to speed construction of the mill so that all operations will be under cover before the heavy snowfalls which normally

tie up the region in early winter. The capacity of Anaconda's first plant unit will be 600 tons a month, about one-tenth of United States total production.

Additional Defense Housing Units Approved by President

Extensive addition to the defense housing program was authorized last week by President Roosevelt to relieve severe shortages in communities with a large number of defense workers.

The President approved 30 localities in 17 states and Alaska in which moderately-priced homes may be financed under the liberalized Federal Housing Administration insurance program. The act under which this step was taken permits 90 per cent mortgage insurance to operative builders on multi-unit developments in localities "in which the President shall find an acute shortage of housing exists or impends which would impede national defense activities."

A temporary shelter program for ten defense communities also approved last week provides for demountable dormitory accommodations for single workers and trailers or portable houses for families. These would be used only until houses could be provided. Areas included in this project: Benecia, Calif., 50 trailers; Vallejo, Calif., 300 dormitory units, 200 portable family homes; Bridgeport, Conn., 250 dormitory units, 200 portable family homes; Kingsbury-LaPorte, Ind., 500 dormitory units, 400 trailers; Burlington, Iowa, 275 trailers; Jacksonville, N. C., 200 trailers; Port Clinton, O., 60 trailers; Portsmouth, Va., 252 dormitory units; and Honolulu, T. H., 600 dormitory units.

Construction of an additional 500 homes and 500 dormitory units, with purchase of 300 trailers to house families of workers at the Ravenna Ordnance Plant in the Ravenna-Warren, O., area, also was approved by the President. It was recommended 250 of the regular homes be of demountable construction, that they might be salvaged and removed for use elsewhere after the emergency.

Pledge Non-Profit Support in Collection of Aluminum Scrap

Full support on a non-profit basis in the collection of scrap aluminum throughout the nation was pledged to the Office of Production Management last week by the scrap metal industry. Spokesmen for the National Association of Waste Material Dealers, Empire Metal Merchants Association of New York, Philadelphia Metal Association, and an unaffiliated Chicago group made the pledge at a meeting with OPM officials.

Entire trade, said the scrap dealers, will arrange for sorting, preparation and sale of aluminum without compensation of any kind "as a voluntary contribution to national defense." Labor employed in actual segregation and preparation of the metal will be paid at regular rates by local civic committees.

Limited Property Seizure Bill Proposed by War Department

Restrictions on the "property seizure" bill specifying the items which the President could requisition were proposed last week by Robert P. Patterson, undersecretary of war. The substitute bill would empower the Chief Executive to take over military or naval equipment, patents, machine tools, manufacturing equipment and plans "to promote the national defense and overcome shortages."

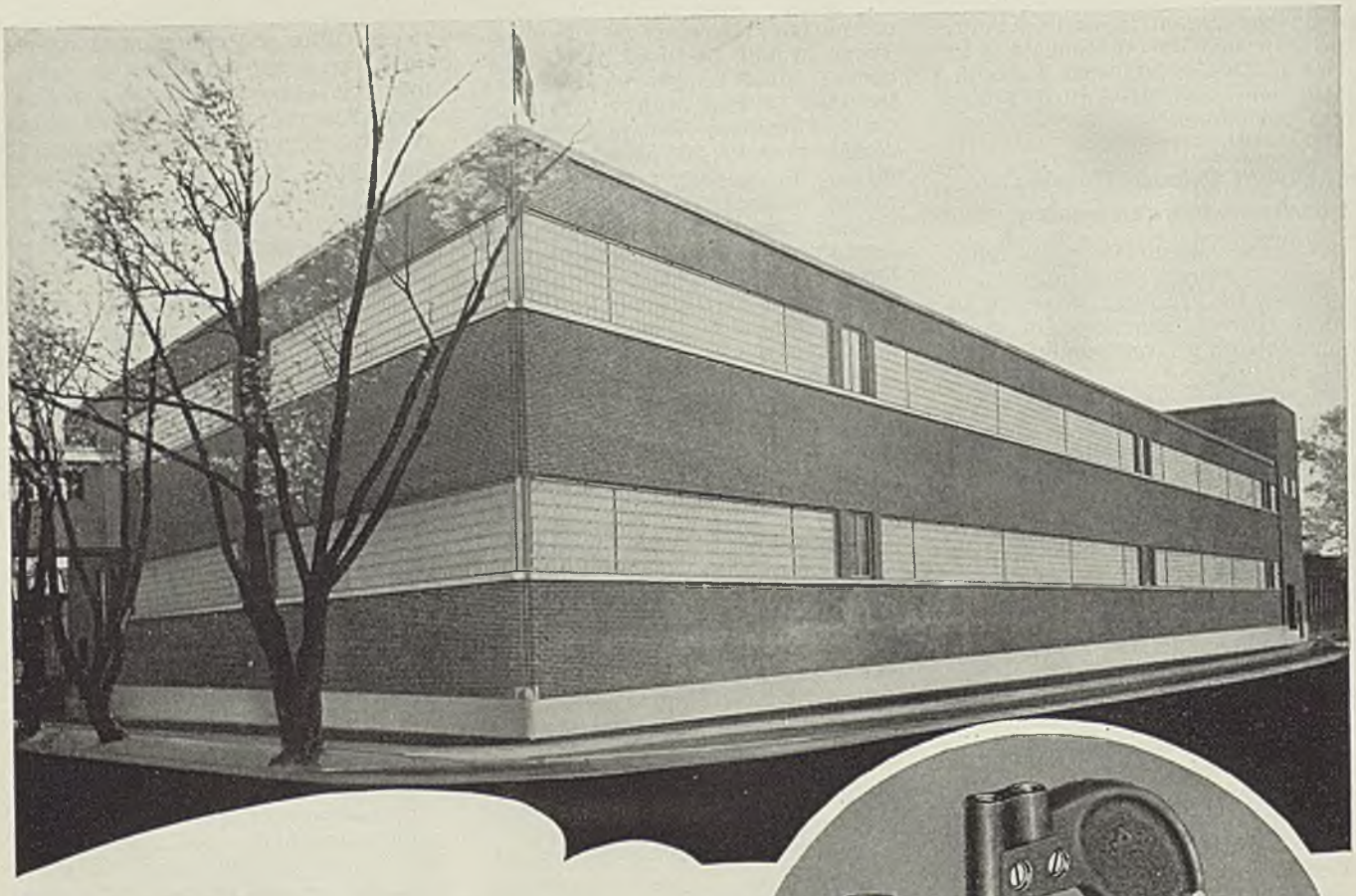
The original measure was opposed by some congressmen as being too broad and placed no restriction of the President's commandeering power so long as the seized property was needed for defense. Mr. Patterson said the substitute was intended to allay fears that "we would come up and ask a man for his watch."

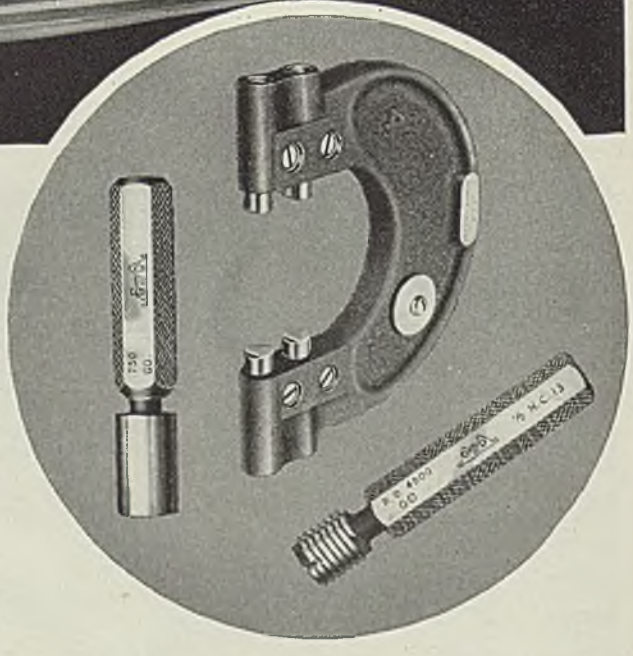
Diesel-Powered Generating Sets Under Export Control

Electrical generating sets powered by diesel engines have been added to the products under export control in export control Schedule No. 10, issued last week by Administrator Maxwell.

Crash That Hurt No One

■ Three million volts of man-made lightning strike an automobile without injuring the car or the occupant in an experiment at Westinghouse Electric & Mfg. Co.'s high-voltage laboratory, Trafford, Pa. The stroke can be seen jumping over the left front tire to reach ground. Dr. Gilbert D. McCann, in the car, who conducted the experiment, said the demonstration proved for the first time that occupants of a steel-topped automobile are safe from natural lightning attacks





NEW HOME for "GREENFIELD" Gages

MEMORIAL DAY at "*Greenfield*" was marked by the opening of this new modern air-conditioned plant, devoted entirely to the manufacture of Plain, Thread and Limit Snap Gages. It will more than double "*Greenfield's*" gage manufacturing capacity and symbolizes "*Greenfield's*" determination to cooperate in every way with the national defense program.

The most modern machinery and complete air conditioning will materially assist our hundreds of trained and experienced gage workers to maintain the closest possible control over manufacturing conditions. Even with the greatly enlarged output that the new building makes possible, individual quality and accuracy will be maintained and increased.

Increased research and testing facilities are an important part of the new equipment and will be used unceasingly for the benefit of our friends and customers.

GREENFIELD TAP & DIE CORPORATION

GREENFIELD, MASSACHUSETTS

DETROIT PLANT: 2102 West Fort St.

WAREHOUSES in New York, Chicago and Los Angeles

In Canada:

GREENFIELD TAP & DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Ford goes "all-out" on union contract, with closed shop and dues checkoff. Asks permission to use union label on cars. Company determined to avoid half-way measures. New contract may prove a smart move, throwing burden of responsibility on union. Will match wages of most generous competitor in basic industries . . . Ford to make plastic refrigerator? . . . Chrysler starts two plants for machine gun and bomber production . . . Replies to Henderson

DETROIT

■ IF SOME itinerant prophet or crystal-gazer had issued the forecast ten days ago that in the short space of 36 hours Germany would be invading Russia and Ford would have signed a closed-shop contract with the UAW-CIO, he would have been considered a ripe subject for the booby-hatch. Which suggests that asylums may be the proper places to search for correct interpretations of what is to come.

Of the two about-faces, the Ford agreement is of more immediate and localized interest. The second-guessers are of course saying they knew it all the time, and the insiders are saying they were tipped off a couple of weeks in advance, but generally speaking announcement of the contract was a distinct blitzprise.

As a document which may eclipse in significance the first union contract signed by the automobile industry in 1937, the Ford pact is worthy of detailed analysis. The closed union shop, checkoff system of dues collection and permission to use the union label on Ford products are the highlights, but a number of other details are of interest. First, the entire contract is based on two essential considerations—continuous and uninterrupted manufacture and production of goods by the company, and orderly collective bargaining relations between the company and the union to secure prompt and fair disposition of grievances. All else is contributory to these ends.

All types of supervisory policing, clerical and professional employes are exempted from the terms of the agreement. All others will have union initiation fees, dues and special assessments deducted by the company from their weekly pay checks, although special assessments in excess of $1 per year will not be paid by the company. This brings into the union treasury a neat $120,000 a month, not including initiation fees, since the contract covers all Ford production and assembly plants—34 in all. This money is to be distributed by the union treasurer "in accordance with constitution, laws and regulations of the union."

Given 30 Days To Join Union

Every workman in the plants must become a member of the UAW-CIO within 30 days if he is not now, and any person dropped from the union is automatically discharged by the company.

To the management is reserved the right to hire, discharge, discipline and promote employes, as well as to determine the number and location of plants and equipment, products to be manufactured and methods of manufacture, scheduling of production, designing, engineering and control of raw materials and parts.

Employes will be represented by one committeeman for each 550 persons, plus a building committee of three for each shift. Chairmen of each building committee will comprise a plant committee, and these men will devote their full time to committee work. Committees will meet once a week with designated plant officials. A final appeal board, made up of an equal number of union and company representatives, will constitute a supreme court for review of individual grievances.

The path of grievances is as follows: First to foreman, then to departmental committee and departmental superintendent, then to building committee and building superintendent, then to the plant committee and plant officials, and finally to the appeal board. Settlement of grievances must be arrived at within two weeks of the time of their original presentation. There is nothing particularly new about this procedure as far as the automobile industry is concerned.

Seniority provisions likewise are patterned after those of other union contracts. Two provisions are noteworthy:

"Employes transferred to the aircraft building or to other branches for defense work shall have the right to return to their former jobs on the basis of seniority when and if the company discontinues such operations.

"Promotions to higher paid jobs or better jobs with equal pay are based primarily upon merit and ability, but when all other things are equal the employe having the greatest seniority will receive the preference. This clause does not apply to promotions to supervisory positions."

With regard to wages, Ford has offered to match the highest rates paid anywhere in the automobile, cement, glass, steel and tire industries, the union having ten days to name the rates paid by the "major competitor" in these respective industries. Where present Ford wages are higher, they will remain unchanged. Two off-hour shifts will receive 5 cents an hour more than the day shift. Time and a half will be paid for over 8 hours

a day or over 40 hours a week, and double time for work on Sunday or on six legal holidays. An exception is the case of continuously operating departments such as the steel and glass plants. A change in federal laws regarding working hours would mean negotiations leading to modification of these overtime payments.

The end of Harry Bennett's secret police force is sounded with these few words: "All plant protection employes shall wear conspicuous insignia to clearly distinguish them from other employes."

Near the end of the contract is this clause, inserted according to union officials as a "concession" to the company: "The union will permit the company to use the union label on products manufactured in plants covered by this agreement."

Hitherto the UAW-CIO label has had only scattered application to tools, dies and parts. The company is reported to have asked for a redesign to permit application on motor cars.

So Henry Ford, an ardent opponent of unions for years, has bowed to the will of his employes. It is conceded by many as a smart move, for a number of reasons:

1. He has stolen a march on his competitors, who doubtless will be forced to follow suit within the next year.

2. He has thrown complete responsibility upon the union for maintenance of order and efficiency in his plants.

3. He has rid himself of expensive and interminable court battles over interpretations of Wagner Act.

4. He has cleared the decks for "all-out" production. On Monday last week, for example, motor assemblies at the Rouge plant jumped to the highest rate in many weeks, solely because of labor co-operation.

5. He has wiped out boycotting of Ford products that might have been practiced because of his former nonunion stand.

6. He has keyed his vast productive effort to the industrial tempo of tomorrow—production for use, with complete organization of employes for job security.

The UAW-CIO claims it now has paid-up membership of 540,000, which at a dollar a month means annual revenue of nearly $6,500,000. No accounting of these funds is now required, but it is a good bet the Ford contract will prove a stimulant for legislation requiring incorporation of unions in general.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,128
Feb.	317,520	422,225	509,233
March	389,499	440,232	533,912
April	354,266	452,433	489,841
4 mos.	1,418,247	1,764,382	2,057,112
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†
May 31	106,395	61,255
June 7	133,645	95,560
June 14	134,682	93,635
June 21	133,565	90,060
June 28	127,926	87,550

†Comparable week

Ford Gets Plastic Car, Now Wants Plastic Refrigerator

Another event of significance last week was the delivery to Mr. Ford of his all-plastic automobile—that is, all plastic except for the chassis. The description all-plastic is somewhat of a misnomer, too, for the nonmetallic assemblies actually have only about 25 per cent of plastic material in their composition, the balance being canvas or other type of fabric reinforcement—and Ford engineers are working toward cutting down this 25 per cent to 15 per cent.

Mr. Ford also has asked his engineers to develop an electric refrigerator design of the all-plastic type, suggesting that before long the list of Ford products may include household refrigerators, as well as automobiles, airplane engines, bombers, tractors, agricultural implements, fuels, etc.

Break Ground for Plants To Make Machine Gun Parts

Chrysler Sales and De Soto Divisions of Chrysler Corp. have broken ground for two new buildings to house manufacturing of parts for the Bofors 40-millimeter antiaircraft machine gun. The former will build a 520 by 240-foot plant adjoining the Chrysler body and assembly plants on East Jefferson avenue, providing 125,000 square feet of floor space and complete with heat treating department and laboratory. Slated for operation by fall, the plant will produce, in addition to gun parts, certain elements for the Martin B26B bomber. Both bomber and machine gun parts will be supplied likewise in the new De Soto plant on Wyoming avenue, which will have 63,000 square feet of floor space.

The Bofors gun, or rather the U. S. version of this type of gun, fires at a rate of 120 rounds a minute, and the British have found it effective in combating dive bombers. The guns are mounted singly on carriages for the army and in groups for installation on ships.

Barrel of the gun will be rifled by the broaching method, it is understood, preliminary estimates indicating a time of 2 hours and 40 minutes per barrel for rifling. A set of tools for the job costs around $1200 and comprises a series of "button" broaches made in increasingly larger cutting diameters and pulled through the barrel one at a time.

Chrysler Replies to OPACS Administrator, with Figures

Chrysler Corp. directed a figure-bristling reply to OPACS Administrator Henderson's charge that the company was not co-operative in refusing to rescind recent price increases.

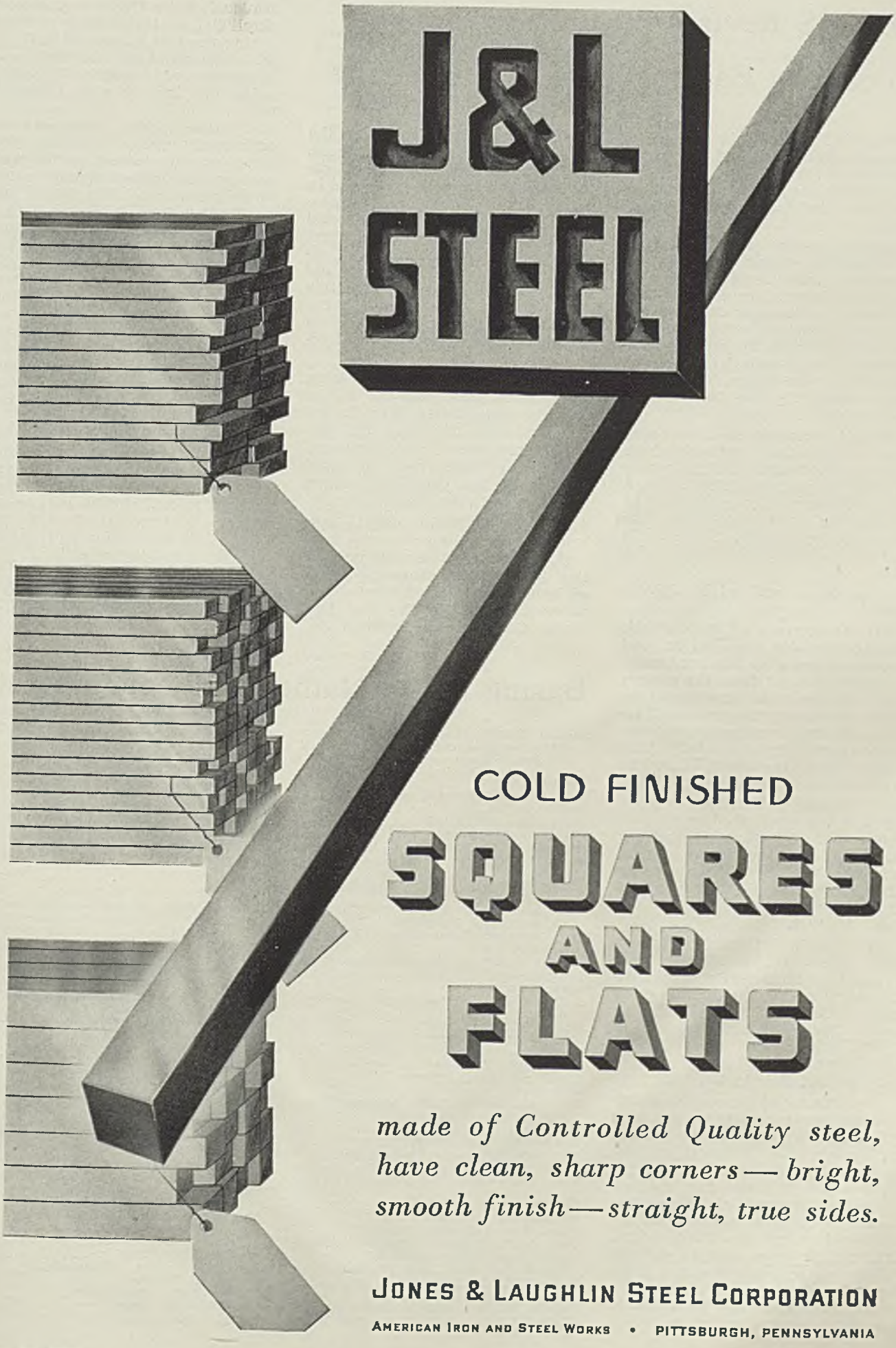
The company pointed out that in year ended May 31 it delivered to the government $31,666,171 worth of trucks, repair parts, cartridge cases, bomb fuse noses, field kitchens and space heaters, realizing profit of only $13,295, or 1/25 of 1 per cent. Further it has gone ahead on bomber parts work for the past eight months, paying rent on leased plant, with no contract from the government.

Regarding auto prices, on June 1 payrolls were increased 8 per cent and last December 2 per cent. Prices on current models were set last September and since then there have been many increases in material, tools and supplies. Effect of all increases caused estimated increase in cost per car of $27.55 or 4.89 per cent. Price increase announced June 4 was equivalent to 4.125 per cent, or an increase in corporation's income before taxes of $26.62 per car.

For 12 months ended March 31 net profits after taxes on domestic passenger car business amounted to $30.47 per car, or 4.41 per cent of the sale price, so cost increases since first of year practically cancel out this profit.

OPACS mentioned the profit of Chrysler for last year of $27,802,000, but the company pointed out it should be remembered that accompanying this were taxes paid of $53,177,000, wages of $137,000,728 and purchases from other industries of $453,396,000. Furthermore, out of above net profit $23,931,000 was paid in dividends to stockholders.

The Chrysler statement continues that the automobile industry which is being restricted in its output for civilian use and is being subjected to extraordinary costs in undertaking unusual production for defense should not be compared with industries which are increasing production of their usual products.


J&L
STEEL
COLD FINISHED
SQUARES
AND
FLATS
made of Controlled Quality steel,
have clean, sharp corners — bright,
smooth finish — straight, true sides.
JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

OPACS Revises Steel Price Order; Broadens Basing Point, Export Rules

■ SLIGHT revisions in Leon Henderson's steel price-freezing order of April 17, in favor of producers, were announced last week by the Office of Price Administrator and Civilian Supply.

Broadly, prices are still held at first quarter levels, but changes have been made to adjust some of them to abnormal conditions, such as those due to lack of ships because of commandeering for British aid, and need for certain steelmakers to ship material far out of their usual territories. The export price set-up also has been altered to a moderate extent.

Sales to domestic consumers now may be computed on the basis of the basing point nearest the mill where the steel is produced. Previously, it was necessary to figure in terms of the basing point which gave the lowest delivered price. The order is accompanied by detailed basing point data.

Changes as outlined by OPACS are:

(1) In determining the domestic ceiling price for any iron or steel product sellers may now use "transportation charges from the governing basing point to the place of delivery as customarily computed" instead of "the lowest published common carrier freight rate." This change brings the schedule into line with customary industry practice.

(2) Basing point prices in effect April 16 are established as the ceiling instead of those in effect March 31, 1941, as specified in the original schedule. This gives effect to minor changes in charges for extras instituted between March 31, 1941 and April 16, 1941.

(3) An alternative ceiling for export prices is established. The original schedule required that domestic prices at the basing point nearest the point of production be used. Now the export prices of United States Steel Export Co. at the various seaboard shipping points may be used if desired.

(4) In view of the possible shortage in water transportation and need of shipyards to place steel orders at interior mills, producers are now permitted to go to a basing point system for Gulf and Pacific Coast shipments instead of being compelled to continue use of arbitrary delivered prices at these points. Rail freight rates may be charged where water transportation is no longer available.

(5) Sellers are now permitted to compute delivered prices in terms of the basing point price nearest the mill where the steel is produced. Under the original schedule all domestic sales had to be computed in terms of the basing point price which gave the lowest delivered price. Needs of the defense program have forced allocation of orders to mills which ordinarily did not sell in the areas to which this steel must go. The change in the schedule permits such mills to handle such orders without undue hardship.

"OPACS is utilizing the basing point, price leadership and extras systems, presently in effect in the steel industry, including the customary practice of steel producers in gearing their own delivered prices to the base prices announnced by recognized price leaders.

The term "Basing Point Base Prices" means either:

(1) the prices announced prior to Dec. 31, 1940, or customarily quoted by Carnegie-Illinois Steel Corp., American Steel & Wire Co., Tennessee Coal, Iron & Railroad Co., National Tube Co. and Columbia Steel Co., as base prices effective during the first quarter of 1941, or in effect on April 16, 1941, and applicable at designated basing points for iron or steel products; or

(2) those prices announced or customarily quoted by other persons for such period or on such date as base prices at any basing point listed in Section 1306.7, Appendix A." (See following list.)

A lower price than the ceiling price may be charged, demanded, offered or paid. The price limitations set forth in this price schedule shall not be evaded by additional charges for prompt or early delivery, or by other direct or indirect methods, nor shall the other terms and conditions of sale be made more onerous to the purchasers than those available or in effect on April 16, 1941.

In naming basing points Mr. Henderson, administrator, stated that "such acceptance of these systems merely as a vehicle for determining prices, should not be regarded as approval thereof, nor should this reservation be regarded as indicating disapproval."

The revisions were made in accordance with suggestions received from a cross-section of the steel industry.

Basing Points Named for Steel Products

Section 1306.7 (Appendix A), Basing Points by Products (Other than Gulf and Pacific Ports)

Berwick, Pa.
Bars, Billets, Blooms, Muck bar—Iron

Bethlehem, Pa.
Alloy Steel, Hot Rolled
Bars and Billets—Tool Steel
Blooms, Billets and Slabs—Alloy Steel
Structural Shapes

Birmingham
Axles—Rolled or Forged
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms, Billets and Slabs—Carbon Steel
Light Rails—60 lb. or less per yd.
Plates—Carbon
Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Hot Rolled
Structural Shapes
Wire Rods
Wire—Drawn (Includes Manufacturers and Merchants Quality)
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Posts (Angle line posts only)

Buffalo
Bars—Alloy Steel, Hot Rolled
Bars—Alloy Steel Cold Finished
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Carbon Steel, Cold Finished
Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms, Billets and Slabs—Alloy Steel
Blooms, Billets and Slabs—Carbon Steel
Railroad Tie Plates—for Standard Tee Rails
Sheet Bars
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Steel Sheet Piling and Accessories
Structural Shapes

Burnham, Pa.
Bars, Billets, Blooms, Muck Bar—Iron

Canton, O.
Bars—Alloy Steel, Hot Rolled
Blooms, Billets and Slabs—Alloy Steel
Sheet Bars

Chicago
Axles—Rolled or Forged
Bars—Alloy Steel, Hot Rolled
Bars—Alloy Steel, Cold Finished
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Carbon Steel, Cold Finishing
Bars—Concrete Reinforcing, New Billet and Rail Steel
Bars, Billets, Blooms, Muck Bar—Iron
Blooms, Billets and Slabs—Alloy Steel
Blooms, Billets and Slabs—Carbon Steel
Light Rails—60 lb. or less per yd.
Plates—Carbon
Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes
Sheet Bars
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Sheets—Long Terne
Strip Steel—Cold Rolled
Strip Steel—Hot Rolled
Skelp—Carbon Steel
Steel Sheet Piling and Accessories
Structural Shapes
Tin Plate and Terne Plate
Tin Mill Black Plate
Wheels—Car, Rolled Steel

Wire Rods
Wire—Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Wire Hoops
Fence Posts

Claymont, Del.

Plates—Carbon

Cleveland

Bars—Alloy Steel, Cold Finished
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Carbon Steel, Cold Finished
Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms, Billets and Slabs—Carbon Steel
Plates—Carbon
Sheet Bars
Sheets—Cold Rolled
Sheets—Hot Rolled
Strip Steel—Cold Rolled
Strip Steel—Hot Rolled
Wire Rods
Wire — Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire—Telephone
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Posts

Coatesville, Pa.

Bars, Billets, Blooms, Muck Bar—Iron
Plates—Carbon
Skelp—Carbon Steel
Skelp—Charcoal Iron

Columbia, Pa.

Bars, Billets, Blooms, Muck Bar—Iron

Creighton, Pa.

Bars, Billets, Blooms, Muck Bar—Iron

Cuyahoga Falls, O.

Bars, Billets, Blooms, Muck Bar—Iron

Detroit

Bars—Carbon Steel, Cold Finished

Dover, N. J.

Bars, Billets, Blooms, Muck Bar—Iron

Duluth

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Blooms, Billets and Slabs—Carbon Steel
Wire—Drawn (Includes Manufacturers and Merchant Quality)
Wire—Telephone
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Posts

Gary

Bars—Alloy Steel, Cold Finished
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Carbon Steel, Cold Finished
Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms, Billets and Slabs—Carbon Steel
Pipe—Steel
Plates—Carbon
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Sheets—Long Terne
Strip Steel—Hot Rolled
Structural Shapes
Tin Plate and Terne Plate
Tin Mill Black Plate

Glassport, Pa.

Wire — Drawn (Includes Manufacturers and Merchant Quality)

Granite City, Ill.

Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Tin Plate and Terne Plate
Tin Mill Black Plate

Jersey City, N. J.

Bars, Billets,Blooms, Muck Bar—Iron

Kansas City, Mo.

Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes

Knoxville, Tenn.

Bars, Billets, Blooms, Muck Bar—Iron

Lebanon, Pa.

Bars, Billets, Blooms, Muck Bar—Iron
Railroad Track Spikes

Lorain, Ohio

Girder Rails, and Splice Bars therefor
Pipe—Steel

Louisville, Ky.

Bars, Billets, Blooms, Muck Bar—Iron

Massillon, O.

Bars—Alloy Steel, Hot Finished
Blooms, Billets and Slabs—Alloy Steel

Middletown, O.

Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Hot Rolled

Minnequa, Colo.

Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes

Muncie, Ind.

Wire—Telephone

Pittsburgh

Axles—Rolled or Forged
Bars—Alloy Steel, Hot Rolled
Bars—Alloy Steel, Cold Finished
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Carbon Steel, Cold Finished
Bars—Concrete Reinforcing, New Billet and Rail Steel
Bars, Billets, Blooms, Muck Bar—Iron
Bars and Billets—Tool Steel
Blooms, Billets and Slabs—Alloy Steel
Blooms, Billets and Slabs—Carbon Steel
Light Rails—60 lb. or less per yd.
Pipe—Wrought Iron
Pipe—Steel
Plates—Carbon
Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes
Sheet Bars
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Sheets—Long Terne
Strip Steel—Cold Rolled
Strip Steel—Hot Rolled
Skelp—Carbon Steel
Steel Sheet Piling and Accessories
Structural Shapes
Tin Plate and Terne Plate
Tin Mill Black Plate
Tubes—Boiler
Wheels—Car, Rolled Steel
Wire Rods
Wire — Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire—Telephone
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Wire Hoops
Fence Posts

Portsmouth, O.

Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes

Richmond, Va.

Bars, Billets, Blooms, Muck Bar—Iron
Railroad Track Spikes

St. Louis, Mo.

Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes

Sparrows Point, Md.

Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms, Billets and Slabs (Carbon Steel)
Plates—Carbon
Sheet Bars
Sheets—Hot Rolled
Sheets—Galvanized
Skelp—Carbon Steel
Wire—Telephone

Steelton, Pa.

Girder Rails and Splice Bars therefor
Railroad Tie Plates—for Standard Tee Rails

Syracuse, N. Y.

Bars and Billets—Tool Steel

Terre Haute, Ind.

Bars, Billets, Blooms. Muck Bar—Iron

Trenton, N. J.

Wire—Telephone

Waukegan, Ill.

Wire—Telephone

Weirton, W. Va.

Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes

Worcester, Mass

Strip Steel—Cold Rolled
Wire Rods
Wire—Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring

Youngstown, O.

Bars—Concrete Reinforcing, New Billet and Rail Steel
Blooms. Billets and Slabs—Carbon Steel
Plates—Carbon
Railroad Track Spikes
Sheet Bars
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Cold Rolled
Strip Steel—Hot Rolled
Skelp—Carbon Steel

§ 1306.8 Appendix B, Gulf and Pacific Port Basing Points by Products

GULF PORTS:

Baytown, Tex.

Steel Sheet Piling and Accessories

Beaumont, Tex.

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Steel Sheet Piling and Accessories
Structural Shapes

Corpus Christi, Tex.

Steel Sheet Piling and Accessories

Galveston, Tex.

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Rails and Splice Bars for Rails over 60 lb. per yd.
Steel Sheet Piling and Accessories
Structural Shapes
Wire Rods

Houston, Tex.

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Rails and Splice Bars for Rails over 60 lb. per yd.
Steel Sheet Piling and Accessories
Structural Shapes

Lake Charles, La.

Steel Sheet Piling and Accessories

Mobile, Ala.

Rails and Splice Bars for rails over 60 lb. per yd.
Steel Sheet Piling and Accessories

New Orleans, La.

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Rails and Splice Bars for rails over 60 lb. per yd.
Steel Sheet Piling and Accessories
Structural Shapes

Orange, Tex.

Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon

Steel Sheet Piling and Accessories
Structural Shapes

Port Arthur, Tex.
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Steel Sheet Piling and Accessories
Structural Shapes

PACIFIC COAST PORTS:

Bellingham, Wash.; Everett, Wash.; Long Beach, Calif.; Los Angeles; Sacramento, Calif.; San Diego, Calif.; Stockton, Calif.
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Railroad Tie Plates—for Standard Tee Rails
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Hot Rolled
Steel Sheet Piling and Accessories
Structural Shapes
Tin Mill Black Plate
Wire Rods
Wire—Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Posts

Oakland, Calif.; Portland, Ore.; San Francisco; San Pedro, Calif.; Seattle, Wash.
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Rails and Splice Bars for rails over 60 lb. per yd.
Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Hot Rolled
Steel Sheet Piling and Accessories
Structural Shapes
Tin Mill Black Plate
Wire Rods
Wire—Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Ties

Tacoma, Wash.; Wilmington, Calif.
Bars and Small Shapes—Carbon Steel and Rail Steel, Hot Rolled
Bars—Concrete Reinforcing, New Billet and Rail Steel
Plates—Carbon
Railroad Tie Plates—for Standard Tee Rails
Railroad Track Spikes
Sheets—Cold Rolled
Sheets—Hot Rolled
Sheets—Galvanized
Strip Steel—Hot Rolled
Steel Sheet Piling and Accessories
Structural Shapes
Tin Mill Black Plate
Wire Rods
Wire——Drawn (Includes Manufacturers and Merchant Quality)
Wire—Spring
Wire Nails and Staples
Twisted Barbless and Barbed Wire
Wire Fencing (except Chain Link)
Bale Ties
Fence Posts

Maximum Steel Export Prices

As issued last week by OPACS

§ 1306.9, APPENDIX C, Export Base Prices of United States Export Co. for Principal Products, F. A. S. Principal Ports, in Effect April 16, 1941.

Products	Boston New York Philadelphia Baltimore Norfolk	Charleston Savannah New Orleans Mobile	Galveston Houston	San Francisco Seattle Portland Los Angeles (San Pedro)
		(Dollars per gross ton)		
Ingots	$37.00	$37.00	$39.49	$46.60
Blooms—Billets & Slabs, Sheet Bars	42.00	42.00	44.49	51.60
Forging Billets	48.00	48.00	50.49	57.60
Wire Rods in Coils	52.00	52.00	54.49	61.60
Light Rails (60 Lbs. and Under)	52.50	52.50	58.01	62.21
Heavy Rails (over 60 Lbs.)	54.15	54.15	59.66	63.86
Girder Rails	55.00	58.55	60.25	64.27
		(Cents per 100 lbs.)		
Angle Splice Bars for Heavy Rails	3.52	3.52	3.64½	3.92
Tie Plates	2.92	2.92	3.04½	3.32
Track Spikes	3.25	3.25	3.37½	3.65
Axles	3.38	3.58	3.66	3.78
Skelp	2.20	2.40	2.48	2.60
Piling	2.60	2.80	2.88	3.00
Plates (Carbon Steel)	2.45	2.45	2.57½	2.85
Structural Shapes (Standard)	2.45	2.45	2.57½	2.85
Merchant Bars and Bar Mill Shapes	2.45	2.45	2.57½	2.85
Concrete Bars (New Billet)	2.45	2.45	2.57½	2.85
Cold Finished Carbon Steel Bars	2.88	3.08	3.16	3.28
H. R. Alloy Bars	2.79½	3.04	3.04	3.14
Cold Finished Alloy Bars	3.56	3.69	3.69	3.79
H. R. Carbon Tool Steel Bars (Tennessee Special)	7.57	7.57	8.37	7.50
Black Annealed Wire	3.10	3.30	3.38	3.50
Galvanized Plain Wire	3.60	3.80	3.88	4.00
Galvanized Barb Wire	3.65	3.85	3.93½	4.07½
Bright Nail Wire	2.80	3.00	3.08	3.20
Wire Nails	2.85	2.85	2.98½	3.29
Galvanized Staples (Incl. $1.17 extra for Galvanized)	3.90	4.12	4.21	4.34
Bright Staples (Incl. 72c extra for Bright)	3.50	3.72	3.81	3.94
		(Dollars per base box)		
Tin Plate 14″ x 20″ 107-112-Lb. Sheets, Wooden Boxes — Wire Strapped	5.35	5.35	5.49	5.80
		(Cents per 100 lbs.)		
Hot Rolled Sheets, 24 B. G. Plain Bundles (Includes 90c for Gage)	3.25	3.25	3.37½	3.65
10 U. S. G. Plain Bundles	2.35	2.35	2.47½	2.75
Cold Rolled Sheets, 17 U. S. G. in 2 Ton Metal Crates (Includes 15c for Packing)	3.40	3.60	3.68	3.80
Galvanized Sheets, 24 B. G. in Plain Bundles	3.90	3.90	4.02½	4.30
Hot Rolled Strip	2.40	2.60	2.68	2.80
Cold Rolled Strip	3.10	3.30	3.38	3.50
	Per Cent	‡(Discounts from list) Per Cent	Per Cent	Per Cent
American Standard Pipe, Black, T. & C. 1″ to 3″	67	65	64.2	63
American Standard Pipe, Galvanized, T. & C. 1″ to 3″	56.2	54.2	53.4	52.2
American Extra Strong Pipe, Black, Plain Ends 1″ to 3″	65.5	63.5	62.7	61.5
American Extra Strong Pipe, Galvanized, Plain Ends 2″ to 2½″	53.8	51.8	51.0	49.8
American Double Extra Strong Pipe, Black, Plain Ends 2″ to 2½″	53.8	51.8	51.0	49.8
American Double Extra Strong Pipe, Galvanized Plain Ends, 2″ to 2½″	43	41	40.2	39
English Gas Tubes, Black, T. & C. ⅜″ to 6″	67†	65¼†	64.5†	53.5†
	65*	63¼*	62.5*	61.5*
English Gas Tubes, Galvanized, T. & C. ⅜″ to 6″	59†	57¼†	56.5†	55.5†
	57*	55¼*	54.5*	53.5*
English Steam Tubes, Painted, T. & C. ⅜″ to 6″	62†	60¼†	59¼†	58.5†
	57*	55¼*	54¼*	53.5*
English Steam Tubes, Galvanized, T. & C. ⅜″ to 6″	50†	48¼†	47¼†	46.5†
	49*	47¼*	46¼*	45.5*

†South American Markets. *Other Markets. ‡Discounts; American Standard Pipe, off American List, No. 6; English Gas Tubes, off English List, No. 3, converted 2c to the penny.

Government Stabilizes Pig Iron Prices at Second Quarter Levels

■ MAXIMUM prices that may be charged for pig iron were set up last week by the Office of Price Administration and Civilian Supply. The ceiling prices generally are those prevailing June 24.

Pig iron is the third major factor in the iron and steel industry on which prices have been frozen; similar action was taken earlier on iron and steel scrap and on iron and steel products.

"Recent wage increases and increased demand for pig iron resulting from the national defense emergency have been exerting pressure upon the price structure," stated Leon Henderson, OPACS administrator.

The schedule sets forth basing point base prices for the five major grades of pig iron at various cities; such prices for three minor grades; differentials based on silicon, phosphorus and manganese content; and two exceptions. The basing point prices are the same quoted by STEEL, page 90, with the exception of basic pig iron at Birmingham, where the ceiling is 38 cents a ton lower than quoted.

Domestic ceiling prices will be the aggregate of the basing point base price at the governing basing point; differentials according to content of the iron; and transportation charges from the governing basing point to the point of delivery as customarily computed.

Export ceiling prices will be the aggregate of the basing point base price at the governing basing point, differentials, and export transportation charges from the governing basing point to place of delivery as customarily computed. In the case of exports the governing basing point may be the established basing point at or nearest the place of production.

The ceiling prices became effective June 24, "regardless of any commitment theretofore entered into . . . provided, that with respect to any sale of pig iron for future delivery, a contract may provide for the payment of an adjusted price not to exceed the maximum price in effect at time of shipment."

The order provides: "Every person who produces pig iron shall retain copies of all invoices, dated Jan. 1, 1941, or later, relating to sales of such products, including sales to exporters, brokers and all other persons purchasing for resale. Reports on such sales, in such form as may be determined, will be required by supplements issued under this price schedule.

"Every person who produces and sells pig iron shall file a copy of his price schedule, including differentials, stating the prices, charges and discounts in effect on June 24, 1941. Such materials shall be filed with the Office of Price Administration and Civilian Supply, Washington, on or before July 10, 1941.

Supplements further stating the schedule's scope will be issued from time to time as may be necessary, or appropriate. Modifications may be made if necessary.

Price Control Spreads; Extended To Consumer-Goods Industries

■ PRICE control over a wide range of commodities, including many consumer goods, last week was becoming an actuality as Leon Henderson, OPACS administrator, established price ceilings or issued warnings of price maximums to be established.

Mr. Henderson warned the automobile industry that refusal to rescind recent price advances "is forcing us to take the pricing of automobiles out of the hands of the industry." (For Chrysler Corp.'s reply to Henderson, see page 28.)

Forty-seven large furniture manufacturers were told the "open" method of quoting prices must cease immediately and further price increases without consulting OPACS must not be made.

Household refrigerator builders were "requested" to make no additional advances in prices. Recent markups, Mr. Henderson said, are being studied with a view toward determining their justification.

Bans Car Wheel Advance

Price increase announced by makers of railroad car wheels for July 1 "must be withdrawn," Mr. Henderson declared.

Meeting with manufacturers to discuss the situation, he said he will continue his policy of asking voluntary co-operation rather than legislative control "only so long as individual businesses are willing to assume the responsibility of maintaining price stability."

Makers of carbon black also were asked to refrain from announcing a price increase until the industry has consulted OPACS. A distributor was said to have announced a 12½ per cent advance effective July 1.

Asks Tool Steel Scrap Cut

Unless price of high speed tool steel scrap demanded by dealers is reduced a schedule of ceiling prices will be imposed on the industry, Mr. Henderson said. Companies that produce such scrap, containing 12 per cent or more of tungsten, have been quoted prices of $1.80 per pound of contained tungsten in recent months, he declared. However, certain dealers and users have been asking higher prices. Condemning this practice, Mr. Henderson said it is important scrap be returned promptly at fair prices to the mills.

Users of tungsten steel were urged to send the scrap back to producers without delay, either directly or through dealers who can be depended upon to sell it at fair prices.

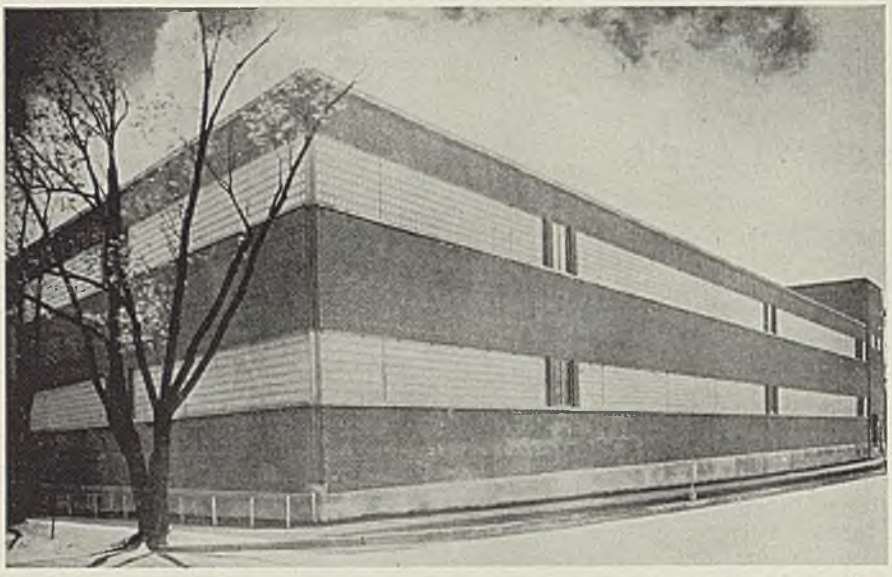
"Should dealers hold up flow of scrap back to producing mills, measures will be taken to correct the situation," he announced. Pressure on supplies of tungsten is said to have eased considerably since OPM cut the amount of tungsten steel that may be purchased by industrial users.

Scrap Price Ceiling Schedule Amended

■ An additional amendment has been made to Price Schedule No. 4, establishing maximum prices for scrap iron and steel, according to Mr. Henderson.

The change, which became effective June 21 is designed to simplify the schedule in respect to switching charges of 84 cents per gross ton on scrap originating from railroads operating in Chicago.

Previously it had been required that this charge be deducted from the maximum price of scrap when sold by railroads operating in Chicago to consumers located outside of Chicago. The latest amendment eliminates this deduction and instead permits Chicago consumers of scrap originating from railroads operating in Chicago to pay as much as 84 cents per gross ton in switching charges above the maximum prices set up for scrap from this source.



New Gage Plant Quadruples Greenfield's Output of Essential Defense Tools

■ NEW manufacturing facilities recently completed by Greenfield Tap & Die Corp., Greenfield, Mass., will more than quadruple the company's gage output and will permit a closer accuracy control despite increased quantity and speed of production.

Ground for the new plant was broken late in November, 1940, and by April 15 equipment was being moved into the building. The brick structure is 80 x 200 feet, windowless, and was erected by E. J. Pinney Co., Holyoke, Mass., from plans by McClintock & Craig, Springfield, Mass.

Special attention was paid to temperature and humidity control and the elimination of dust. The main factory air conditioning system consists of fans, filters, heating and cooling coil assemblies, automatically controlled. Variation of temperature is slight.

The final inspection room on the second floor is separately air conditioned and here is maintained a 68-degree Fahr. temperature with 50 per cent relative humidity constantly.

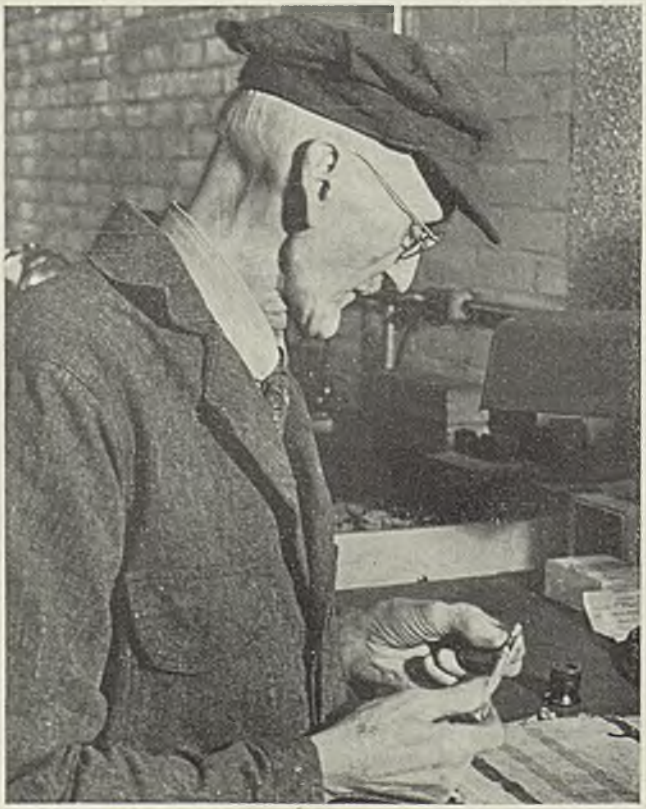
Fluorescent lighting has been installed; average intensity of 25 foot candles is maintained throughout, with intensities up to 65 foot candles on equipment and at final inspection.

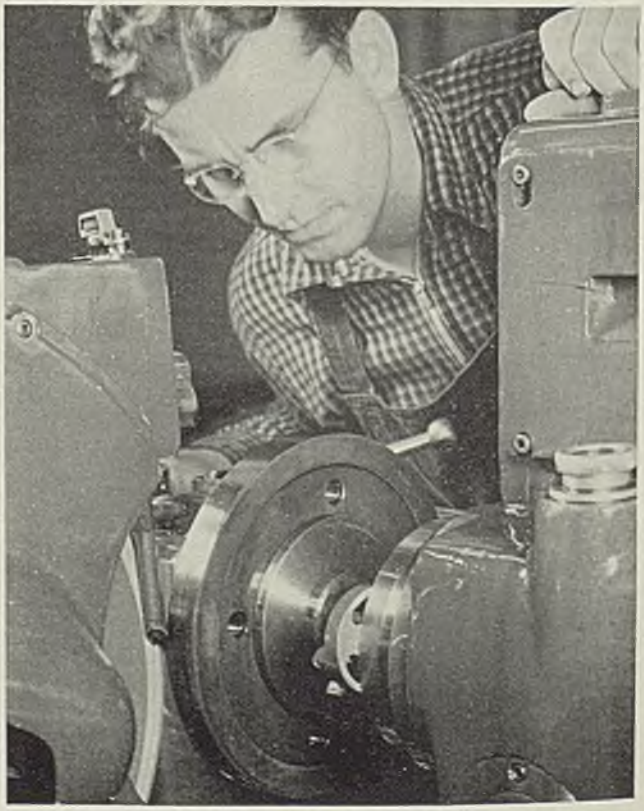
Many new tools and other manufacturing equipment have been procured to increase both speed and accuracy of production. Batteries of new thread grinding machines with a wide range of capacities have been installed. New lapping equipment is in place and heat treating facilities have been enlarged and improved. Inspection equipment includes the most modern, rapid and accurate mechanical and optical devices available.

Careful flow chart analysis of product movement, both for the new building, where all finishing operations after heat treating are concentrated, and for the starting or "soft" operations, governed the layout of the plant.

♦

■ **At top of page, the new plant. Harry Kellogg, veteran gagemaker now past his eightieth year, left below, made the first commercial gages produced by Greenfield Tap & Die Corp. 31 years ago. Recently he produced the first to be made in the new plant, presented them to Gen. C. M. Barnes of the United States Army ordnance office. Right, an operator grinds threads on a 10-inch plug gage**





Defense Contracts Awarded by War Department Total $32,660,231

■ DEFENSE contracts last week reported awarded by the War Department totaled $32,660,231. Quartermaster and engineers corps awards were more numerous than in recent weeks. Ordnance department purchases also were heavy. Aircraft and aircraft parts awards, for the first time in many weeks, were small and few. Among contracts reported by the War Department in the week were:

Kelsey-Hayes Wheel Co., Detroit, $5,800,000 Defense Plant Corp. agreement for construction and equipping of a machine gun plant at Detroit.

Lockheed Aircraft Corp., Burbank, Calif., airplanes and spare parts, $777,831.

Moser Jewel Co., Perth Amboy, N. J., $37,345 Defense Plant Corp. agreement for equipment and construction at its aircraft parts plant.

Reynolds Metals Co., Louisville, Ky., supplemental agreement of lease with Defense Plant Corp. for additional plant facilities and equipment for manufacture of aircraft supplies and equipment. Value of additional facilities is $415,970, making total financed by the Defense Plant Corp. $2,920,581.

Wyman-Gordon Co., Worcester, Mass., $2,046,845 Defense Plant Corp. agreement; $1,629,745 of this will be used for aircraft forgings equipment at the company's Harvey, Ill., plant.

Ordnance Department Awards

American Car & Foundry Co., Berwick, Pa., idlers, $6875.

American Cutter & Engineering Co., Detroit, head punches, $2160.

American Smelting & Refining Co., Federated Metals Division, Whiting, Ind., antifriction metals, $1005.60.

Baird Machine Co., Bridgeport, Conn., tools and machinery, $5646.

Baldwin Locomotive Works, Baldwin-Southwark Division, Philadelphia, fatigue testing machine, $1120.

Barbour-Stockwell Co., Cambridge, Mass., cast iron, $1184.77.

Barclay White Co., Philadelphia, erect elevator shaft and install elevator, $19,387.

Barker Tool Die & Gauge Co., Detroit, gages, $21,080.

Becker, Christian, Inc., New York, weighing equipment, $1377.90.

Bethlehem Steel Co., Bethlehem, Pa., forging breech rings, $44,950.

Bliss, E. W., Co., Brooklyn, N. Y., vertical presses, $9136.

Buckeye Traction Ditcher Co., Findlay, O., parts for tractors, $17,807.

Buda Co., Harvey, Ill., parts for tanks, $58,020.40.

Braeburn Alloy Steel Corp., Braeburn, Pa., high speed tool bits, $1045.

Bridge Tool & Die Works, Philadelphia, carrier plates, $4920.

Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $23,194.04.

Carpenter Steel Co., Philadelphia, high speed dies and steel, $1160.33.

Cincinnati Milling Machine Co., Cincinnati, grinders, cutters, tools, $5877.06.

Continental Motors Corp., Detroit, radial engines, $101,881.

Continental Roll & Steel Foundry Co., East Chicago, Ind., steel castings, $1107.60.

Crucible Steel Co. of America, Pittsburgh, steel, $2022.49.

Dempster Bros. Inc., Knoxville, Tenn., hoisting units with detachable buckets, $4709.30.

Detroit Seamless Steel Tubes Co., Dearborn, Mich., seamless steel tubing, $1998.72.

Dravo Corp., Philadelphia, pumps, $2891.

Felt & Tarrant Mfg. Co., Boston, comptometers, $1755.

Firth-Sterling Steel Co., Philadelphia, trimming and burring tools, $1548.

Fischer Spring Co., Brooklyn, N. Y., rifle extractors, $142,000.

Gilbert & Barker Mfg. Co., West Springfield, Mass., thumb screws, $2334.36.

Globe Sales & Mfg. Co., New York, bandoleers, $7399.70.

Goddard & Goddard Co. Inc., Detroit, cutters, $1186.64.

Great Lakes Steel Corp., Ecorse, Detroit, Mich., plate steel, $4229.88.

Hampden Electric Supply Co., Springfield, Mass., equipment, $1122.

Hendey Machine Co., Torrington, Conn., motor driven shapers, $2770.

International Engineering Works, Framingham, Mass., steel plate stampings, steel punchings, $18,403.20.

Kent Aircraft & Machine Tool Co., Camden, N. J., gages, $13,434.75.

Krueger, H. R., & Co., Detroit, chambering machines, fixtures, $46,135.

Lindberg Engineering Co., Chicago, furnaces, $13,640.

Lukens Steel Co., Coatesville, Pa., parts for top carriage on gun mounts and steel stampings, $58,073.45.

Midvale Co., Nicetown, Philadelphia, tube forgings, $3776.64.

National Cash Register Co., Dayton, O., fuzes, $268,180.

New York Thread Grinding Corp., New York, gages, $1500.

Otis Steel Co., Cleveland, steel, $11,254.93.

Quality Tool & Die Co., Indianapolis, gages, $1688.

Reliable Tool Co., Irvington, N. J., tools, $31,375.25.

Remington Arms Co. Inc., Bridgeport, Conn., cartridges, $349,432.70.

Revere Copper & Brass Inc., Chicago, naval brass and manganese bronze, $1655.43.

Riverside Metal Co., Riverside, N. J., nickel-silver strip, $1178.12.

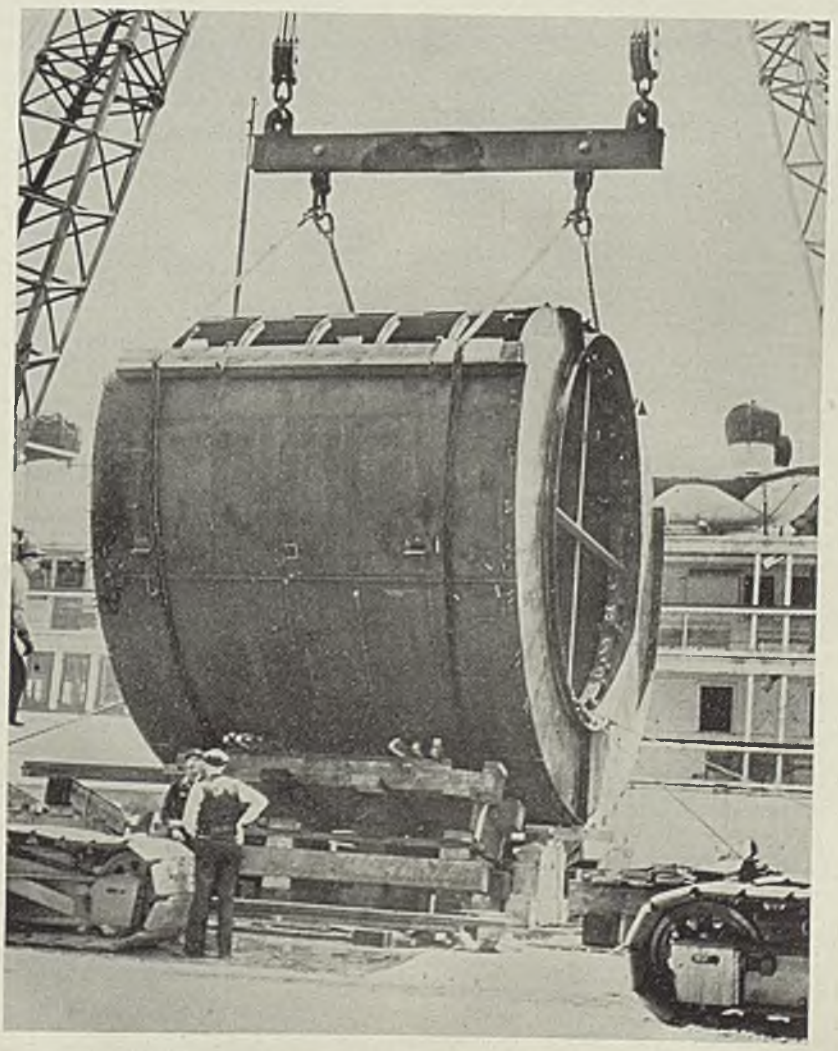
Rock Island Metal Foundry Co., Rock Island, Ill., bronze castings, $2992.80.

Union Spring & Mfg. Co., New Kensington, Pa., support assemblies, $1275

Union Twist Drill Co., Athol, Mass., cutters, $6099.08.

Vickers Inc., Waterbury Tool Division,

Building Submarine in Wisconsin



■ This center section of a submarine for the United States navy was placed recently on launching ways of a shipbuilding yard in Manitowoc, Wis. Eleven other prefabricated sections will complete the shell. As reported in STEEEL, June 23, p. 29, it is the first submarine to be built on the Great Lakes. NEA photo

Waterbury, Conn., parts for speed gears, $3004.50.
Wilson Mechanical Instrument Co. Inc., New York, testers and equipment, $1300.
Wollaston Brass & Aluminum Foundry, North Quincy, Mass., bronze castings, $3712.
Worthington Pump & Machinery Corp., Holyoke, Mass., air compressors, $8316.

Coast Artillery Corps Awards

Okonite Co., Passaic, N. J., lighting and power cable, $2327.10.
Witte Engine Works, Kansas City, Mo., generating sets, $7443.50.

Chemical Warfare Service Awards

Eureka Vacuum Cleaner Co., Detroit, brass eyerings, $34,700.
National Stamping Co., Detroit, diaphragm angletubes, $30,500.
United Carr Fastener Corp., Cambridge, Mass., clinch plates, sockets, studs, washers and clips, $56,399.97.

Engineers Corps Awards

Acme Electric Welder Co., Huntington Park, Calif., steel spot welders, aircraft assembly plant, Kansas City, Kans., $2524.
Aqua Systems Inc., New York, gasoline dispensing system, air base, Charlotte, N. C., $64,137.
Aves, Arthur A., Yakima, Wash., millwork, $3760.55.
Bartells, E. J., Co., Seattle, pipe and fittings, $9475.88.
Belmont Iron Works, Eddystone, Pa., structural steel, military airfield, Windsor Locks, Conn., $2250.
Blair, Algernon, Montgomery, Ala., warehouses, Brookley field, Mobile, Ala., $267,485.
Carrington, Glenn, & Co., Seattle, power units, $2200.
Casson, J. A., Co., Hayward, Calif., landing strip, Bakersfield municipal airport, Bakersfield, Calif., $172,986.
Chase Pump & Equipment Co., Providence, R. I., centrifugal pump, $521.04.
Chrysler Corp., Fargo Motor Corp. Division, Detroit, four-door sedans, $5145.
Cleveland Twist Drill Co., Cleveland, detonating cord drills, $7743.
Columbia Equipment Co., Seattle, wire rope, $8202.50.
Crane Co., Seattle, pipe and fittings, $4227.03.
Crown Iron Works Co., Minneapolis, ponton sets, $237,168.
Dickie Construction Co., St. Louis, cold storage building, Jefferson barracks, St. Louis, $108,860.
Dietzgen, Eugene Co. Inc., Chicago, engineers' transits, $108,267.50.
Doermann - Roehrer Co., Youngstown, O., black pipe, Patterson field, Ohio, $3424.54.
Early, Fred J., Jr. Co., San Francisco, sewage disposal plant, Bakersfield flying field, California, $60,637; sewage disposal plant, Fresno air base, California, $47,731.
Evans, George H., & Co., Philadelphia, hangar and boiler house, Harrisburg municipal airport, New County, Pa., $99,165.
Fate-Root-Heath Co., Plymouth, O., locomotives, $31,358.
Fisher Contracting Co., Phoenix, Ariz., airport lighting system, Ajo municipal airport, Arizona, $21,495; airport lighting system, Winslow airport, Arizona, $14,340.
Flotation Systems Inc., Los Angeles, gasoline fueling system, New Orleans Municipal airport, Louisiana, $138,750.
Gayle Bros., Houston, Tex., sewage treatment plant, Brooks field, San Antonio, Tex., $66,750.
General American Transportation Corp., Chicago, railroad tank cars, $9068.
General Electric Supply Corp., Washington, cables and cable terminals, $8062.33.
Graybar Electric Co., Occidental & King, Seattle, electrical materials, $5775.90.
Greene-Winkler Co., Seattle, kitchen equipment, Snohomish county airport, Everett, Wash., $2404.11.
Hall, E. C., Co., Eugene, Oreg., roadbed and masonry for relocated Oregon Pacific & Eastern railway, Dorena reservoir, Lane county, Oregon, $142,906.
Harnischfeger Corp., Milwaukee, trench machine, Jefferson barracks, Missouri, $2500.
Harris Seybold Potter Co., Cleveland, rotary press, $4040.
Hill & Combs, San Antonio, Tex., buildings, San Angelo flying field, San Angelo, Tex., $263,500.
Honeycutt, A. J., Co. Inc., Birmingham, Ala., control tower, Gunter field, municipal airport, Montgomery, Ala., $10,500.
Independent Concrete Pipe Corp. Inc., St. Louis, pipe and fittings, Jefferson barracks, Missouri, $7027.
Kiewit, Peter, Sons' Co., Omaha, Nebr., airport improvements, Billings municipal airport, Montana, $148,768.10.
Leschen, A., & Sons Rope Co., Seattle, wire rope, $3414.
Ley Construction Co., Springfield, Mass., air corps fueling system, Windsor Locks airfield, Connecticut, $120,800.
Lyon Metal Products Inc., Aurora, Ill., shelving units in depot supply buildings, Hill field, Ogden, Utah, $225,619.62.
McGowin-Lyons Hardware & Supply Co., Mobile, Ala., cast iron pipe, Brookley field, Mobile, $2319.90.
Means Construction Co., Jacksonville, Fla., radio and operations building, municipal airport, Jacksonville, $6920.
Missouri-Kansas Texas Railroad Co., Dallas, Tex., service railroad, aviation mechanics' school, Wichita Falls, Tex., $67,840.58.
New England Bolt Co. Inc., Everett, Mass., bolts, anchor and pipe sleeves, Ft. Story, Virginia, $3276.
Paving Supply & Equipment Co., Washington, gasoline engine driven shovels, $11,750.
Ply Weld Inc., Marblehead, Mass., ramps and trestle fittings, $2736.80.
Raney Chevrolet Co., Wilmington, N. C., trucks, $1575.
Ritter Bros., Harrisburg, Pa., engine storage warehouse, Middletown air depot, Pa., $258,356.
Roy, J. G., & Sons Co., Springfield, Mass., sewage treatment plant, Westover field, Chicopee Falls, Mass., $56,399.
Sciaky Corp., Chicago, aluminum welding machines and rectifiers, aircraft assembly plant, Kansas City, Kans., $30,740.
Seattle Steel Co. Inc., Seattle, structural steel, $4792.27.
Smith & Pew Construction Co., Atlanta, Ga., temporary housing, Candler field, Atlanta municipal airport, Georgia, $107,668.
Snyder Construction Co., Vincennes, Ind., levee embankment pumping plant building, drainage structure, electric transmission line; Brevoort levee unit, Knox county, Indiana, $164,000.
Star Machinery Co., Seattle, stiffleg derrick and hoist, $10,301.04.
Teichert, A., & Son Inc., Sacramento, Calif., street extensions, McClellan field, Sacramento, $39,360.
Tidwell, H. K., Bossier City, La., control towers, Barksdale field, Shreveport, La., $6250.
Tucson Gas, Electric Light & Power Co., Tucson, Ariz., electric distribution system, Tucson municipal airport, Arizona, $55,616.50.
Vinson & Pringle, Phoenix, Ariz., water supply system, Las Vegas airport, Nevada, $99,904.98.
Wattson, R. A., Co., Los Angeles, airport lighting system, Arizona state airport, Valle, Ariz., $19,000.
Welsbach Sales Co. Inc., Cincinnati, electrical equipment, Patterson field, Ohio, $40,052.
Western Machine Tool Works, Holland, Mich., radial drills, $9476.
Westinghouse Electric Supply Co., Seattle, electric lighting fixtures, $2322.25.
Wickes Boiler Co., Saginaw, Mich., install steam generating units in the addition to central heating plant, Patterson field, Ohio, $192,170.
Ziebarth, Fritz, Long Beach, Calif., lighting system, Tucson municipal airport No. 2, Arizona, $22,980.

Quartermaster Corps Awards

Angelle, Robert, Breaux Bridge, La., 170-man mess hall, three 63-man barracks recreation building, storehouse, two hospital officers' and nurses quarters and hospital mess, Camp Livingston, Louisiana, $65,983.
Atlantic Products Corp., Trenton, N. J., canteen covers, $50,000.
Atlas Mfg. Co., New York, canteen covers, $42,800.
Avildson, Clarence, trading as Republic Drill & Tool Co., Chicago, twist drills, $299,942.67.
Barnes, James I., Construction Co., Santa Monica, Calif., clothing renovating plant, power house, pump house, and transformer station, Utah general depot, Utah, $368,500.
Bath, John, & Co. Inc., Worcester, Mass., high speed taps, $1089.12.
Bell Aircraft Corp., Buffalo, gun mount adapters, $35,625.
Bendix Aviation Corp., Bendix, N. J., compass, starter and switch assemblies, $219,619.50; Bendix Products Division, South Bend, Ind., hydraulic gun charging cylinders and valves, $179,250.
Bergesen, Sam, South Tacoma, Wash., two incinerators, sanitary sewerage system, water supply system, Ft. Lewis, Washington, $40,500.
Berntson, John, Salt Lake City, Utah, 600,000-gallon concrete reservoir, Ogden ordnance depot, Utah, $24,456.
Brown Instruments Co., Minneapolis, control valves, $1770.
Buffalo-Springfield Roller Co., Springfield, O., road rollers, $216,524.
Burkes Bros., New Orleans, seven ordnance warehouses, ordnance repair shop and boiler house, Camp Shelby, Mississippi, $93,624.
Caterpillar Tractor Co., Peoria, Ill., tractors, $50,410.
Central Engineering Co., Davenport, Iowa, paving of Rodman avenue at Rock Island arsenal, Rock Island, Ill., $137,238.20.
Chapman, J. T., & Sons, Sulphur, Okla., six regimental chapels, Ft. Sill, Oklahoma, $102,120.
Cleveland Twist Drill Co., Cleveland, cutting tools, $1379.04.
Crescent Stove Works, William R. Bootz, successor, Evansville, Ind., fire units for field ranges, $812.70.
Cumina Building & Construction Co., New Brunswick, N. J., administration building and guard house, Raritan arsenal, Metuchen, N. J., $146,091.
Denison Engineering Co., Columbus, O., spark plug testers, $137,519.
Electro Dynamic Works, Bayonne, N. J., electric motors and starting equipment, $15,234.04.
Freemen, Jesse H., Moline, Ill., 20-foot concrete road, Savanna ordnance depot proving ground, Illinois, $39,770.
Fruehauf Trailer Co., Detroit, semitrailers, $150,062.22.
Gray, George W., Lubbock, Tex., two barracks buildings, Camp Barkeley, Abilene, Tex., $14,880.
Harmon Construction Co., Oklahoma City, Okla., cold storage plant, Ft. Sill, Oklahoma, $95,737.
Hershson, Harry, Co. Inc., New York, two warehouses, Delaware ordnance depot, Pedricktown, N. J., $103,887.
Holm-Page Co., Rockford, Ill., guard house, regimental chapels, Camp Grant, Illinois, $93,630.
Ideal Electric & Mfg. Co., Mansfield, O., primary cubicles, $58,932.
Illinois Gage Co., Chicago, gages, $3842.
Johnson, J. F., & Co., Philadelphia, punches, $7115.
Jones & Lamson Machine Co., Springfield, Vt., cams, $6854.
Jones, R. J., Pineville, La., four barracks buildings, Camp Claiborne, Louisiana, $39,936.96.
Kirk & Blum Mfg. Co., Cincinnati, water heater case, $184.80.
LaPointe Machine Tool Co., Hudson,

Mass., broaching machines, $35,973.50.
Lite Mfg. Co., New York, target assemblies, $98,380.
Manhattan Construction Co., Muskogee, Okla., inert materials warehouse, Savanna ordnance depot proving ground, Illinois, $132,440.
McCrosky Tool Corp., Meadville, Pa., shell end mills, $1435.50.
Metal & Thermit Corp., New York, welding electrodes, $11,200.
Milliment, M., & Associates, New York, service club, Ft. Eustis, Virginia, $16,600.
Minton, R. J., Construction Co., Orinda, Calif., identification building and mess hall, Ft. Mason, California, $12,590.
Moore & Roberts, San Francisco, steel building, Benicia arsenal, California, $27,667; 63-man barracks, Benicia ordnance depot, California, $8787.
Morton Mfg. Co., Muskegon Heights, Mich., milling machines, $83,500.
North Star Specialty Mfg. Co., Minneapolis, food containers, $850.
Norton Co., Worcester, Mass., grinding wheels, $1083.69.
Ogden Cache Electric Co., Ogden, Utah, installation of electrical distribution system, Utah general depot, Ogden, Utah, $85,381.
Onsrud Machine Works Inc., Chicago, milling machines, $2979.
Owen Ames Kimball Co., Grand Rapids, Mich., added reception center facilities, ordnance facilities, detention ward, radio building, and hospital barracks, Ft. Custer, Michigan, $513,750.
Prentiss, Henry, & Co. Inc., Boston, grinders, cutters and tools, $1702.
Reynolds Metals Co., Louisville, Ky., aluminum alloy, $292,856.98.
Ritter Bros., Harrisburg, Pa., chapel, Carlisle barracks, Pennsylvania, $19,228.
Santucci Construction Co., Skokie, Ill., sewage treatment plant, Ft. Sheridan, Illinois, $89,920.
Scott, Palmer & Co., New Bedford, Mass., diesel motor launches, $21,000.
Seifreat-Elstad Machinery Co., Dayton, O., tinners' equipment, $54,412.50.
SKF Industries Inc., Philadelphia, spherical rollers, $2785.72.
Southeastern Mfg. Co., Tuscaloosa, Ala., six barracks buildings, Camp Shelby, Mississippi, $42,390.
Square D Co., Kollsman Instrument Division, Elmhurst, N. Y., altimeter assemblies, $113,700.
Standard Pressed Steel Co., Jenkintown, Pa., work benches, $50,267.60.
Sullivan & Cozart, Louisville, Ky., nine regiment chapels, Ft. Knox, Kentucky, $173,626.
Threadwell Tap & Die Co., Greenfield, Mass., rifling tools, $2000.
Titeflex Metal Hose Co., Newark, N. J., manifold and lead assemblies, $84,270.
Unicon Co., Kansas City, Mo., transportable base photographic laboratories, $139,675.
Universal Construction Co., Kansas City, Mo., clothing renovation plant, quartermaster depot, Kansas City, Mo., $347,900.
Van Range, John, Co., Cincinnati, stainless steel pans, $672.
Vascoloy-Ramet Corp., Union City, N. J., dies and tools, $1877.58.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., vertical, bullet assembly gaging and weighing machines, $45,200.
West Coast Construction Co., Seattle, water main, Ft. Lewis, Washington, $17,000.
Wheeling Corrugating Co., Louisville, Ky., shields and waterheater case, $105.
Wiedemann Machine Co., Philadelphia, gages, $21,607.50.
Williams Lumber Co., Columbus, Ga., fourteen miscellaneous buildings, Benning, Ga., $90,135.
Yarbrough, S. O., & George T. Reinhardt, Austin, Tex., 124 day rooms, nine regimental chapels, Camp Barkeley, Abilene, Tex., $335,455.

Cast Steel Hull, Turret Feature Canada's New 28-Ton Cruiser Tank

TORONTO, ONT.

■ FIRST Canadian-made cruiser tank, a 28-ton model known as M.3, will run off the line at Montreal Locomotive Works, Montreal, Que., June 30, according to C. D. Howe, minister of munitions and supply.

United States ordnance officials, to whom the first tanks of this type will be shipped, are waiting to check Canadian improvements, said to make the new tanks more efficient, and faster to build than any unit formerly produced in North America or Great Britain.

Canada's version has already been adopted by Great Britain, and much interest in the new design has been indicated in the United States.

From the waist down the M.3 cruiser tank is identical with units being produced by the American Locomotive Co., New York, but the turret, hull and heavy cannon mounting are decidedly different.

Both United States and British tank manufacturers have been riveting armor plate to make hulls and turrets. Canadian M.3 is cast steel, and has passed all tests.

Hull is a solid 10-ton piece of steel, welded to the tank frame. No rivets are employed. Turret also is solid cast steel. Heaviest gun is mounted in the turret instead of in a fixed position at the side, making it possible to fire in any direction without turning the tank. Unit is designed especially to fit mass production methods, and has been selected for volume output. Casting of the hull in a solid piece, it was learned, not only provided for faster construction but produced a unit stronger than was obtainable through riveting or welding.

When engineers of the three countries started work on the new model, it was agreed to standardize certain features. Engines, differentials, bottom armor plate against land mines are the same. Endless caterpillar chain, it is reported, so evenly distributes the 28 tons that weight on the ground at any one spot is little greater than that of an average man walking.

British Requirements Different

For the upper works Canadian designers encountered gun mounting problems in meeting British army requirements, different from those of the United States. This started a divergence in design which was carried further when Canada turned to steel castings to speed production. The new tank is entirely North American standard as regards bolts, screws and the minute details which have caused difficulty in adapting production to British needs.

"Immediately" More, Aim for Airplanes

Plans have been completed for immediate expansion of Canada's airplane production. Contract for more than $25,000,000 has been placed with National Steel Car Corp. Ltd., Hamilton, Ont., for Martin B26 bombers, excluding engines, propellers and instruments. Planes will be built in the company's Malton, Ont., plant.

R. J. Magor, president, National Steel Car Corp., will be responsible for management and administration of the plant. Following labor troubles at the Hamilton plant the company's works there were placed under direction of a government representative.

Award of a $30,000,000 order for 4-motor Liberator bombers, to be manufactured at Canadian Car & Foundry Co.'s plant at Ft. William, Ont., is expected shortly.

Much more drastic restrictions on civilian use of commodities required for war are anticipated. Restrictions were published last week on installation of oil furnaces and similar equipment, leading to conservation of oil and gas, and gasless Sundays are impending.

Creighton & Smith Motors Ltd., Fredericton, N. B., have received a contract for production of $300,000 of practice shells for the Navy; John Meed & Son, Bristol, N. B., has been awarded an $80,000 order for mechanical machinery, also for the Navy. Creighton & Smith, it is reported, will take over the MacFarlane & Neil plant at North Devon, N. B., which has been shut down and will convert it into a machine shop for shell production.

Department of Munitions and Supply, in the week ended June 13, placed 2487 contracts with aggregate value of $10,098,494, including orders to United States companies totaling $141,582. The orders:

Shipbuilding: Canadian Car & Foundry Co. Ltd., Montreal, Que., $25,064; Canadian Power Boat Co. Ltd., Montreal, $6874; Keating Sons & Co., Montreal, $6342; Macdonald Bros. Aircraft Ltd., Ottawa, Ont., $51,737; Opsal Steel Co. Ltd., Vancouver, B. C. $5960.

Dockyard supplies: Robb Engineering Works Ltd., Amherst, N. S., $31,900;

Anglo-Canadian Wire Rope Co. Ltd., Montreal, $47,802; Drummond, McCall & Co. Ltd., Montreal, $9940.

Instruments: Dominion Electric Protection Co., Montreal, $15,450; Noorduyn Aviation Ltd., Montreal, $23,018; Ontario Hughes-Owens Co. Ltd., Ottawa, $6571; Ferranti Electric Ltd., Toronto, $13,944; Viceroy Mfg. Co. Ltd., Toronto, $104,138; Trans-Canada Air Lines Ltd., Winnipeg, Man., $48,600.

Land transport: Dunlop Tire & Rubber Goods Co. Ltd., Toronto, $24,743; Lubrication Equipment Co. Ltd., Toronto, $12,932; Massey-Harris Co. Ltd., Toronto, $35,724; Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto, Ont., $297,846; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $267,364; Brantford Coach & Body Ltd., Brantford, Ont., $118,805; Eastern Steel Products Ltd., Preston, Ont., $65,018.

Aircraft: Air Ministry, England, $2,139,000; Macdonald Bros. Aircraft Ltd., Ottawa, $51,397.

Electrical equipment: Silver's Agencies Ltd., Halifax, N. S., $7842; Aviation Electric Ltd., Montreal, $35,000; Canada Wire & Cable Co. Ltd., Toronto, $19,965; General Supply Co. of Canada Ltd., Ottawa, $6366; A. Sheppard, $8999; Canadian Telephones & Supplies Ltd., Toronto, $6696.

Machinery and tools: Harley-Kay Ltd., Georgetown, Ont., $32,760; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $10,288.

Ordnance: British Admiralty, England, $322,120; Electrical Mfg. Co. Ltd., Montmagny, Que., $14,240; Turnbull Elevator Co. Ltd., Toronto, $28,358; Atlas Steels Ltd., Welland, Ont., $37,083; Hill-Clark-Francis Ltd., New Liskeard, Ont., $40,800.

Munitions: British Admiralty, England, $501,516.

Metals: Atlas Steels Ltd., Welland, $45,208.

Miscellaneous: C.-O.-Two Fire Equipment of Canada Ltd., Toronto, $7445; Canada Block Co., St. Catharines, Ont., $6029; Aga Heat (Canada) Ltd., Toronto, $8987; James W. Ross, Montreal, $60,000; Canadian Comstock Ltd., Toronto, $16,000; Frank E. Simmons, Winnipeg, Man., $37,000; Moncton Plumbing & Supply Co. Ltd., Moncton, N. B., $22,000.

War construction projects: Horton Steel Works, Toronto, construction of storage tanks at Dartmouth and Halifax, N. S., $50,000; Toronto Iron Works Ltd., Toronto, storage tanks at Shelbourne and Sydney, N. S., $65,000; Redfern Construction Co., addition to plant of Research Enterprise Ltd., Toronto, $70,000; Imperial Oil Co. Ltd., Ottawa, transfer and re-erection of steel tank at St. John, Newfoundland, $26,000; Bennett & White Construction Co., Calgary, Alta., building at Suffield, Alta., $220,000; M. F. Schurman Co., Summerside, P. E. I., air navigation school, Charlottetown, P. E. I., $225,000; New Brunswick Contractors Ltd., and Diamond Construction Co. Ltd., Fredericton, N. B., $449,010; A. Janin Building Co. Ltd., Montreal, $250,000.

■ Export to Great Britain and Canada of construction and conveying machinery, and mining, well and pumping equipment, was approved late last week by the State department. General licenses covering these products were issued to collectors of customs. At the same time the department removed individual license requirements for shipments of barbed and twisted wire and woven wire fencing to Argentina, Brazil and Cuba.

Contracts Signed for Ford Airplane Assembly Plant

■ Defense Plant Corp., Loan Administrator Jesse Jones reported last week, will build and equip an airplane manufacturing plant at Ypsilanti, Mich., for the Ford Motor Co. at a total cost of $47,620,171. Contracts were signed on Thursday.

Approximately 25,000 tons of structural steel will be required for the building. Guesses at to eventual employment run all the way up to 50,000.

Negotiations with the Tennessee Copper Co., New York, for operation of a $2,375,000 government-owned oleum plant to be built at Copperhill, Tenn., were reported also by the War Department.

Other agreements announced by the Defense Plant Corp. included: Radio parts plant at Latrobe, Pa., for Stupakoff Ceramic & Mfg. Co., to cost $320,699; machinery and equipment for production of machine tools, Lees-Bradner Co., Cleveland, $281,499.

Reconstruction Finance Corp., said Mr. Jones, has loaned $47,736 to Stacey Mfg. Co., Cincinnati.

Additional Arsenal Expansions Authorized

■ Defense projects approved and authorized by the War Department last week included: Expansion of the Centrifugal Casting Plant, Watertown Arsenal, Watertown, Conn., $3,795,134. Major portion of fund is for machine tools and accessories to increase production of gun tube castings.

Construction of storehouse at Erie Proving Ground, Lacarne, O., $2,275,000.

Storage and assembly building at Aberdeen Proving Ground, Aberdeen, Md., $425,000, to be used in assembling and storing materiel.

Optical shop expansion at Frankford Arsenal, Philadelphia, $1,020,000 for complete operating unit to manufacture optical equipment for fire control instruments.

Overseas discharge and replacement depot, Ft. Lawton, Washington, $926,350, including barracks buildings, administration, storeroom, mess and other units.

Honor 25-Year Employes

■ Five employes of Keystone Steel & Wire Co., Peoria, Ill., were honored at the annual dinner of the Keystone 25-Year Club, in Hotel Pere Marquette last week by officers and directors of the company. Each year employes who have been with the company 25 years or more become eligible for membership into the club. Total membership now is 67. W. H. Sommer, president of Keystone, presented the new members.

Lessons in Wire at the University

■ Placing barbed wire entanglements quickly and effectively calls for preliminary study and practice. Members of the Canadian Officers' Training Corps of McGill University, Montreal, here are receiving instructions by means of diagrams and specimen loops and splices. NEA photo passed by censor

Steel Exports Increase in April; Four Months' Total Up 31 Per Cent

■ EXPORTS and imports of steel and iron products, other than scrap, increased in April, according to the durable materials unit of the Bureau of Foreign and Domestic Commerce. Exports were 515,657 gross tons, compared with 512,844 tons in March. This was the first gain in exports since the record month of August, 1940. April imports were 1526 tons, compared with 872 tons in March.

Cumulative exports for four months were 2,208,161 tons, 31 per cent above 1,676,910 tons exported in the first four months of 1940. Cumulative imports show an opposite situation, with 3450 tons imported in four months this year, only 13.5 per cent of the 25,558 tons received in the comparable 1940 period.

Pig iron was the leading item in point of tonnage, April exports being 86,749 tons, more than three times the 27,464 tons shipped in March. Nonalloy steel ingots, blooms, etc., were second in volume, though involving only 72,734 tons, in contrast to 124,956 tons in March.

April scrap exports rose sharply to 120,152 tons, more than double the 54,383 tons exported in March. In four months scrap exports totaled only 293,968 tons, against 850,253 tons in the comparable 1940 period. Scrap imports in April were 1094 tons, compared with 5401 tons in March. Total scrap imports in four months were 6662 tons, against 1226 tons in the corresponding period last year.

■ Steelworks and rolling mills continue to lead all other industries in the Chicago district, the Illinois Manufacturers' Association reports, based on 1939 Census of Manufactures. Value of the products was $449,199,389, even before the stimulus was given by war orders. Meat packing was No. 2 at $389,983,359.

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Apr. 1941	Apr. 1940	Jan. through April 1941
Pig iron	86,749	14,685	241,378
Ferromanganese and spiegeleisen	518	111	1,633
Other ferroalloys	2,835	312	9,578
Ingots, blooms, etc.:			
Not containing alloy	72,734	79,551	514,225
Alloy, incl. stainless	38,287	553	167,993
Steel bars, cold fin.	8,634	4,050	51,161
Bars iron	304	251	1,442
Bars, concrete	21,766	9,090	58,467
Other steel bars:			
Not containing alloy	21,066	29,364	81,102
Stainless steel	47	137	249
Alloy, not stainless	8,592	3,176	22,114
Wire rods	9,894	15,516	44,525
Boiler plate	1,809	940	15,032
Other plates, not fab.:			
Not containing alloy	34,320	39,394	142,319
Stainless steel	3	40	143
Alloy, not stainless	328	219	1,471
Skelp iron or steel	14,260	989	51,570
Sheets, galv. iron	339	412	4,345
Sheets, galv. steel	8,934	13,600	35,355
Sheets, "black" steel:			
Not containing alloy	29,300	32,573	135,678
Stainless steel	100	198	395
Alloy, not stainless	1,798	1,098	3,658
Sheets, black iron	1,444	1,624	3,992
Strip steel, cold-rolled:			
Not containing alloy	3,666	2,906	19,641
Stainless steel	32	54	162
Alloy, not stainless	49	56	206
Strip steel, hot-rolled:			
Not containing alloy	6,619	9,816	33,515
Stainless steel	5	20	23
Alloy, not stainless	38	52	183
Tin plate, taggers' tin	23,310	32,306	66,388
Terneplate (incl. long ternes)	658	159	2,916
Tanks, except lined	1,312	4,299	8,741
Shapes, not fabricated	14,287	19,864	109,031
Shapes, fabricated	3,573	3,873	22,838
Plates, fabricated	2,241	692	11,967
Metal lath	190	84	646
Frames and sashes	72	106	663
Sheet piling	649	534	3,452
Rails, 60 lbs.	6,070	1,828	42,364
Rails, under 60 lbs.	2,142	2,160	17,003
Rails, relaying	354	1,708	3,054
Rail fastenings	1,513	400	7,911
Switches, frogs, crsgs.	94	189	721
Railroad spikes	747	273	2,683
R. R. bolts, nuts, etc.	141	71	621
Boiler tubes, seamless	6,056	1,658	17,738
Boiler tubes, welded	65	248	643
Pipe:			
Seamless casing and oil-line	7,161	11,313	21,966
Do., welded	3,105	5,153	5,811
Seamless black	3,878	1,011	9,883
Pipe fittings			
Mall.-iron screwed	399	436	1,639
Cast-iron screwed	89	198	358
Pipe and fittings for:			
Cast-iron pressure	5,839	1,746	15,378
Cast-iron soil	685	1,020	4,221
Pipe, welded:			
Black steel	6,349	2,347	17,614
Black wrought-iron	96	663	1,379
Galvanized steel	8,734	4,171	24,479
Galv. wrought-iron	376	515	1,954
All other pipe, fittings	1,165	672	10,019
Wire:			
Plain iron or steel	5,781	6,470	21,492
Galvanized	5,987	5,304	20,000
Barbed	4,677	2,145	17,238
Woven-wire fencing	316	339	1,245
Woven-wire sc'n cloth:			
Insect	69	43	350
Other	254	182	849
Wire rope and cable	1,385	754	4,876
Wire strand	197	77	609
Electric welding rods	405	273	2,076
*Card clothing	.....	2	.....
Other wire	1,513	2,061	4,515
Wire nails	4,902	4,414	14,566
Horseshoe nails	250	102	841
Tacks	99	70	331
Other nails, staples	694	373	2,471
Ordinary bolts, machine screws	2,745	1,280	13,804
Castings:			
Gray-iron (incl. semisteel)	1,173	299	3,396
Malleable-iron	495	130	1,574
Steel, not alloy	298	104	979
Alloy steel, incl. stainless	129	50	421
Car wheels, tires, axles	1,790	1,704	5,096
Horseshoes and calks	92	38	229
Forgings, n.e.s.:			
Not containing alloy	5,177	2,008	13,424
Alloy incl. stainless	409	412	2,140
Total (gross tons)	515,657	389,118	2,208,161
Scrap, iron and steel:		218,778	
†No. 1 heavy melt.	25,863		70,506
†No. 2 heavy melt.	47,936		117,838
†Baled and bundled	13,662		22,351
†Cast and burnt	4,073		18,524
†Other	27,396		59,782

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1941		1940	
	Exports	Imports	Exports	Imports
Jan.	698,853	423	583,521	8,274
Feb.	600,240	796	671,301	6,740
Mar.	567,227	6,273	663,980	5,096
April	635,809	2,620	612,906	6,674
May	.....	.....	783,964	7,759
June	.....	.....	936,047	5,505
July	.....	.....	1,034,938	3,542
Aug.	.....	.....	1,402,075	2,105
Sept.	.....	.....	1,221,052	2,598
Oct.	.....	.....	1,105,510	3,966
Nov.	.....	.....	788,176	980
Dec.	.....	.....	805,158	4,064
Tot.	.....	.....	10,608,628	57,303

Articles	Apr. 1941	Apr. 1940	Jan. through April 1941
Scrap, tin plate	176	798	176
Tin plate circles, strips, cobbles, etc.	413	530	1,923
Waste-waste tin plate	613	748	2,596
Terneplate clippings and scrap	20	298	272
Total scrap	120,152	221,152	293,968
GRAND TOTAL	635,809	610,270	2,502,129
Iron ore	70,792	369	72,062

*Not separately classified after Dec. 31, 1940.
†New class.

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Apr. 1941	Apr. 1940	Jan. through April 1941
Pig iron	.....	286	.....
Sponge iron	.....	368	23
Ferromanganese (1)	10	1,408	21
*Spiegeleisen	.....	99	.....
Ferrochrome (2)	67	1	67
Ferrosilicon (3)	84	63	288
*Other ferroalloys	.....	26	.....
Steel ingots, blooms, etc.	.....	.....	.....
Billets, solid or hollow	.....	45	55
Concrete reinforc. bars	.....	.....	.....
Hollow bar, drill steel	46	183	126
Bars, solid or hollow	48	536	108
Iron slabs	.....	.....	.....
Iron bars	.....	31	15
Wire rods	4	1,382	91
Boiler and other plate (including skelp)	2	.....	6
Sheets, skelp, saw plate	13	8	17
Die blocks, blanks, etc.	.....	3	.....
Tin plate, taggers' tin and terneplate	12	11	38
Structural shapes	40	46	107
Rails and track material	405	13	633
Cast-iron pipe, fittings	.....	.....	.....
Other pipes, tubes	94	567	508
Cotton ties	.....	.....	.....
Other hoops and bands	.....	112	.....
Barbed wire	.....	44	.....
Round iron, steel wire	.....	277	24
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	672	392	1,121
Wire rope and strand	.....	60	71
Other wire	.....	.....	1
Nails, tacks, staples	4	17	11
Bolts, nuts, and rivets	.....	24	10
*Horse and mule shoes	.....	.....	.....
Castings and forgings	25	190	109
Total	1,526	6,192	3,450
Iron and steel scrap	1,094	482	6,662
GRAND TOTAL	2,620	6,674	10,112

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.
*No longer separately classified.

ASTM Studies Co-ordination of Specifications as Aid to Defense

CHICAGO

■ MEANS for facilitating the national defense program through co-ordination of industrial and federal materials specifications and through development of adequate substitutes for critical materials were given foremost attention at the forty-fourth annual meeting of the American Society for Testing Materials, at the Palmer House, June 23-27.

The society also followed customary procedure in reporting and approving desirable changes and advancements in standards and testing practices. The meeting was largely attended.

"In the existing national emergency and in the years ahead, the safety of this nation and the future success of our whole economic life will be determined by the work of the research scientist and the production engineer," said W. M. Barr, chief chemical and metallurgical engineer, Union Pacific railroad, Omaha, Nebr., in his presidential address.

"As they have served so invaluably in the past four decades, so now and in the years to come, the specifications and research work of the American Society for Testing Materials will have a prominent place in solving the many grave problems that will be encountered —problems that must be successfully solved if this nation and the American way of life are to survive."

Mr. Barr stated services of the society have been offered to the government, have already been accepted and are being used to advantage.

More Knowledge of Materials

A considerable portion of the annual report of the executive committee, presented by C. L. Warwick, secretary-treasurer of the society, Philadelphia, was devoted to the program being followed to give co-operation to the government.

"The nation engages upon the defense program far better prepared with respect to specifications than ever before," the report stated. "In the last two decades, research in industry, by the government, and in educational institutions and research foundations has brought forth a great fund of knowledge concerning materials and methods of determining their properties and evaluating their service characteristics. This knowledge has been systematically assembled and codified into the useful form of methods of testing and specifications.

"By providing a forum for co-operation of industry—both producer and consumer—government and the educational and general interest groups, our society has been able to formulate standard ASTM methods and specifications that represent accepted industrial practice in the production and utilization of the materials covered. In 1917 there were 133 ASTM specifications, methods and definitions; now there are 952, an increase of some seven-fold, which is one measure of the progress that has been made in this work.

"In this same period, the government has greatly improved the basis of its purchases by establishing the system of federal specifications and co-ordinating purchase requirements of various governmental departments through activities of the Federal Specifications Executive Committee and the Procurement Division, Treasury Department. There are now over 1300 federal specifications in addition to the hundreds of specifications of the Army and Navy covering materials primarily for military purposes. Thus, the government is well prepared with specifications upon which to base the procurement of defense material."

Executive committee of the organization "considers it of first importance that the society continue vigorously the development of its standards for materials, especially those of importance in national defense; that they be kept up to date, and especially so with respect to changes such as those brought about by scarcity of certain materials; and finally, that standards be issued promptly and brought directly to the attention of those both in industry and in government who are responsible for production and procurement of materials.

Continued Research Important

"Scarcely less important than standardization itself is continued research in materials, since such research provides knowledge required for efficient utilization of materials, and at the same time produces factual information needed to write useful specifications. Every effort will be made to carry this work forward as expeditiously as possible, despite the fact the essentially co-operative nature of ASTM research activities and its dependence largely upon industry for laboratory and other facilities may result in delays due to preoccupation of personnel because of production demands upon industry.

"It seems clear," the report continues, "that federal specification-writing activities will increase considerably as an outcome of stepped-up requirements for defense material. These activities will comprise new specifications, the revision of existing specifications, and frequently, in the interest of economy and facilitating procurement, the harmonizing of requirements of two or more specifications covering materials for substantially the same purpose.

"Wherever there are comparable ASTM specifications—and this is frequently the case—the knowledge and services of our committees can be used to bring about closer co-ordination already effected through membership of government departments and individuals connected therewith on ASTM committees and through joint activities with various government bureaus and laboratories will be most helpful.

"Even more direct co-operation is desirable, however, particularly in the early stages of specification writing. Through such co-operation it will be possible (1) greatly

G. E. F. Lundell

New Officers

President

G. E. F. Lundell, chief, chemistry division, National Bureau of Standards, Washington.

Vice President

Dean Harvey, materials engineer, engineering laboratories and standards department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Members of Executive Committee

A. W. Carpenter, manager, testing laboratories, B. F. Goodrich Co., Akron, O.

T. A. Fitch, director, Bureau of Standards, Los Angeles.

C. D. Hocker, plant products engineer, Bell Telephone Laboratories, New York.

J. L. Miner, director and vice president, Atlas Lumnite Cement Co., New York.

E. W. Upham, engineering department, Chrysler Corp., Detroit.

to facilitate inclusion of requirements in ASTM specifications to cover the needs of government procurement; (2) to inform federal specification committees of considerations underlying present requirements in ASTM specifications and of the status of new specification work in progress; and (3) in general to make available to them the wealth of information and data on specifications and tests in the hands of ASTM committees.

"Opportunity for such co-ordination will develop with respect to revisions of specifications required by the need to conserve certain strategic materials. Already the government, through the Federal Specifications Executive Committee, in collaboration with the Office of Production Management, is promulgating 'emergency alternate' specifications.

C. W. MacGregor
Awarded Charles B. Dudley Medal

"Under this plan, the federal specification itself is not changed; the alternate specification, which embodies provisions for conserving scarce materials called for in the standard, is intended for use by the various agencies of the government in all possible cases. The society, through its committees, is prepared to advise respecting such emergency modifications, and to consider temporary revisions in its own specifications designed to accomplish the same ends."

Organization and management of materials is the key to success in the defense effort, declared J. H. Van Deventer, president and editor, *The Iron Age,* New York, in addressing the opening session of the meeting on "Mobilizing Materials for Defense." Quantitative and qualitative control of industrial materials is more important than their applications, he declared.

Continuing, he said it is Hitler who is dictating our six-fold increase in machine tool production in the past five years, in increasing output of aluminum and, in fact, our whole defense program. Thus, our thinking must be a little better than his.

To produce 6000 bombers a year, the current program, will require 450,000 men, or more than are now employed in the automobile industry, Mr. Van Deventer said. The materials shortage will assert itself first in manpower, and second in horsepower. Branding the idea of a 10,000,000-ton increase in steel capacity as foolish, he pointed out that with steel it is not so much a matter of capacity as the ability to obtain the kind you want when you want it.

Concluding, he stated the shortage of materials will become most acute when the defense program gets into full swing in perhaps six months. Higher prices lie ahead—if not forced by higher wages, they will most certainly be forced by the necessity of permitting marginal plants to operate profitably.

Will Review Specifications

Reporting for committee E-10 on standards, its chairman, R. P. Anderson, sectional division of refining, American Petroleum Institute, New York, announced that the society at present has 581 standards and 371 tentative standards, making a total of 952. If recommendations made during the annual meeting are accepted, the total will become 1015.

Mr. Anderson said his committee and the executive committee have considered a suggestion that marking clauses in ASTM specifications should contain a requirement that materials or products covered therein be marked or tagged in some suitable manner to indicate conformity with specifications. This requirement is to provide identification of the material or product as furnished by the manufacturer in accordance with requirements of the specifications. The society is not in any sense certifying or guaranteeing compliance with these requirements; the latter remains as heretofore a matter entirely between the parties to the specification.

Standing committees have been requested to review specifications in their charge and to determine prior to the 1942 annual meeting whether marking requirements in accordance with this policy, if not already provided, shall be included; and if so, to include the necessary revisions in their 1942 reports.

During the first four days of the meeting the society conducted an exhibit of testing apparatus and related equipment, with 40 displays of testing equipment and laboratory supplies. Special educational displays were sponsored by several ASTM committees and a number of institutional and industrial research laboratories.

An adjacent area in the hall was set aside for the photographic exhibit and competition in which a large number of photographs related to "Materials, Testing and Research." A special section on photomicrography was developed by the society's committee E-4 on metallography.

Certificate commemorating 40 years' continuous service in the society was presented to C. N. Forrest, Barber Asphalt Co., Barber, N. J. Twenty-seven have been made since these awards were established three years ago.

At the conclusion of the opening session, newly elected officers, chosen by recent mail ballot and to assume office at the close of the annual meeting, were introduced.

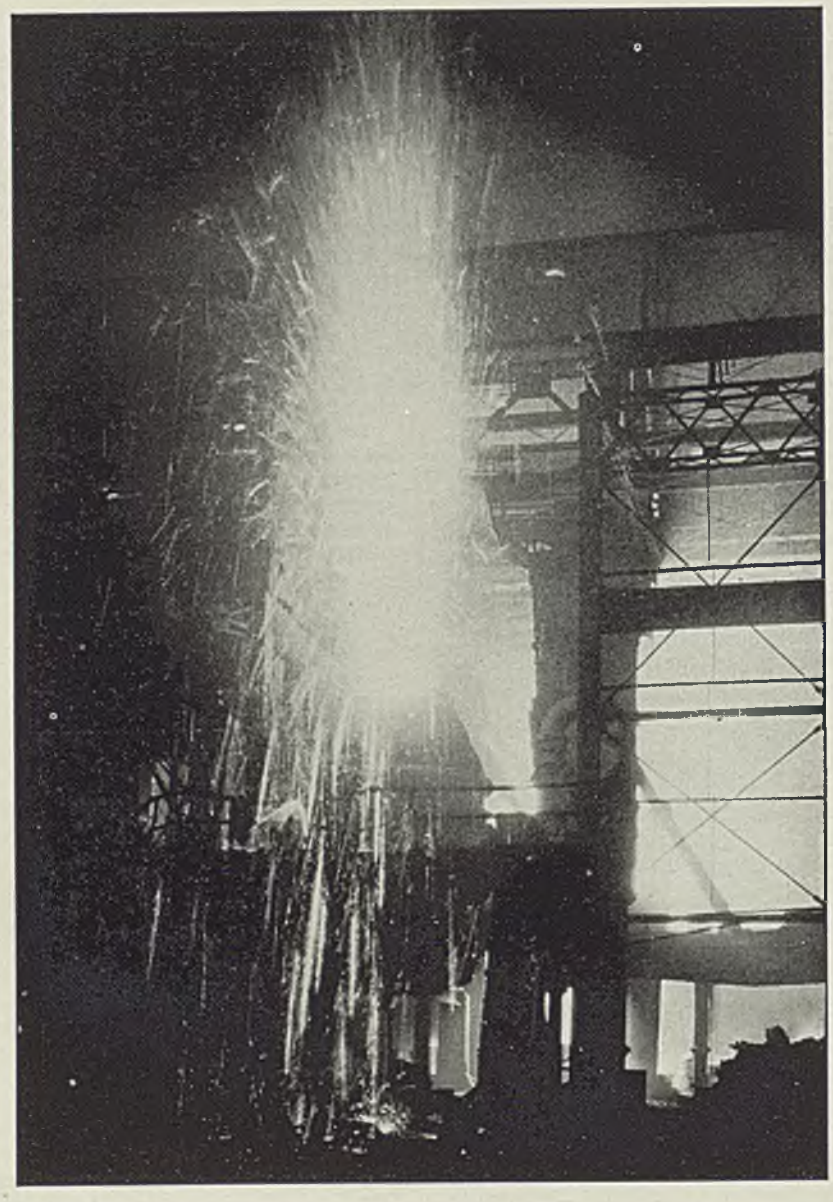
Secretary Warwick announced membership of the society on June 1 was 4470, an all-time high. Previous peak was 4449 in October, 1930. Net gain of 156 for the year compares with 115 in the preceding year and 43 two years ago.

H. L. Fisher
Marburg Lecturer

Announcement was made that the next year's spring meeting and group committee meetings will be held in Cleveland, March 2-6, and the annual meeting in Atlantic City, N. J., June 22-26.

Sixteenth Edgar Marburg lecture was presented June 25 by Dr. Harry L. Fisher, director of organic research, U. S. Industrial Chemicals Inc., Stamford, Conn. Subject was "Natural and Synthetic Rubbers."

At the conclusion of the lecture, the Charles B. Dudley medal, an annual award made to the author or authors of a paper of outstanding merit constituting an original contribution on research in engineering materials, was presented to C. W. MacGregor, associate professor of applied mechanics, Massachusetts Institute of Technology, Cambridge, Mass. The award was for Prof. MacGregor's paper "The Tension Test," presented at the 1940 annual meeting in Atlantic City.



July 4th, 1941: U. S. Bessemers Working at 75 Per Cent of Capacity

■ BESSEMER converters, representing 8.3 per cent of total steel producing capacity, have been used relatively little during recent years. Demands of the national defense program have brought an increase in bessemer operations, but still the nearly 7,000,000 net tons' capacity is being employed at only about 75 per cent.

In 1940 bessemer production totaled 3,708,573 tons, or 61.7 per cent of capacity. For the first five months this year, bessemer operations have averaged 74.8 per cent, or at an annual rate of 5,110,812 tons. Open hearth operations during the same period have been at 100 per cent. The lag in bessemer operations, according to Gano Dunn, former OPM steel consultant, is due to a lack of orders.

Before 1908, bessemer steel production accounted for more than half the total output. In that year, open hearth production forged into the lead and since has gained steadily and rapidly.

For most purposes open hearth steel is superior, but for many uses requiring large tonnages, such as reinforcing bars, blacksmith supplies, corrugated building sidings, barbed wire, nails and low-grade pipe, bessemer is equally good. For some grades of pipe it is considered superior because of ease of threading.

Extension of the allocation system is expected to result in a fuller utilization of bessemer capacity for those needs for which it is best adaptable. Accompanying display of pyrotechnics shows a converter blowing. Photo, courtesy, Youngstown Sheet & Tube Co.

Wean Acquires Control of Broden Construction Co.

■ Wean Engineering Co. Inc., Warren, O., has purchased a controlling interest in Broden Construction Co., Cleveland, designers and manufacturers of wire and strip mill machinery. Broden will be operated as a subsidiary of Wean, which specializes in designing and manufacturing processing and annealing equipment for sheet, tin and strip mills.

Building expansion to provide for additional machinery requirements and steel fabricated air raid shelters is being considered.

Other Wean associate companies are McKay Machine Co., Youngstown; Flinn & Dreffein Co., Chicago; Lee Wilson Engineering Co., Cleveland; Hallden Machine Co., Thomaston, Conn.; Wellman-Smith Owen Engineering Corp. Ltd., London, England; and Wean Engineering Co. of Canada Ltd., Hamilton, Ont.

New officers of the Broden company are: R. J. Wean, president and treasurer; F. J. Keller, vice president and general manager; S. R. Wean, secretary; N. L. Fromberg, assistant secretary. New directors are: R. J. Wean, F. J. Keller, S. R. Wean, E. J. Boyd, president of Second National Bank, Warren, O., and H. W. Lynn, manager of sales, Wean Engineering Co.

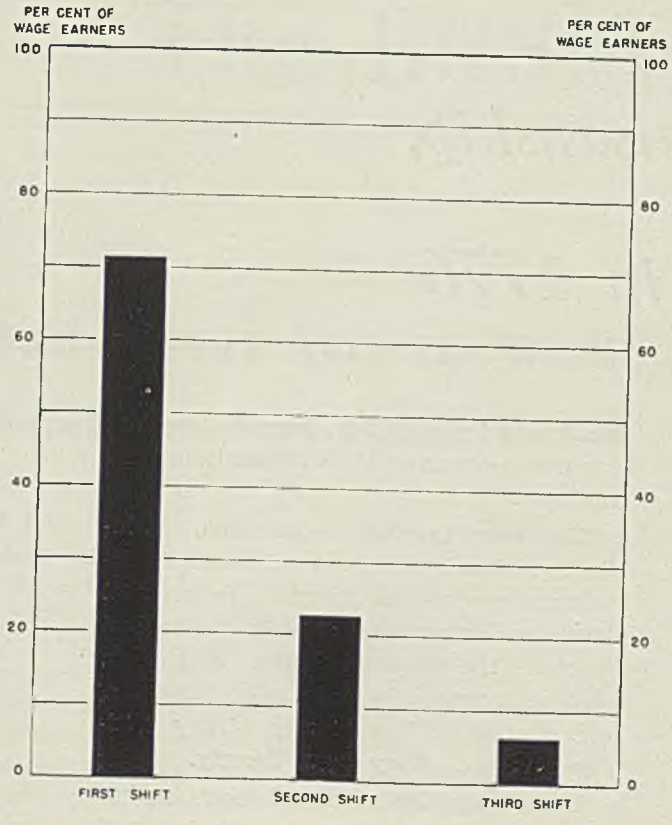
Nominate Officers for Mechanical Engineers

■ Nominations for 1942 officers of American Society of Mechanical Engineers were announced last week by A. L. Kimball, chairman of the nominating committee. Selections were made during the semiannual meeting of the society in Kansas City, Mo., recently. Election will be by letter ballot of the entire membership of 15,000, closing Sept. 23. Nominees:

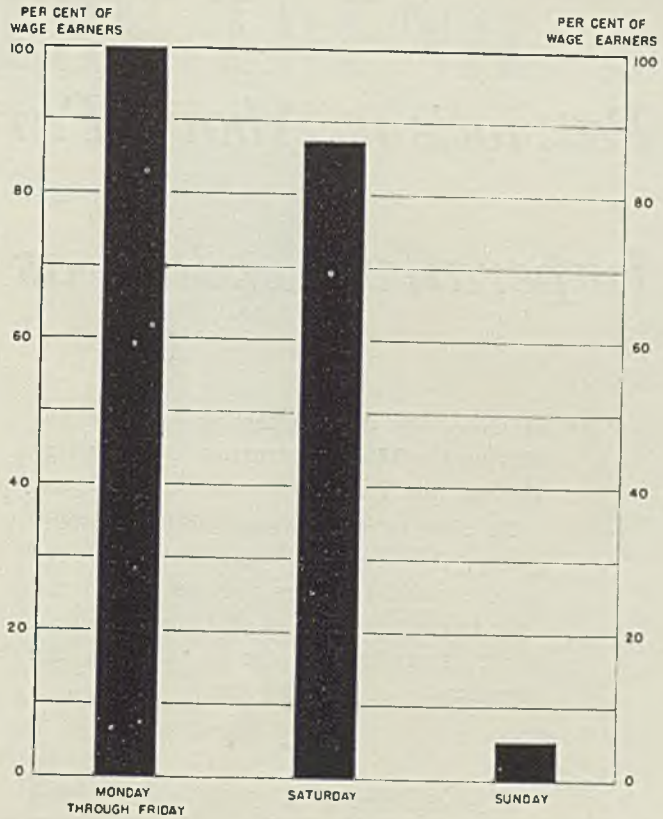
President: James W. Parker, vice president in charge of engineering, Detroit Edison Co., Detroit.

Vice presidents: Clarke F. Freeman, vice president, Manufacturers Mutual Fire Insurance Co., Providence, R. I.; Clair B. Peck, managing editor, *Railway Mechanical Engineering*, New York; William H. Winterrowd, vice president, Baldwin Locomotive Works, Eddystone, Pa.; and Willis R. Woolrich, dean of engineering, and director, bureau of engineering research, University of Texas, Austin, Tex.

Managers: William G. Christy, smoke abatement engineer, Jersey City, N. J.; Herbert L. Eggleston, Gilmore Oil Co., Los Angeles; and Thomas S. McEwan, McClure, Hadden & Orthan, Chicago.



■ Percentage distribution of wage earners in 90 machine tool plants, by shift



■ Weekday, Saturday and Sunday employment in 90 machine tool plants

20,000 More Skilled Workers Needed To Achieve Maximum Tool Output

■ SHOULD all plants in the machine tool industry adopt maximum shift ratios now set up in those which are on a multi-shift basis, more than 20,000 additional skilled workers, with greatly increased supervisory staffs, would be required. Such is the conclusion drawn from a survey by the Bureau of Labor Statistics in March.

Results of this survey, which covered 90 plants employing 60,000 wage earners, representing 68 per cent of the estimated total for the entire industry for that month, are shown in the accompanying charts.

Independent investigations made by STEEL indicate that while the ratio between the first and second shifts has improved somewhat since the survey was made, the manning and staffing of increased third shifts still remains a major problem.

In respect to Sunday, improvement in schedules are limited mainly to bottleneck departments and repair and maintenance.

Of the plants reporting to the bureau, 57 were operating on a two-shift basis, but in some cases these two shifts totaled as much as 22 hours per day, the other two hours being devoted to maintenance. Lunches were eaten while tools were cutting. General willingness of skilled machine tool operators to work overtime is indicated. In mid-March almost 95 per cent of them averaged 12½ extra hours per week.

The extent of the personnel problem in attaining maximum practical shift ratios with existing equipment is shown by the fact that approximately twice as many skilled workers as now employed would be required. Apparently it is a problem of educating rather than merely hiring. The situation is said to emphasize the increasing importance of systems of quick training which actually were being developed in the machine tool industry before the present emergency arose and which now are being pushed as hard as possible.

OPM To Take Machine Tools From Consumer-Goods Plants

Machine tools needed in defense industries will be acquired from consumer goods industries, OPM Chief Knudsen announced last week. Mr. Knudsen said he had received a letter from the President asking that this action be taken and requesting to be informed if any difficulty were encountered in executing the request.

The OPM Director General stated the problem of surveying the consumer-goods industries to see what tools they had that might be used in defense was under way with the co-operation of the War and Navy Departments.

The defense agency's policy in general, he said, would be to take the defense jobs to the machine wherever possible, but where this is not feasible the machine will be taken to the job.

Questioned as to whether such action would not threaten the existence of small industries and cause hardship to communities which had no defense work, Mr. Knudsen explained:

"We are fighting a war, or what amounts to a war, and defense must come first. Of course, we will try to do what we have to do with as little dislocation as possible, but the main thing is we are going to do it.

"Developments of the past few days have not lessened the necessity for doing this job at an even faster pace. If the Germans overrun Russia, and I have no illusions about what will happen, you know what would happen next."

Patriotism Above Partisanship, Imperative Today, as in 1776

■ IN A few days Americans will be observing the 165th anniversary of the adoption of the Declaration of Independence.

In view of the present national emergency, it would be appropriate if every citizen would take time out on July 4 not only to read the text of that historic document carefully but also to visualize the significance of its adoption.

♦ ♦ ♦

It states clearly fundamental principles of human rights under government. "All men are created equal . . . . are endowed . . . . with inalienable rights . . . . among them life, liberty and the pursuit of happiness. To secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed."

Then follows a bill of particulars as to how the King of Great Britain had trampled upon these rights.

In conclusion the signers "publish and declare that these united colonies are and of right ought to be free and independent states. . . ."

♦ ♦ ♦

This bold breaking of ties with the mother country was not done hastily. When the idea was first broached, opinion on it was sharply divided. The proposal was debated long and earnestly and up to the eleventh hour some representatives were in doubt as to whether they should support it.

In the end they all signed and in signing mutually pledged to each other "our lives, our fortunes and our sacred honor."

There is a profound lesson in this for Americans in 1941. It is a lesson well known to industrialists, because they are required to practice it continuously in their business.

The lesson involves co-operation. In industry, when a company undertakes to develop a new product, various department heads and consulting experts are invited to check the proposed design. Engineers, designers, production men, sales managers, etc. contribute ideas freely. They criticize severely. They argue fiercely.

But finally the chief authority makes a decision. He accepts one design and throws out all the others.

That decision spells the end of criticism and argument. Henceforth every man in the establishment works to the utmost to make the new project a success.

♦ ♦ ♦

We are nearing the point of decision in our national defense program. For long months we have been arguing plans and ways and means. There has been criticism, dissension, lack of unity.

It is about time to call a halt to debate, to crystallize the ideas that have been thrown into the basket and to announce positively, "This is what we are going to do and this is how we will do it."

When these words, or their equivalent, are said, they will be the signal for every American to sink his individual opinions and preferences and, like the signers of 1776, pledge "their lives, their fortunes and their sacred honor" to the success of the undertaking.

E. L. Shaner

EDITOR-IN-CHIEF

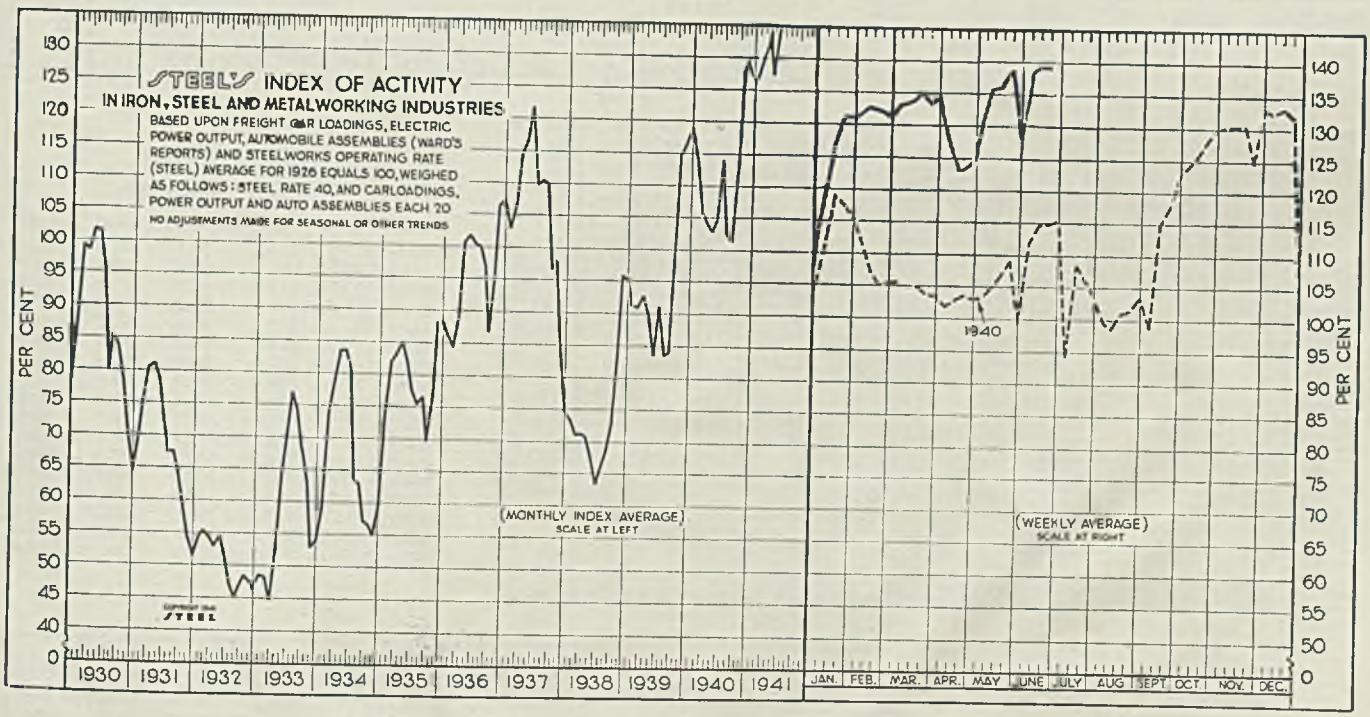
The BUSINESS TREND

Industrial Activity Well Sustained at Peak Level

■ INDUSTRIAL activity continues at peak levels. Many lines are operating against rising order backlogs despite efforts to limit incoming business to immediate needs. Shortages of supplies are hampering production schedules in an increasing number of instances and this situation is expected to become further accentuated over the coming months.

Carloadings rose sharply to the highest level this year during the week of June 21. Freight traffic is expected to approach the 1,000,000 cars-per-week level during the peak of the fall movement this year.

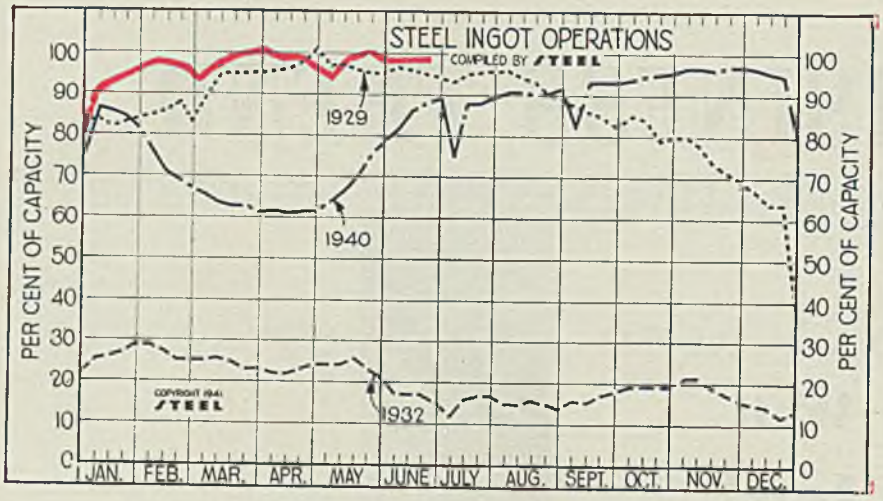
Automobile production was slightly lower at 133,565 units during the week, while steelmaking operations held unchanged at 99 per cent of capacity. Revised electric power consumption figures—which now include certain additional governmental and industrial power generation as part of the public supply not heretofore reported—eased moderately to 3,055,841,000 kilowatts during the week of June 21. To offset this inclusion of additional power generation the 1926 base figure on electric power consumption—used in compiling STEEL's index figure—has been adjusted.



STEEL'S index of activity remained unchanged at 138.7 in the week ended June 21:

Week Ended	1941	1940
April 5	128.9	101.8
April 12	123.8	102.7
April 19	124.2	103.4
April 26	126.5	102.8
May 3	132.6	103.3
May 10	135.9	104.8
May 17	136.1	106.8
May 24	138.6	109.1
May 31	128.4	99.2
June 7	138.4	111.9
June 14	138.7	114.6
June 21	138.7	114.8

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	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	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

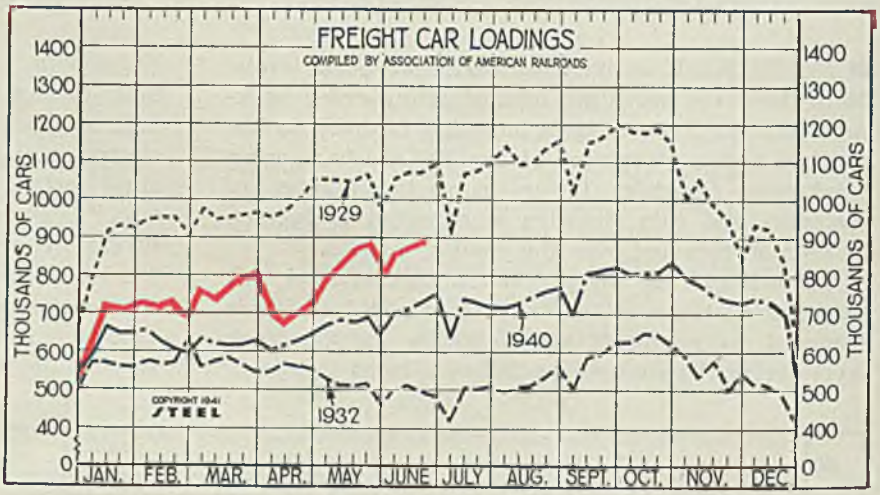
(Per Cent)

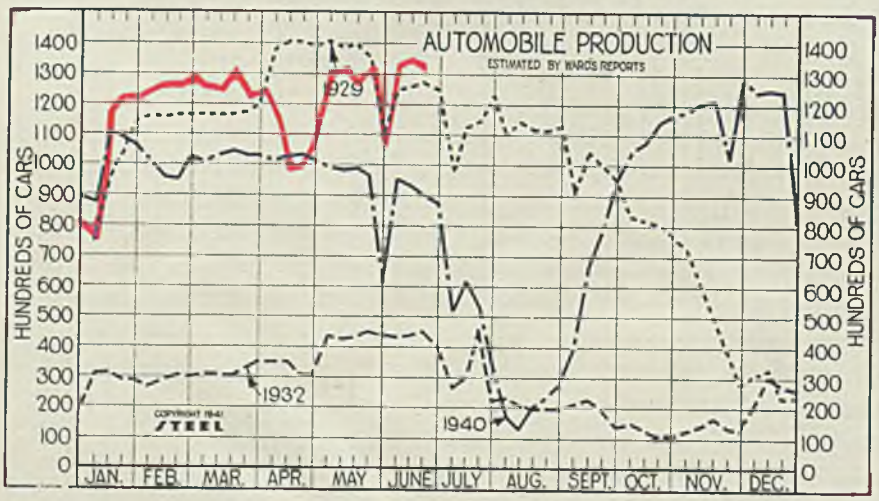
Week ended	1941	1940	1939	1938
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5...	98.0	61.5	53.5	32.0
March 29..	99.5	61.0	54.5	36.0
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

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12.....	680	619	548	538
April 5.....	682	603	535	522
March 29....	792	628	604	523
March 22....	769	619	605	573
March 15....	759	619	595	540
March 8.....	742	620	592	557
March 1.....	757	634	599	553





Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19..	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0
April 5...	116.3	101.7	87.0	61.0
March 29..	124.2	103.4	86.0	57.5
March 22..	123.8	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

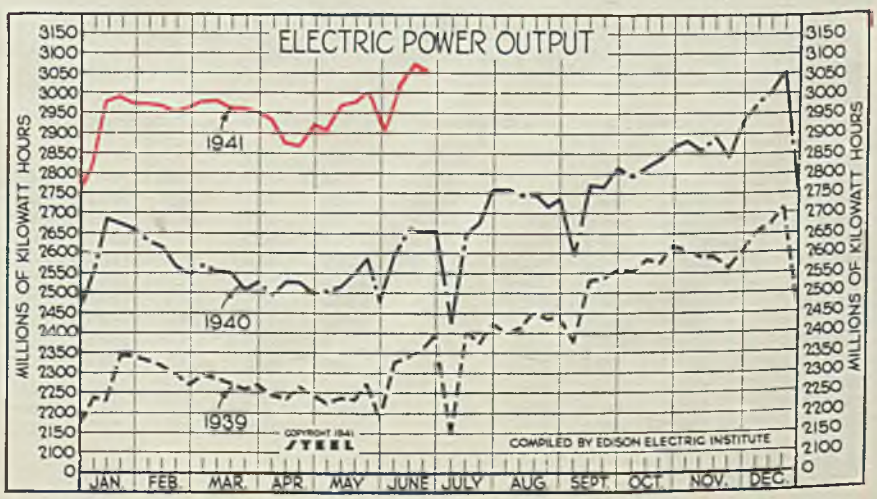
Electric Power Output

†

(Million KWH)

Week ended	1941	1940	1939	1938
June 21.....	3,056	2,654	2,362	2,082
June 14.....	3,057	2,665	2,341	2,051
June 7.....	3,042	2,599	2,329	2,057
May 31.....	2,924	2,478	2,186	1,937
May 24.....	3,012	2,589	2,278	2,031
May 17.....	2,983	2,550	2,235	2,024
May 10.....	2,975	2,516	2,239	2,019
May 3.....	2,915	2,504	2,225	1,992
April 26.....	2,926	2,499	2,244	1,996
April 19.....	2,874	2,529	2,265	2,010
April 12.....	2,882	2,530	2,235	2,016
April 5.....	2,938	2,494	2,244	2,050
March 29.....	2,956	2,524	2,272	2,037

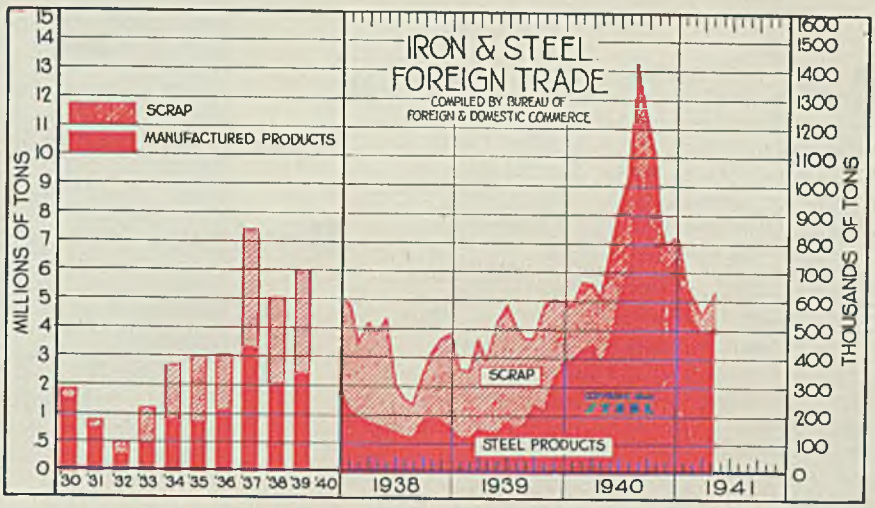
†New series: Includes additional governmental and power generation not previously reported.

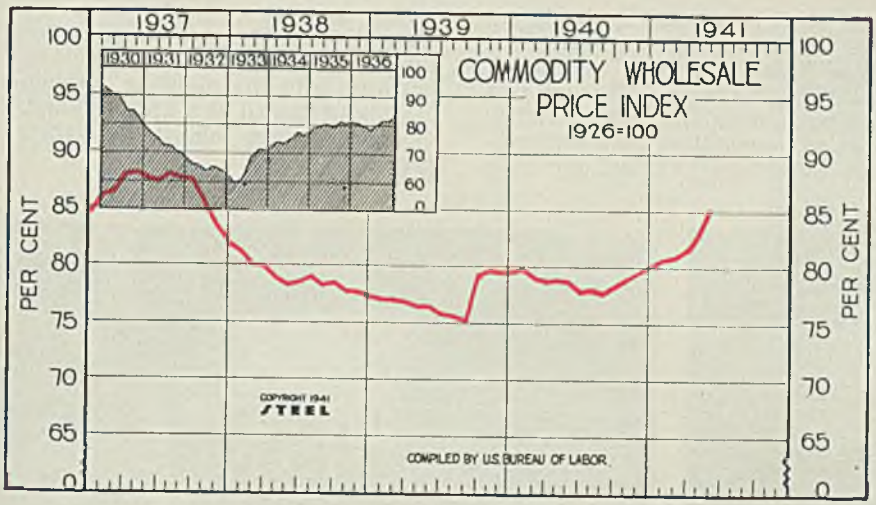


Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	698.9
Feb.	525.9	436.6	74.4	234.7	600.2
Mar.	512.8	457.1	54.4	206.9	567.2
April	515.7	391.8	120.2	221.2	635.8
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	.....





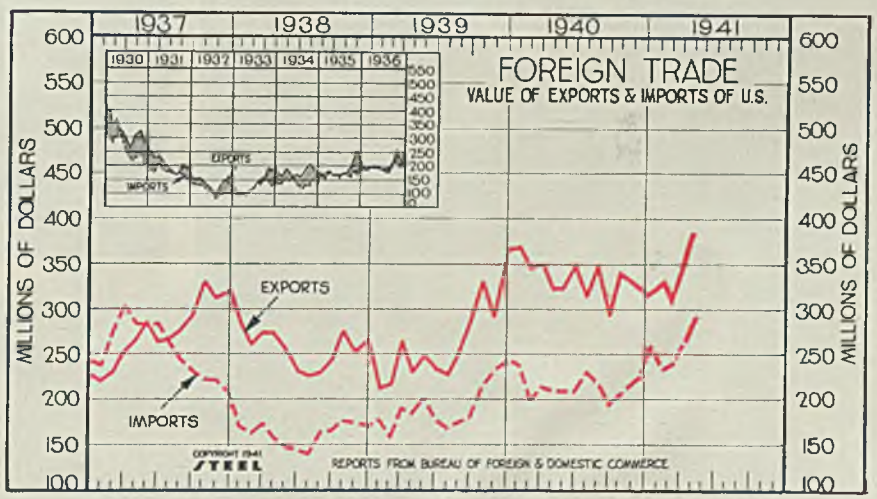
All Commodity Wholesale Price Index
U. S. Bureau of Labor
(1926 = 100)

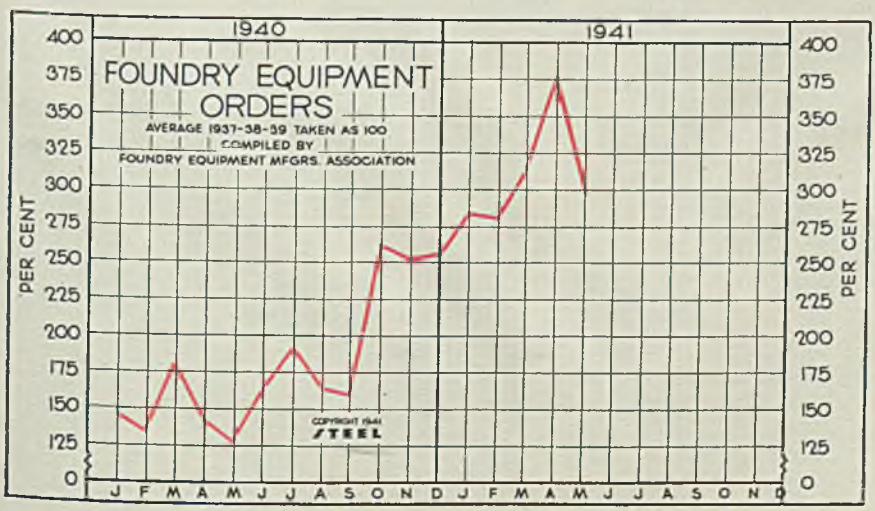
	1941	1940	1939	1938	1937
Jan.	80.8	79.4	76.9	80.9	85.9
Feb.	80.6	78.7	76.9	79.8	86.3
March	81.5	78.4	76.7	79.7	87.8
April	83.2	78.6	76.2	78.7	88.0
May	85.2	78.4	76.2	78.1	87.4
June	....	77.5	75.6	78.3	87.2
July	....	77.7	75.4	78.8	87.9
Aug.	....	77.4	75.0	78.1	87.5
Sept.	....	78.0	79.1	78.3	87.4
Oct.	....	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

United States Foreign Trade

(Unit: $1,000,000)

	Exports		Imports	
	1941	1940	1941	1940
Jan.	$325.4	$368.6	$228.7	$241.9
Feb.	303.4	347.0	233.7	199.8
Mar.	357.6	352.3	267.8	216.7
April	385.5	324.0	287.6	212.2
May	.....	325.3	.....	211.4
June	.....	350.2	.....	211.4
July	.....	317.0	.....	232.3
Aug.	.....	349.9	.....	220.5
Sept.	.....	295.2	.....	194.9
Oct.	.....	343.5	.....	207.1
Nov.	.....	327.7	.....	223.4
Dec.	.....	322.3	.....	253.1
Total	.....	$4,021.6	.....	$2,625.4





Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

	1941	1940
Jan.	285.3	149.0
Feb.	281.1	135.7
March	315.2	183.2
April	377.2	145.2
May	298.7	129.1
June	....	164.9
July	....	194.4
Aug.	....	165.4
Sept.	....	161.2
Oct.	....	264.0
Nov.	....	254.2
Dec.	....	257.8

Special Materials Handling Devices Speed Production of NAVAL SHELL

■ THE NUTTALL works of the Westinghouse Electric & Mfg. Co. very recently completed an order of 6 and 8-inch target projectiles for the United States Navy. Special fixtures for handling the projectiles played an important part in saving considerable operating time—another example of the benefits obtainable by carefully planning materials handling work.

Operations carried on at Nuttall involved only the manufacture of the projectile body. Windshields, base plugs, and tracer plugs were made elsewhere and shipped here for final assembly. Notice all the way through the following story how the use of multiple tooling and fixtures speed up the machining work. Note, too, the thought given to each operation to assure maximum efficiency through use of proper materials handling methods and devices.

The straight-line production of naval shell as carried on by Westinghouse at its Nuttall works involves some interesting and novel manufacturing steps. Although two sizes were manufactured—6 and 8-inch shell—machines, tools and processes used were identical for both except for size. Following is a running pictorial story of the manufacture of the 8-inch projectile from its entrance into the plant as a rough casting to its exit as a finished shell. Operations are shown in their proper sequence.

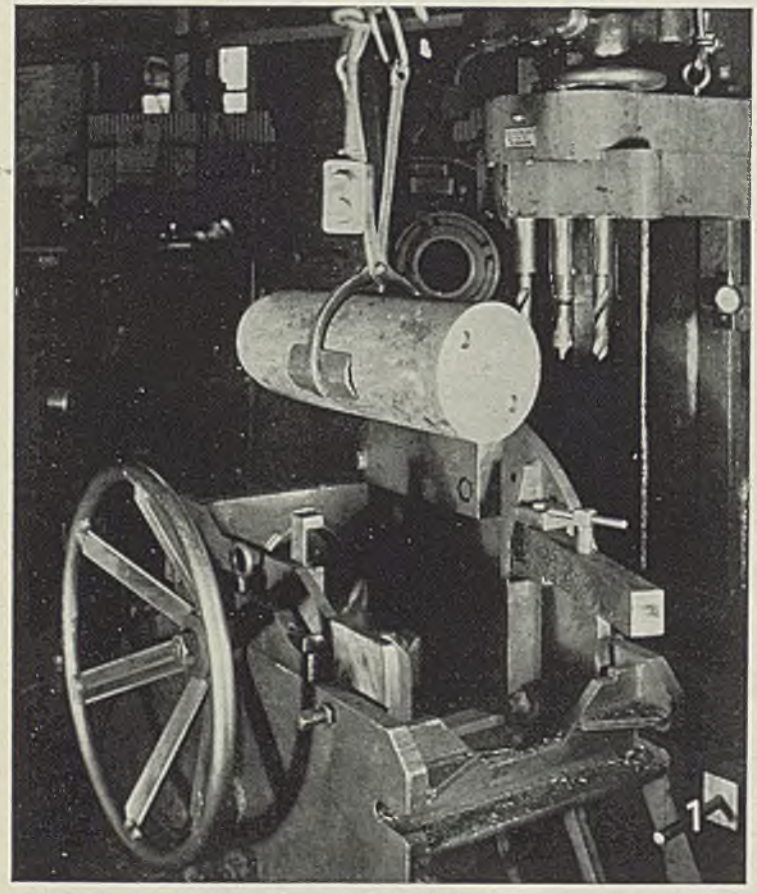


Fig. 1—First operation performed on the rough casting is drilling the centering and driving holes on the front and rear ends. The casting is loaded into this 3-position trunion fixture (picture actually shows unloading operation) by means of a hoist and is clamped into position by the clamping belt on the swinging bar at the right

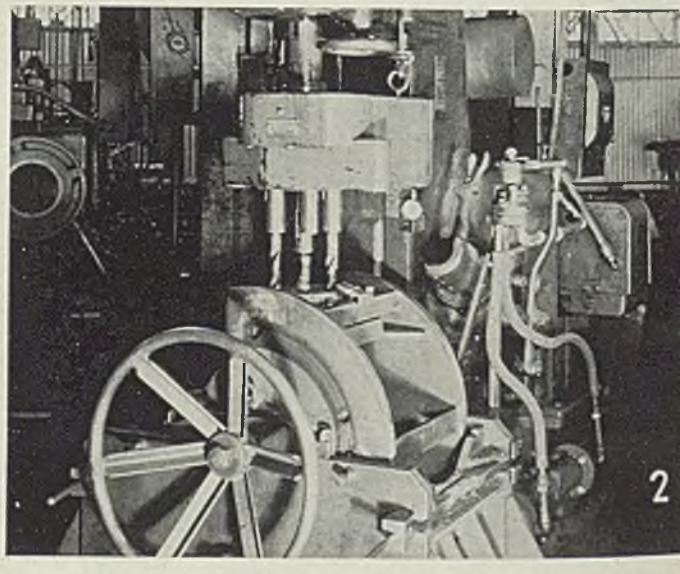


Fig. 2—After loading, the trunnion fixture is pulled into position under the drill press by an air cylinder; the fixture is indexed 90 degrees, and the rear end of the 8-inch casting is drilled. Then the trunnion fixture is indexed 180 degrees, and the front end is drilled. Indexing is done with the handwheel, positioning being accomplished by the positioning pin and holes visible on the trunnion fixture. When ready to be unloaded, this fixture is moved out from under the drill press. The air cylinder that does the moving is shown at the lower righthand side of the press

Fig. 3—The trunnion fixture is here withdrawn from under the drill-head but is not yet indexed to the unloading position, after drilling has been completed. The threaded head on the top end of the fixture is an adjustment to take care of variations in casting length

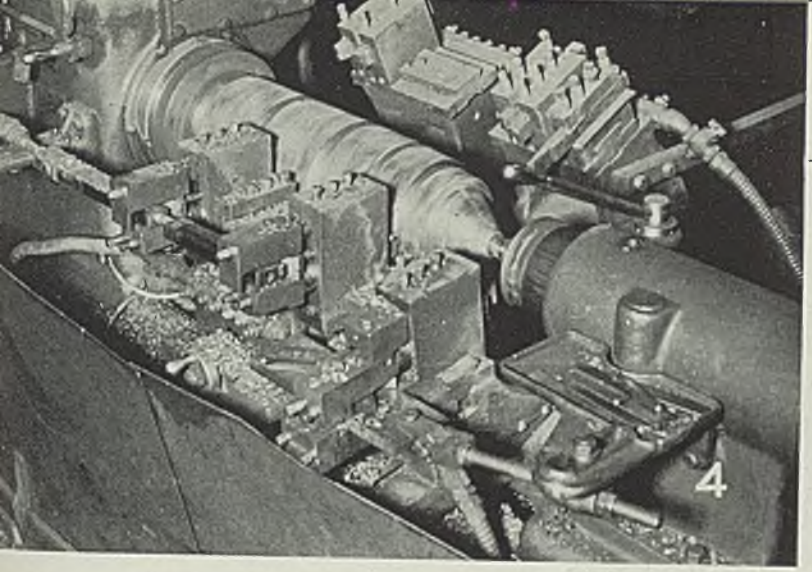


Fig. 4—The rough turning and facing operation is fully automatic. Altogether, ten tools are used, six for turning and four for facing the shoulders. The six turning tools on the left are starting to work. Just before they complete their operation, the facing tools at the right will move in and face the four shoulders. Lathe operation is arranged so that both turning and facing cuts finish at the same time, and both sets of tools kick out simultaneously, stopping the lathe. Approximately ½-inch of metal is removed from the diameter in rough turning. Note two slide bars at front, controlling taper

Fig. 6—Next step after finish turning and facing is to shape the rear end of the projectile and drill the cavity or the inside of the shell. This is all done on a single-spindle turret lathe fitted with eight different tools. Each mounted in proper cutting position on one of the two turrets. The large turret at the right carries five of the eight tools and feeds endwise; the remaining three are in the small turret (which feeds crosswise) just to the left of the large one. In finishing the rear end of the shell, the lathe operator goes through the following procedure:

1. Chucks the finished-turned casting in the turret lathe's collet chuck
2. Starts drill and drills cavity, using first tool on the large turret

2a. At the same time, another tool in the small turret cuts off the rear end of the shell; the cut-off piece falling onto the cavity drill bar

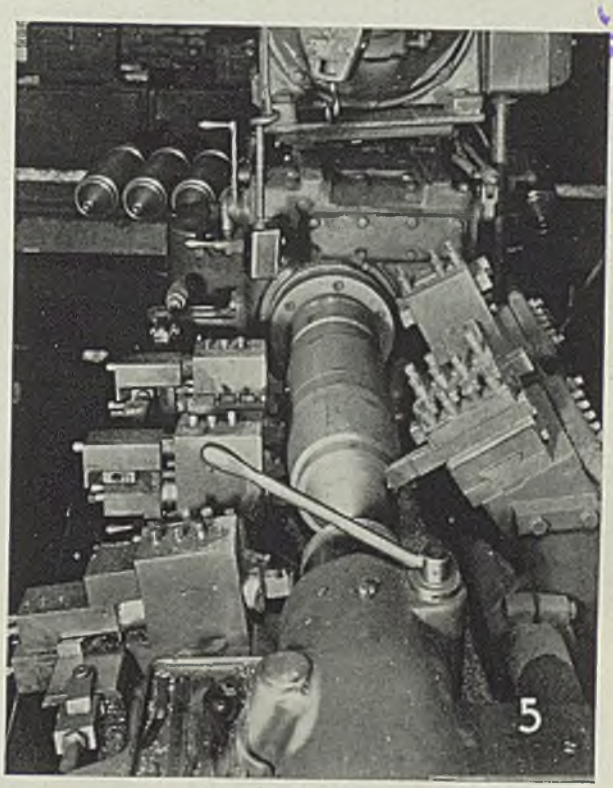
3. Large turret is indexed, second tool comes into position and bores the shell for the base plug

3a. At the same time, small turret also is indexed, and its second tool faces and chamfers the rear end of the projectile

4. Large turret is again indexed, third tool comes into position and finish bores the cavity and the opening for the base plug

4a. At the same time, third tool in the small turret undercuts for the copper band.

5. Large turret is indexed, fourth tool finish bores for the base plug threads.
6. Large turret is indexed again, fifth tool taps threads for base plug



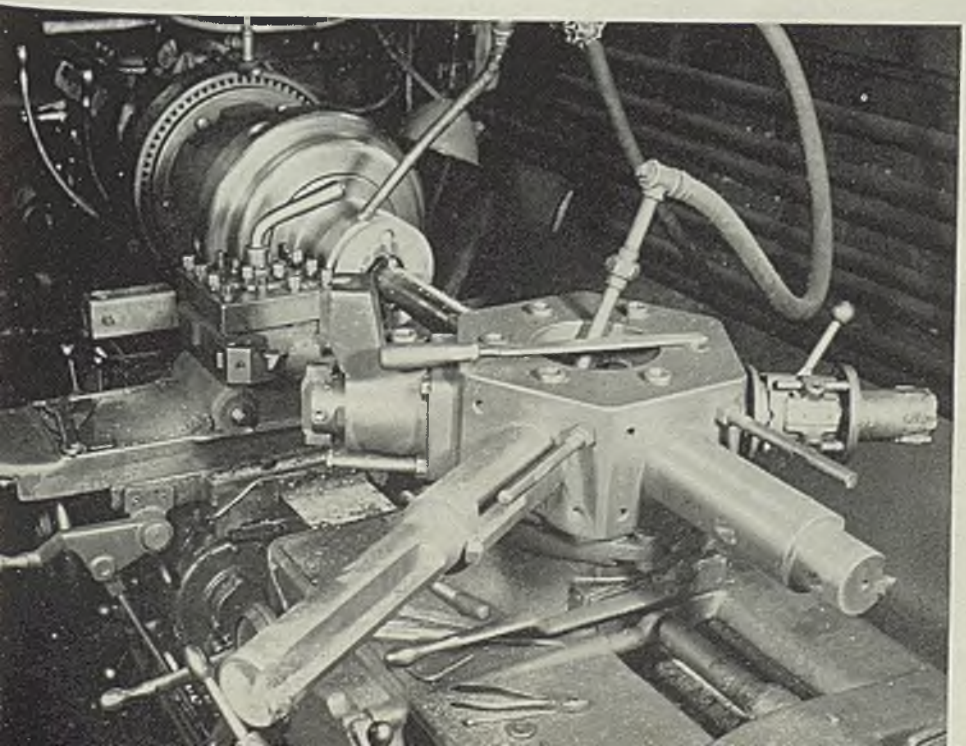


Fig. 5—Finish turning and facing of the projectile is done on the same type lathe as is the rough turning and facing. The number and operation of the automatic multiple tools is the same, but only about 0.030-inch of metal is removed. This is an end view of the projectile and the lathe at the start of the finishing cut. Two slide bars (at left) are also used here. Note pulley and hook above work—part of hoist used to load-unload the shell bodies. Mechanical handling aids like this are an important feature in manufacture of shell

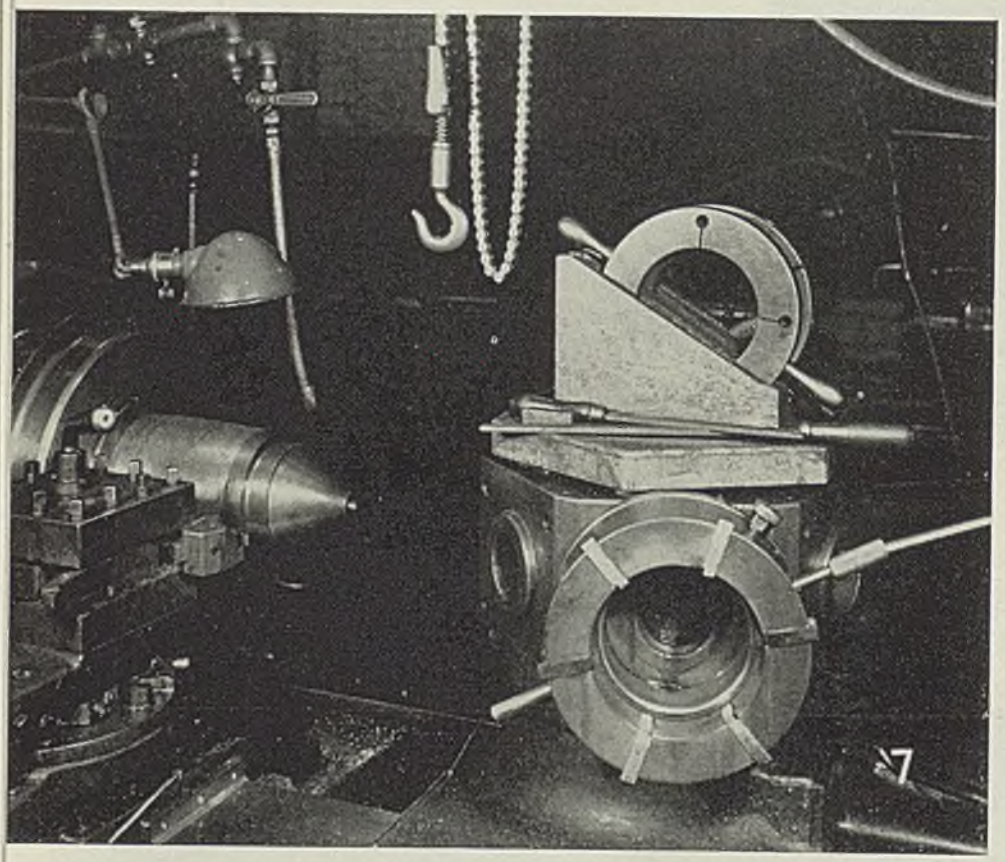
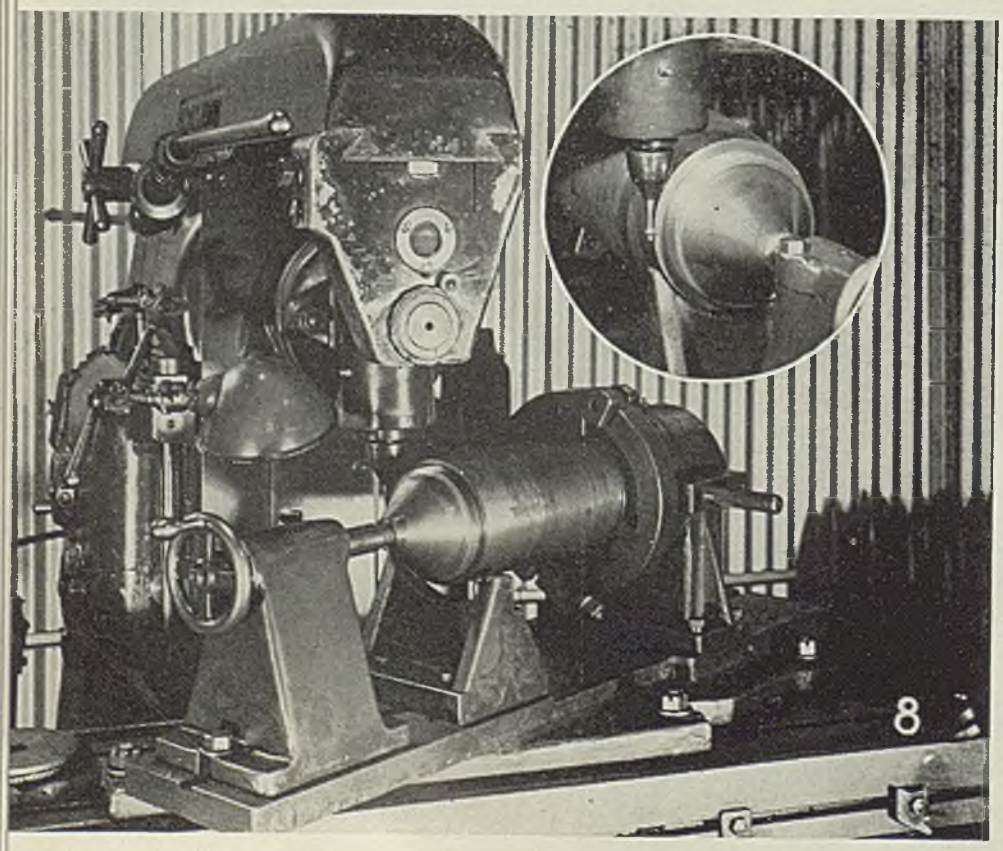


Fig. 7—With the rear end of the shell completed, it is transferred to this turret lathe for front-end finishing. While held in a collet chuck and supported by a center carried in the lathe turret, the front end is undercut. Note the several tools on the cross slide turret. Next it is threaded to accommodate the windshield or nose of the finished shell, using the thread chaser mounted on the main turret at right, which also carries the center used in undercutting. The front end of the shell is shown here after these operations have ben completed. Hook for hoist can also be seen

Fig. 8—Setup for milling notches in the head of the projectile. A 5-position indexing fixture is used in conjunction with a vertical head attachment on the milling machine. The inset shows the cutter working on the far side of the shell



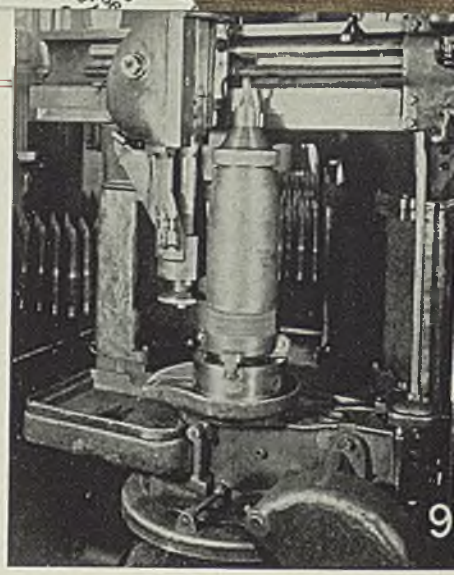


Fig. 9—Serrations for the copper band are milled on this rebuilt gearshaper. In order to accommodate the projectile, 22-inch raising blocks were placed under the shaper's head, and a larger spindle with a suitable support was used. These are easily visible in the illustration. Rebuilding was no easy job as all drive shafts and other connecting mechanisms had either to be lengthened or entirely replaced with new ones to carry over the 22-inch extension; but it proved well worth the effort in the time saved in milling the serrations. This, incidentally, is the last machining operation performed on the projectile casting proper. Next, each projectile is checked for weight after machining and before its copper band is pressed into place

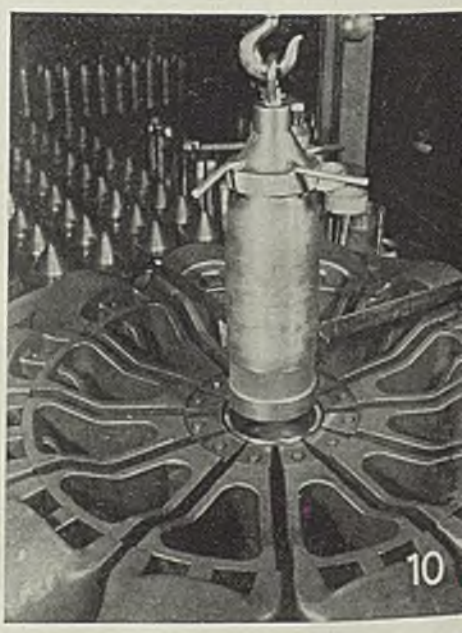


Fig. 10.—Before being pressed onto the projectile case, the copper bands are heated in electric furnaces six at a time. When hot, the band is pressed into place around the projectile on this 12-cylinder press. Three separate presses or "squeezes" are made, and for each one, the projectile is turned to a new position to insure a positive, tight shrink onto the serrated shell body. Note the cap screwed on the shell nose, carrying a ring for easy handling by hoist

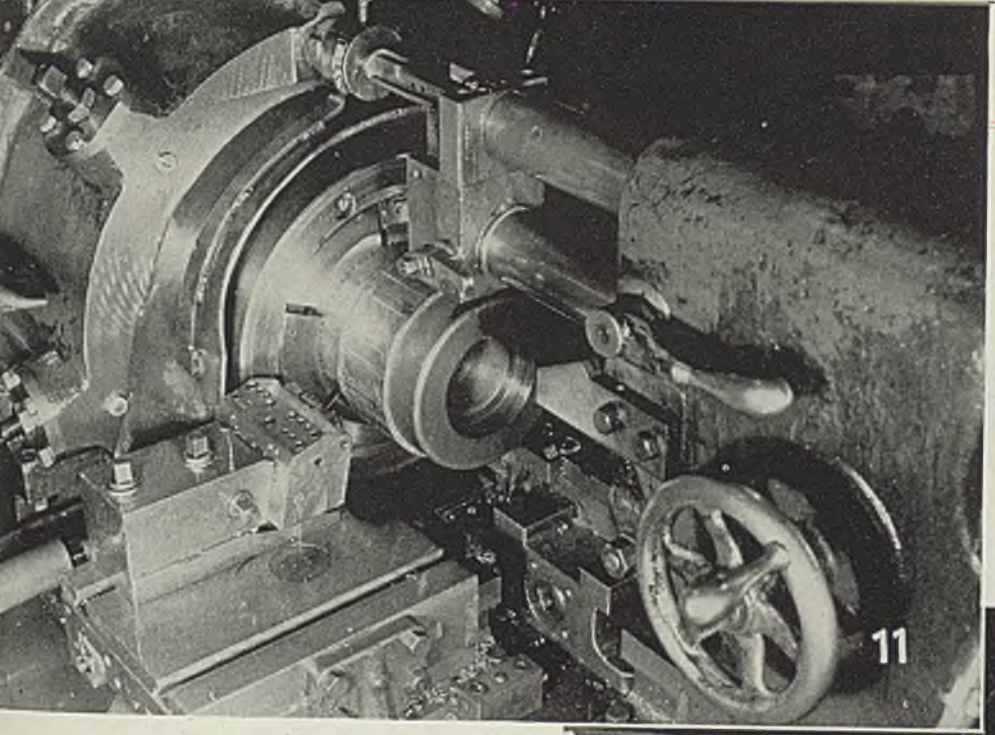


Fig. 11—Finish turning of the copper band, grooving, undercutting and stamping are all done on the same turret lathe (shown here) but each with a different tool. The projectile is held in an air chuck as shown. The tool in the overarm turns the outside diameter of the band. When this is completed, the tool on the front slide, at the left, grooves and faces the band to length. Note how this single tool is ground to produce the finished groove contour. After grooving, the skiving tool, located on the rear slide of the lathe, undercuts the raised sealing gland of the copper band

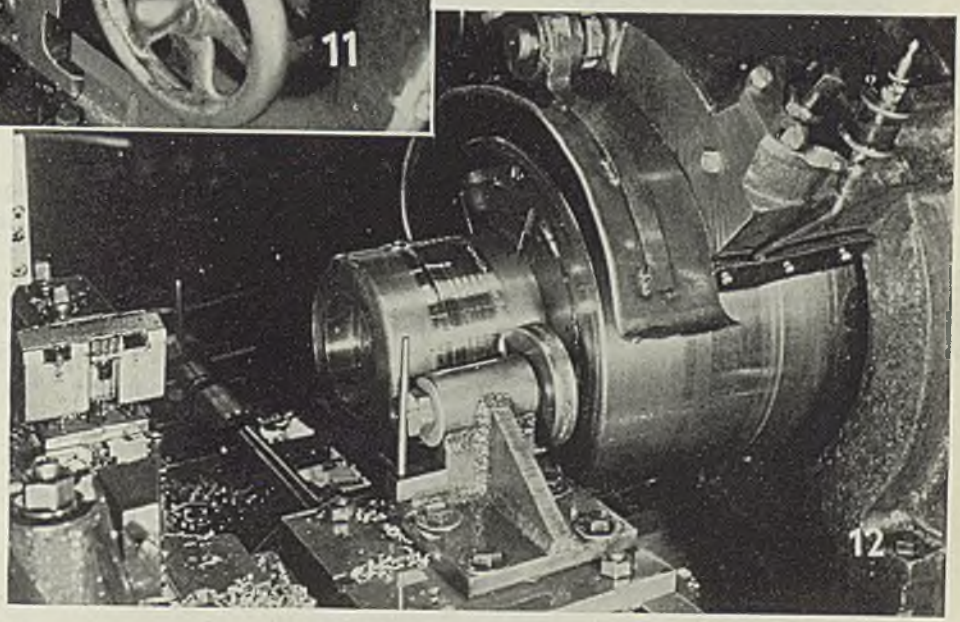


Fig. 12—Last operation performed on the turret lathe shown in Fig. 11 is stamping the copper band. The stamping tool is located on the back side of the turret and rolls against the band to mark it. Skiving tool also is on this side of the lathe, part of it being visible at lower left

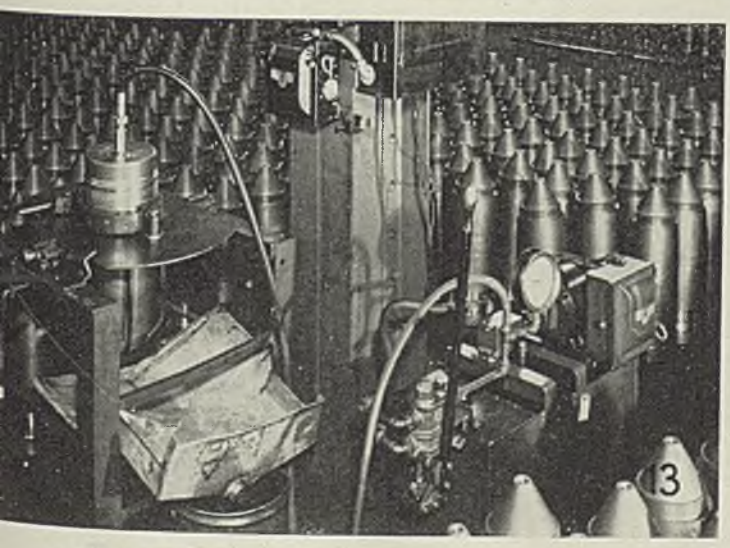


Fig. 13—Each finished projectile body has to pass a leakage test before it can be accepted as a complete product. Testing is performed by screwing into the projectile a base plug connected to a high-pressure hose through which oil is applied at a pressure of 500 pounds per square inch. Note pivoted fixture for tipping shell to remove oil

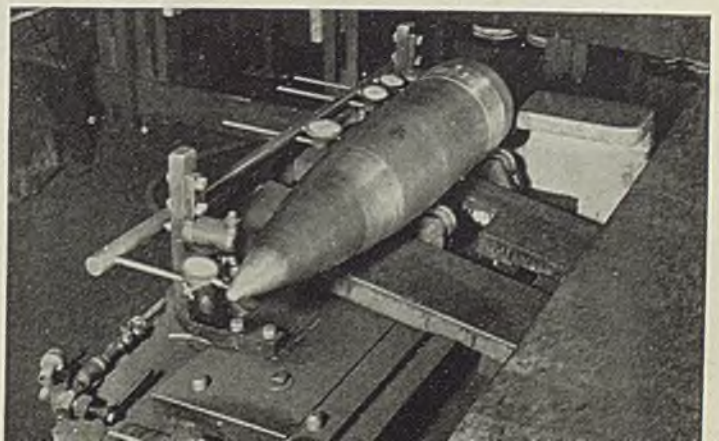
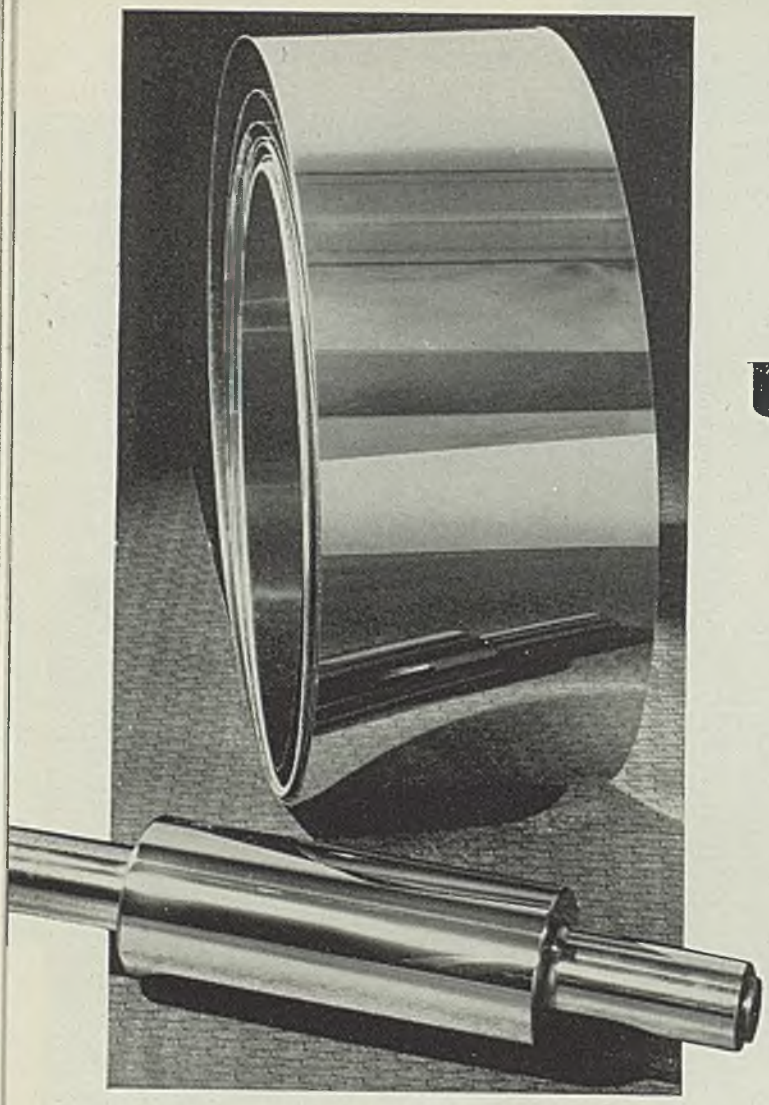


Fig. 14—In the assembly department, the base plug, tracer plug and windshield are attached to the finished projectile body. After assembly, the projectiles are checked to make sure they come within allowed dimensional tolerances, using this special gaging fixture. The projectile is rolled onto the fixture from the table by means of the two runways. The runways, held in the "up" position by an air cylinder, are then let down, dropping the projectile onto the rollers of the gaging fixture. After gaging, the procedure is reversed and the shell returned to the table to go on its way to the storeroom



This is a tungsten carbide Steckel mill roll and super finished strip rolled from it. Note the beautifully sharp reflections on the strip

Ultra Finish . . .

What Is It?

How Is It Obtained?

Bring yourself up-to-date on modern roll grinding techniques and ultra finishes by following this series of articles especially prepared for STEEL on this increasingly important subject. Putting a high finish on strip and sheet at the mili eliminates many expensive finishing operations in the fabricator's plant, thus accounting for the greatly increased interest in this phase of mill work

By H. J. WILLS

Engineer
The Carborundum Co.
Niagara Falls, N. Y.

■ Today, mills are utilizing ultra finished rolls for producing mirror finishes on: Steel, in strip and more rarely in sheet form; copper and brass, in both strip and sheet form; aluminum, in strip, sheet and foil form; and for many precious metals, in strip form. Such a product permits the fabricator to form by deformation parts that require little or no subsequent polishing or buffing.

With present advanced techniques in diemaking, this is possible as the high finishes on drawing dies, for instance, do not produce serious draw marks on the metal worked and therefore the surface qualities produced by the roll are still present after shaping, so may be used or plated as is.

Based on an ordinary cold rolled finish of 5 to 12 micro inches r.m.s., approximate cost of ultra finishes are: For a finish of 3 to 5 micro inches r.m.s., 130 per cent; for a 2 to 3 micro inch finish, 150 per cent; for a 1 to 2 micro inch finish, 175 per cent; for 0.5 to 1 micro inch finish, 200 per cent.

■ WITH ULTRA-FINISH rolls, it is possible to secure strip and sheet steel of such surface perfection that subsequent polishing and buffing is unnecessary. *The product can, if desired, be given a "mirror" finish directly by the rolls.*

Economic Advantages: This, of course, has importance as a potential means of reducing costs, for while such highly finished material naturally commands a higher price, its use affords economies in processing or manufacturing which far overbalance the added cost of the material. Here, for instance, are four typical examples of what can be and is being done by progressive manufacturers.

In a plant making panel strips for instrument boards, practice had been to first form the strips, then polish them, followed by nickel plating, a buffing operation and finally by chromium plating. When ultra-finish rolls were used to produce the final surface on the material during manufacture of the strip, the instrument manufacturer was enabled to obtain the same high final finish merely by chromium plating directly on the steel. Elimination entirely of the nickel plating and buffing work was an important economy. This same economy was found possible on bumpers and other automobile parts.

In a plant making aluminum kitchen ware, it was found that cooking utensils could be fabricated, even spun, without the necessity of a final polishing operation provided that the aluminum sheet had been fully finished.

In some tin plate mills, considerable saving in tin consumption have been made by rolling the steel to a finer surface finish, since the smoother the surface, the less tin adheres to it.

In commercial jewelry manufacture, rolling the precious metals to a finish that requires no further buffing after fabrication or etching is important as buffing would destroy the natural hand etched appearance of the article.

Thus it is evident that ultra-finished material has a high economic value that accounts for its continued rapid adoption in more and more fields. However, highly finished material is made possible only by use

of rolls which themselves are still more highly finished, since no matter how carefully the rolling is done, it is not possible to produce quite as smooth a surface on the work as is on the rolls. For this reason, it is evident that production of highly finished material calls for rolls with a surface as nearly perfect as possible. In fact, that might be used as a definition of ultra finish.

Not long ago it was generally assumed that a "mirror" or reflecting surface was necessarily an exceptionally good surface. That is not true. By burnishing a very rough surface with a dull grinding wheel, the high ridges can be bent down, partly filling the deep valleys, so the roll will shine like a mirror. But after a very short period of use, the bent down ridges will flake off and the real, imperfect surface of the roll will appear on the product. It is important to remember that surface and finish are not synonymous. A poor surface may be given a "mirror" finish and a non-reflecting matte finish may be had on a practically perfect surface.

As a result of much study, we now know many facts about surface quality and the nature of surface defects. Surface qualities as defined by the sectional committee on classification and designation of surface qualities of the American Standards Association are:

"**Surface Deviations:** The departures of the actual surface of an object from the nominal surface of that object. These surface deviations are classified as roughness, waviness, surface flaws, etc.

"**Surface Flaws:** Irregularities of any sort which occur at only one place or at relatively infrequent and widely varying, random intervals in a surface. A surface flaw may be a scratch, a ridge, a hole, or a peak, a crack, a check, etc.

"**Waviness:** A kind of surface deviation which consists of recurrent or random irregularities in a surface which have the form of waves. On 'smooth machined' surfaces, the length of such waves ordinarily are between 0.04 and 1 inch, their height generally not more than a few thousandths of an inch. Such irregularities can be measured by conventional dial gages of appropriate sensitivity, with spherical work contacts of approximately 0.125-inch diameter.

"**Roughness:** Recurrent or random irregularities in a surface which have the form of small waves or bumps. Roughness may be considered as being superimposed upon a nominal surface or upon a wavy surface. On 'smooth machined' surfaces, the distance between the 'high spots' of such irregularities is ordinarily between 0.0002 and 0.010 inch and their height is very much less than their width, usually being between 0.000001 and 0.0005-inch. Similar dimensions for the irregularities in surfaces which are coarser or rougher than those generally classified as 'smooth machined' will be proportionately larger."

An ultra finish roll should, of course, have a minimum of any of these deviations. Surface flaws can be observed with the naked eye, or with the help of a microscope. Waviness is determined with a dial gage.

How Is It Measured? Until recently, roughness was determined by such inaccurate methods as the thumb-and-fingernail test. Others passed a lead pencil, under constant load, across the surface and judged the surface by the rate at which the lead wore down. More accurate was microscopic examination. All, however, were not sufficiently accurate nor did they provide a definite mathematical measurement.

Now several electrical devices are available for measuring surface roughness. One records the magnified profile of the surface. Another gives automatically a running record of the surface roughness in root mean square values in micro inches; that is, millionths of an inch. The root mean square (r.m.s.) value, the measure recommended by the committee for the standardization of classification and designation of surface qualities, is the square root of the sums of the squares (root mean squares, abbreviated r.m.s.) of the distances from the peaks of the curves to the axis of the curve, in micro inches.

Surfaces Classed: These values can be secured by measuring an oscillograph record, or by means of the device already mentioned which gives the r.m.s. average direct. While the committee does not attempt to define the various types of surfaces in r.m.s. values, it gives the following values as illustrative values:

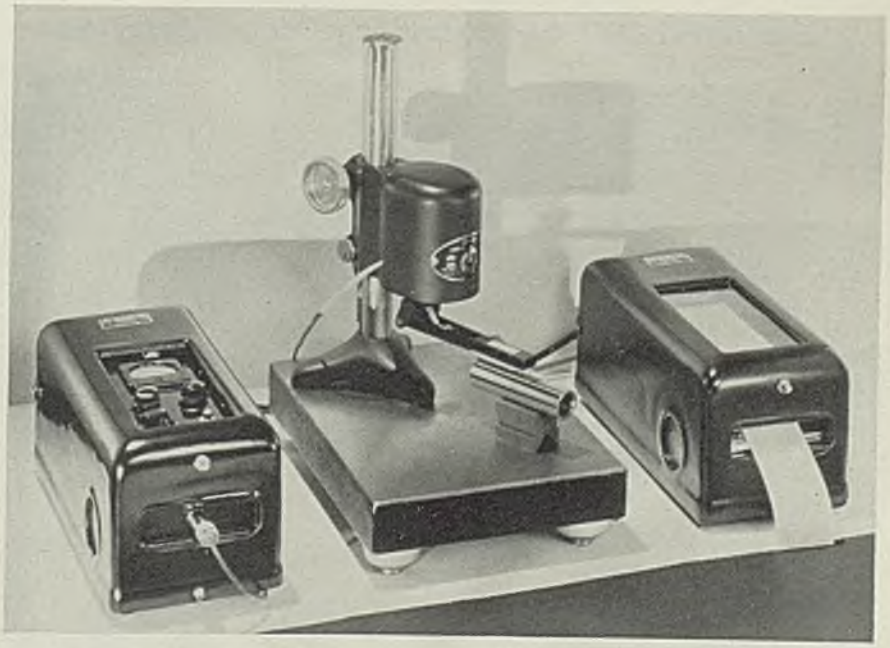
Fine finishing operations generally having a shiny appearance; diamond or hard metal turning and boring; good finish grinding, honing and the like would have r.m.s. averages from 32 to 8 micro inches.

Extremely fine finishing operations such as grinding, honing, or lapping—work done with greatest care—might have r.m.s. average values of 4 to 1 micro inch. Examples may be found on carefully made measuring gages and similar instruments.

Highly polished finishes used largely for laboratory work would run from 0.25 to 0.50 micro inch r.m.s.

How Applied to Rolls: Now, in the light of all this, how shall we define "ultra finish" as applied to rolls? Doubtless there is still much difference of opinion. However, the following are the standards which several progressive roll grinding departments are shooting for—in some cases with considerable success.

There should be no surface flaws such as scratches, ridges, holes, cracks or checks. Any waves should be not less than 1 inch long and not more than a few micro inches high. For continuous cold mill rolls, the surface roughness may be from



Surface analyzer made by Brush Development Co., Cleveland, not only gives a measure of surface roughness in micro inches but can chart the actual profile of the surface at great amplification

4 to 7 micro inches r.m.s. Temper mill rolls should have roughness of from 1 to 3 micro inches r.m.s. High finish strip and Steckel mill rolls should have roughness of 0.5 to 1.0-micro-inch, r.m.s.

How Can Such Perfection and Smoothness Be Secured? First and foremost it is necessary to prevent the appearance of flaws such as burns, checks, scratches and flats as well as chatter, grit and traverse marks.

Such flaws are caused by a poor condition of the machine, dirty coolant, poorly selected wheels or unskillful manipulation of the wheel. To a considerable extent, a wheel that is not ideally suited to the job can be made to perform well by manipulation. But it is useless to try to get an ultra finish on a roll with a machine that is not in the best of condition.

The Spindle—The Key: The heart of the roll grinding machine is the spindle. On its condition largely depends the quality of the work so far as chatter, work concentricity, burning and scoring is concerned. Its condition also determines the grit, grade and type of bond of the wheel that may be used. A spindle of high quality with a properly lapped cap or sleeve bearing of bronze or babbit, with the right oil and heat clearance will permit the use of soft wheel gradings. A wabbly or vibrating spindle needs harder gradings and usually a wheel with an organic bond. But regardless of the wheel that is used, it is impossible to get ultra finish with a spindle that is in poor condition.

Direct driven spindles, if connected to the motor through a coupling, must be carefully aligned. It is not safe to rely too much on the coupling to take care of misalignment. If the motor is integral with the spindle it is essential to balance the assembled unit with extreme care. Also, with integrally mounted motor and spindle, stresses which cause side pull often cause hammering of the wheel due to the vibration set up by the rotating elements.

Vibration is also caused by whipping of driving belts or chains, uneven belts, poor belt splices, faulty work-head thrust bearings and faulty work-driving gears.

Other faults which make the production of ultra finishes impossible are worn guide-ways, loose headstocks and tailstocks, poor machine foundations, building vibration, weak neck-rests and lack of lubrication on necks.

Bearings: For very fine precision grinding, high grade babbitt bearings are to be preferred as they give closer running fits when heated. Bronze bearings should be tightened to minimum clearance when taking finish cuts for ultra finish rolls. To reduce spindle bearing clearance, always heat up the bearings by a preliminary running of the machine before grinding, especially for finishing cuts.

When more than one grinder is available, use one for roughing cuts only and another for finishing only. This permits the finishing machine to be kept at a higher standard of perfection than would be possible if the same machine were used both for roughing and finishing.

Location: The location of the grinding machine should be selected with an eye to avoiding vibration from neighboring machines or general building vibration. The machine should be shielded from drafts of either hot or cold air and direct sunlight as changes in temperature are apt to deform the work or parts of the machine to an extent that makes fine grinding impossible.

Power: Most roll grinding machines have enough power. However, excessive machine friction, lowered line voltage, belt or wheel slippage may cause speed variations which are sure to cause wheel-loading, discoloration of work or uneven grinding.

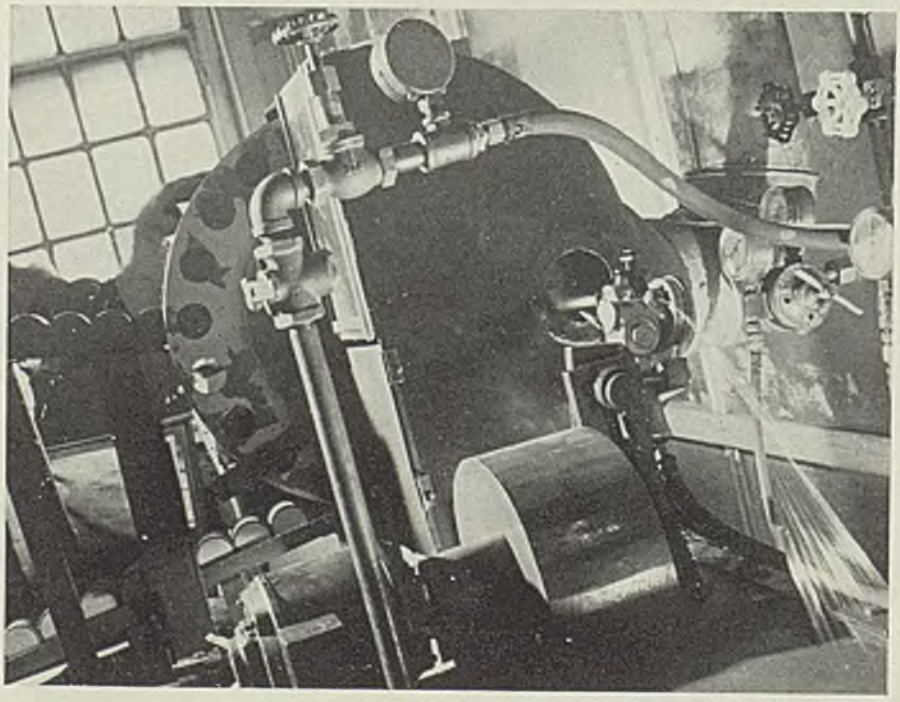
Many rolls are so large that they must be supported in the roll grinder by their necks, in neck-rests or stays. Since the neck-rests sometimes have insufficient bearing surface, there is a tendency for the necks to become heated. This causes misalignment through unequal expansion of the roll and consequent uneven grinding.

Supporting the Roll: Oval grinding of rolls and chatter marks may often be traced to faulty roll necks. If these are out-of-round, the body of the roll will be ground irregularly. If the necks are rough, have flat spots or are checked, a corresponding pattern will show on the roll body after even the most careful grinding. Unless anti-friction bearings are used, it is advisable to resurface the neck journals frequently.

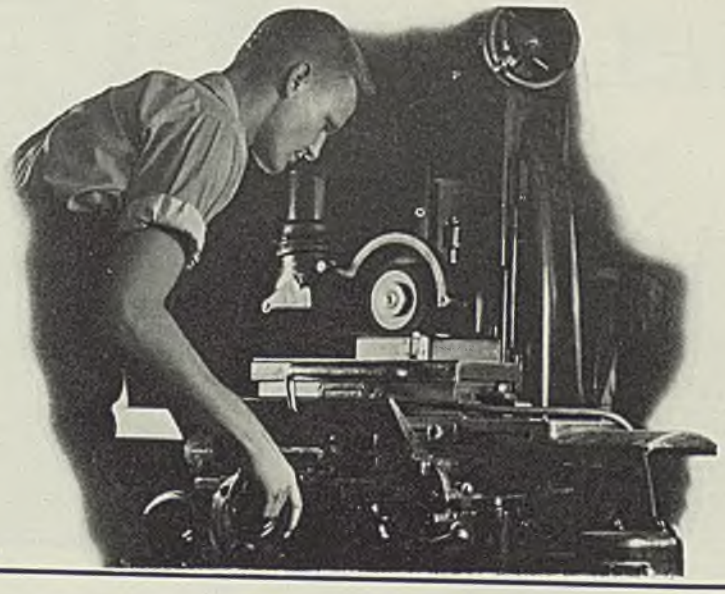
Roll supports or neck-rests should be somewhat shorter than the journal bearings unless the necks are newly ground. Theoretically, the rests cannot be too wide, but due to the different diameters that must be accommodated, it is advisable to confine the width to the minimum. This is best done by having flat rest contact surfaces. With 2-point neck-rests, the front rest should have such an angle that the roll is forced

(*Please turn to Page* 86)

"Ferris Wheel" for Automatic Metal Spraying



■ Here is a 100 per cent mechanized job of copper spraying at Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The same "Ferris Wheel" technique can be applied to many other operations. Blocks of carborundum roll down the upper trough into pockets in the periphery of the wheel which carries them around opposite the metal spray gun at right. Here copper, melted from a No. 12 wire by a gas flame, is atomized and blown against the blocks. Gun nozzle oscillates slowly to form a smooth coating over the entire end of each block. Wheel continues on around, depositing coated blocks in lower or discharge trough. Blocks are used as electric resistance elements



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SHELL CLEANING

Alkali washing equipment has been improved greatly since 1914-18. Also, a new method—vapor degreasing—has been developed and produces exceptionally satisfactory work. Latest types of machines for both methods are described

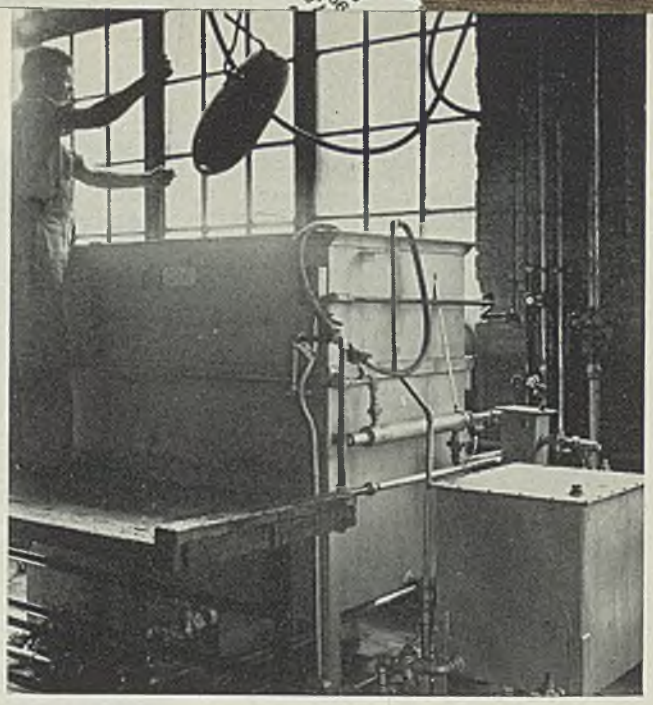


Fig. 4—Cleaning 140-pound aerial demolition bombs in a batch-type solvent degreaser. Rate is 60 per hour

■ AFTER the machining and threading operations have been completed on the forgings for shell bodies, they are completely covered with oil and chips. It is necessary to remove both the oil and the chips before final inspection and painting operations can be accomplished. There are two ways in which this job may be done; that is, by alkali washing or by solvent degreasing.

The first method, that of alkali washing, is the older of the two and was used almost entirely during 1914-18 for shell cleaning. The application of alkali washing at the present time differs from the methods used 20 years ago as various mechanical improvements have been added, resulting in more thorough cleaning. The most notable of these is the oscillating spray nozzle.

Four Cleaning Stages

In alkali washing the shell bodies are held inverted in a fixture suspended from a monorail-type conveyor as in Fig. 1. There are four stages in this type of cleaning. First, a hot alkali solution is sprayed up into the cavity of the shell, cleaning both the cavity and internal threads, while the side sprays are cleaning the outside. The spray nozzle that cleans the inside is an oscillating type of a special design that hits the inside of the shell 28 times during this operation. There are four of these special nozzles in each of the four sections of the washer. They are all oscillated in tandem by separate electric motor drive.

After they leave the wash section there is a drain provided so the solution may drain back into the first tank and thereby cut down carry over of alkali solution. The work then enters a rinse tank where four more oscillating nozzles are used, spraying clean hot water inside the cavity while the outside is being rinsed by side sprays.

The oscillating spray is an important development as it permits more effective cleaning. After the solution strikes any portion of the shell cavity, the jet swings away, affording an opportunity for the solution to drain off and carry the oil and chips with it before the jet again strikes to flush off more of the dirt. Repeating this cycle 28 times on every portion of the shell interior thus provides exceptionally efficient cleaning.

There is another drain section provided before the shell goes into the third cleaning stage where compressed air is blasted on the parts.

By M. A. SNELL
Cleveland Representative
G. S. Blakeslee & Co.

This blow-off removes the excess globules of water.

Then the shell enters the last stage where live steam is sprayed both inside and out using four more oscillating nozzles. This steam spray gives a final clean vapor rinse and raises the temperature of the shell bodies so they dry rapidly when they hit the air. There is ample space on the outside of the machine for convenient loading and unloading.

These machines are built to accommodate any size from 75-millimeter up to 155-millimeter and the larger navy shell (10 and 12-inch). Production ranges from about 150 per hour on 155-millimeter up to 250 per hour on 75-millimeter.

It was pointed out at the beginning of this discussion that the above is an older cleaning method. While it did a good job 20 years ago and is doing a good job today, it is nowhere as positive a process as solvent degreasing. The reason for this is that alkali washing depends entirely upon mechanically removing the oil and chips by the stripping action of the sprays and no part of the shell can be thoroughly cleaned unless these sprays directly hit that part. As against this, vapor degreasing removes the oil more by a chemical reaction and thus is less dependent upon mechanically flushing the oil and chips from the surface.

Equipment Improved Greatly

Solvent degreasing is comparatively new in this country and has only been commonly used for the past eight or nine years. But during this time tremendous strides have been made in the design of the equipment and handling of the solvent. A solvent degreaser of the vapor spray design is used in cleaning shell from 75-millimeter to large naval shell. The usual vapor spray degreaser consists of a double sump tank. One sump is used for boiling the solvent to generate a concentrated vapor. This then rises in the machine till it reaches the level of pipes around the inside surface of the tank. This coil of pipe carries circulating cold water which condenses the vapor as it reaches that level, limiting its rise in the tank to that point.

The other sump is supplied with clean cool solvent which has been condensed by the circulating water condensor at top of vapor level. The clean cool solvent from this sump is pumped through sprays for mechanically removing chips and

OXY-ACETYLENE FLAME-GOUGING is a New Shop "Tool"

What it is:

Flame-gouging is a variation of oxy-acetylene cutting. This process removes a fully-controlled groove or "gouge" of surface metal—without harm to adjacent areas. All that you need to use for gouging is a *standard* Oxweld C-31 or C-32 cutting blowpipe, and a gouging nozzle. These nozzles are available in three different sizes to fill all requirements.

How it is used:

The most common uses of flame-gouging include:

—Removal of faulty or temporary welds.
—Gouging the backside of electric welds.
—Preparing plate edges for welding.
—Maintenance, reclamation, and scrapping.
—Redesign of forgings and castings.
—Preparing broken castings for repair.
—Fabrication of parts requiring a "groove."

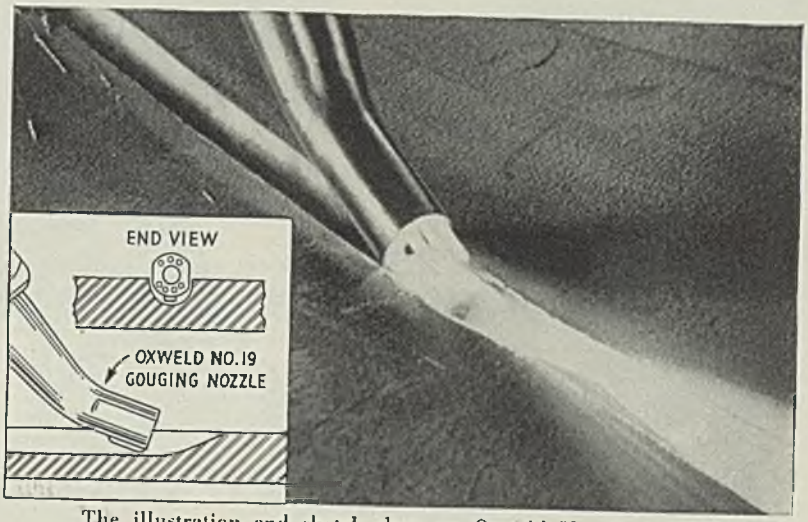
While this process has only been available about one year, its uses seem to be limited only by the ingenuity of the operator and the shop needs that arise.

What its advantages are:

In addition to use in large fabricating plants, gouging offers particular advantages for the small shop—because it can do so many things that formerly required equipment not found in small shops. Some advantages of gouging are:

—It reduces shop noise.
—It is easy to learn and use.
—It requires only a small investment.
—It replaces expensive tools and machining operations.
—It eliminates costly hours of grinding and chipping.

Write for descriptive literature—if you want to know more about this process, write for "Flame-Gouging, An Economical Method of Grooving Steel." A copy will be sent without obligation.



The illustration and sketch show an Oxweld No. 19 gouging nozzle making a groove $\frac{3}{8}$ in. wide and $\frac{1}{4}$ in. deep in steel plate.

A Few Typical Uses

In the construction of tanks, a typical sequence of operations is shown above. Machine-cut plate edges (1) are welded as in (2), then gouged as in (3), for the back-up weld (4).

In preparing steel for welded fabrication, mechanized gouging with Oxweld machines is often used.

One user reported that he makes liquid-level gauges by gouging a channel in steel plate, then facing it with glass.

Studs temporarily welded on to steel pipe, to hold a testing head, were easy to gouge off with Oxweld equipment.

This 750-ton *universal* type Birdsboro Press is doing a mighty job in National Defense. With it, *all* pressed, sheared, formed and deep drawn parts for one and two-seat attack, pursuit, small bombing and training planes are being formed—at high speed —under perfect control.

It offers 3 types of operations; rubber pad, die cushion, bending brake — 3 types of control; fast manual, full automatic, supersensitive micro-manual.

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SPECIFICATIONS

Bed Area—120" R. L. by 50" F. B.
Adjustable Daylight—60" max.
Adjustable Stroke—48" max.
Depth of Draw—22" max.
Closing Speed—20" to 240" per min.
Pressing Speed—11" per min. max.
Opening Speed—240" per min.
Main and Die Cushion pressures adjustable by stepless increments through unusually wide range.

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inert material. The solvent used is essentially trichlorethylene, inhibited to stabilize it against photochemical decomposition.

There are two designs of vapor spray degreasers used for cleaning 75-millimeter shell and larger. The first type, Fig. 2, is what is known as a batch type. Here shell bodies are lowered into the concentrated vapor zone either singly or in multiple racks, depending on shell sizes. As these racks reach the bottom of the tank they engage a switch which turns on a flow of clean solvent, that sprays up into the cavity removing the air, chips and dirt so the vapor may reach every portion of the cavity for a final clean vapor rinse.

After 15 or 20 seconds of spraying, the shell is moved to a vapor compartment where it is allowed to come up to the temperature of the vapor which is 188 degrees. This also gives a final vapor rinse which removes all trace of oil on the surface and penetrates into the pores of the metal as well since the hot vapor condenses rapidly on the comparatively cool steel of the shell. The shell is then raised out of the degreaser by means of a hoist and is immediately ready for final inspection and painting as it is dry and clean.

Loaded by Hand

The other type of degreaser, Fig. 3, is an automatic unit. This machine has a double sump tank also which is filled with a concentrated vapor. The conveyor consists of a double strand roller chain with cross rods on which free-swinging fixtures hold the shell in a slightly inclined inverted position.

In one machine the fixtures may be so constructed that they accommodate all three of the common sizes in the group of 75-millimeter, 90-millimeter and 3-inch anti-aircraft shell. The next larger rack will accommodate both 105-millimeter and 155-millimeter shell. The work is loaded by hand into these fixtures and the conveyor moves through the vapor and then travels over a spray zone where the units are sprayed from both top and bottom. They then travel through another vapor area where they are subjected to a final vapor rinse. There is an automatic unloading feature on this equipment whereby the shell are delivered onto another conveyor that takes them away for the final operations of inspection and painting.

When shell have been cleaned by the solvent degreasing method, they are rendered 100 per cent chemically free of all oil and grease, which insures a perfect bond for acid-proof paint on the inside and the lacquer which is applied to the outside. This is very important because of the rigid inspection to which shell are subjected. As the steel is hot when it comes from the washer, the paint dries almost instantly, which means less time is lost before packing and shipping. It is not possible to guarantee such results from the alkali method of cleaning because there is no positive assurance that either all of the oil may be removed or that the shell may not have a fine film of alkali or that the pores may not hold some of the alkali solution. For this reason, then, the opinion of all concerned with shell production appears overwhelmingly in favor of solvent degreasing.

Cleaning by the degreasing method is economical for this type of work. Equipment now is operating at a cost of one gallon of solvent for 10,000 pounds of work cleaned. Taking into consideration the type of cleaning obtained from degreasing and the positive assurance of practically no rejects, this appears by far the most acceptable method of cleaning shell.

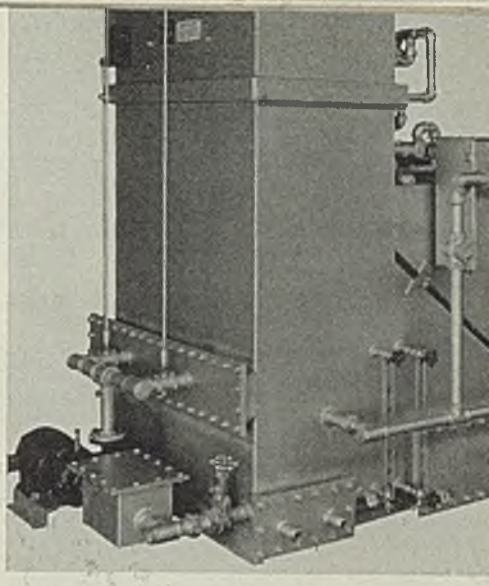
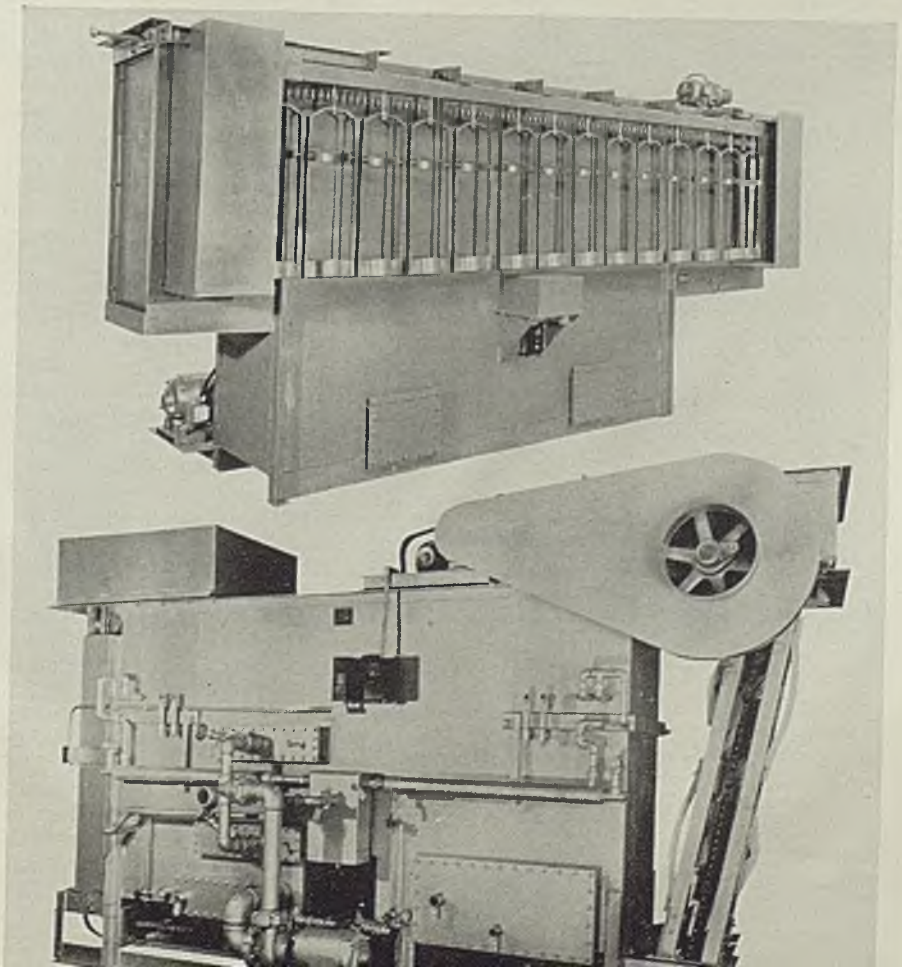
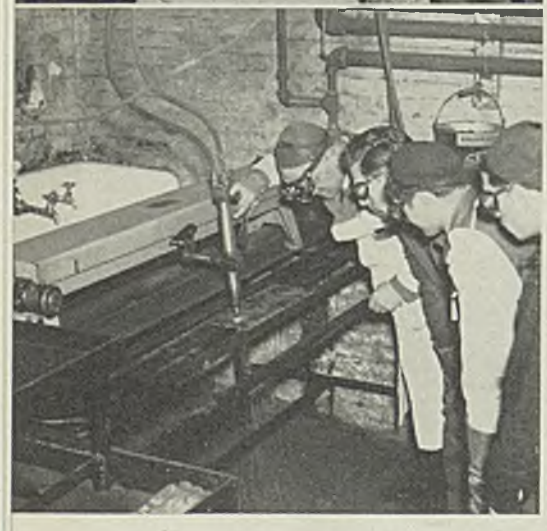


Fig. 2—Batch type, solvent or vapor type degreaser. It handles 155-millimeter shell at rate of 100 per hour, 10 or 12-inch naval shell at 40 per hour, either one at a time or in multiple in racks, depending upon shell size

Fig. 1—Alkali cleaning equipment, top view, washes, rinses, air blasts and steam blasts the shell, using special oscillating type nozzles to swing the spray jet across every portion of the surface 28 times in each of the four stages of washing. Unit is controlled automatically, work going through on a monorail conveyor. All illustrations show equipment made by G. S. Blakeslee & Co., 1844 South Fifty-second avenue, Chicago

Fig. 3—Automatic, high-production type vapor degreaser, lower view: It handles shell sizes 75-millimeter and larger at high rates, and cleans two hundred 75-millimeter or one hundred 12-inch shell per hour. This is type used for modern high-production shell manufacture





Students at Haller Welding School, 522 Bergen street, Brooklyn, N. Y., learning the oxyacetylene processes

How To Get WELDING OPERATORS

By HAROLD LAWRENCE
Welding Engineer

Here Mr. Lawrence tells what to look for in selecting a public or private outside school from which to hire men. Too, he points out what co-operation between the welding plant and the school can do to help assure the manufacturer of the exact type of operator he needs

■ AMERICA needs skilled mechanics in large numbers—especially welders, for even during the depression, the welding industry experienced a steady growth and new welders were absorbed by plants as fast as the men acquired the requisite skill.

Now the need for welding operators far outstrips the ability of available sources of supply to meet the demand. The nation's great need for welders simply means that industry must take a hand in the task of training. Right now there are three sources of supply for welding operators—welding schools outside industry, welding schools within industry and apprentice training programs within industry.

Heretofore the production of young and skilled welders has been an almost effortless procedure unaccompanied by the usual pains of birth. At least the welding foreman, the plant superintendent and the company personnel director were spared any intimacy with the pains involved. But changing times have brought the need for first-hand acquaintanceship into brilliant focus. That the personnel director of a plant using gas welders exclusively cannot use an abundant supply of arc welders is apparent. Yet these boys who spent their money to become arc welders would have been just as willing to study gas welding as they were to undertake instruction in arc welding. And the school was as well prepared to teach one as the other. Then why did these boys take the wrong course? Merely because of lack of foresight on the part of those who had an urgent need for up and coming welders.

Without question the best course of men trained in welding is the private or public welding school. From the viewpoint of industry here is a potential supply of skilled artisans that may be had with almost no cost. These men can be tailored to fit specific requirements. They can be taught the exact procedures that are in demand. All that is suggested is that employers become articulate and let the schools know what training is needed.

Co-operation, the First Step: In getting men from an outside source, someone, preferably the welding foreman or shop superintendent, should first inspect all welding schools in the surrounding territory. Based on what this individual learns on his inspection tour, one or more welding schools can be approved for the future supply of operators. By co-operating with those schools, the employer will then be assured of a sufficient supply of men whose basic skills mesh exactly with his needs. The schools selected are pleased because their graduates are assured employment. The trainees are happy because they realize a course of study is being pursued straight to a job. And the personnel director beams because of a certain backlog of properly equipped workers. All this good is wrought of the metal of co-operation between employer and school.

Before making this selection, the foreman or superintendent should familiarize himself with the whole situation. There are public and private schools. Either or both may prove satisfactory. The public schools are good or bad, depending upon the backing given them and the type of instructor at the head of the work. The more numerous private schools fall into three classes—legitimate, gyp, and poor but honest.

Legitimate: The legitimate schools have been established for the primary reason of producing good welders. While they plan to make money, they are not the "making-hay-while-the-sun-shines" variety as they are building for permanence on the solid ground of honest teaching for a proper cost. While the cost of training in such a school may be greater than in some others, the trainee will take away full value in training received.

Gyp: The fundamental excuse for the existence of the gyp school is the tremendous hustle and bustle of those rearming America. As most young men seeking training are totally unfamiliar with welding practice, they may be fooled by the

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WISSCO WIRE
BY WICKWIRE SPENCER

gyp operators. Here, as elsewhere, a bargain may be measured by the low cost of the course rather than by the yardstick of value received. Fortunately, state supervisors of education and better business bureaus are doing much to combat this evil.

Poor But Honest: The last classification, and the most vicious one, is the poor-but-honest welding school. While the owners may try to give the student an honest return for his investment, they may be as unfamiliar with welding and welding needs as the prospective students. Industry can do much good in this type of school. When a school of the poor-but-honest type is uncovered by the foreman or superintendent, he has made a find that will yield many profitable results from a simple expenditure of directive effort. Perhaps the loan of an instructor from the plant will be all that is required. Or a conference or two with plant engineers and welding foremen may turn the trick. The poor-but-honest school will do wonders with co-operative guidance from industry.

When the entire output of the nearby training centers is already allotted, industry is forced to establish its own training school. Just how this is done and just what definite groundwork is indicated will be discussed in a coming article.

Another helpful arrangement is apprentice training within industry. This plan does not aim to give the operator a comprehensive training in all the fundamental skills, but only on a specific job or operation. It will be the subject of a third article in this series. It has the important advantage of producing man-hours of gainful work far sooner than the other two.

Aptitude Essential: Since the first things ought to come first, consider the selection of trainees by schools. While public schools must accept every applicant up to their capacity, they can and *must* eliminate inept students at an early point in the proceedings. Attempting to train backward students only deprives others of an opportunity to take the courses. Beyond this, it unwittingly delays the all-important national defense effort.

Legitimate private schools are exceptionally careful about the men they accept. They are in a position similar to that in which many doctors find themselves. They cannot afford to have too many patients die. They realize proper selection is essential to keep their mortalities to a low percentage while increasing their utility to the industrial community at the same time.

All recognized private schools have an agreement that is fair to both sides. If, after a reasonable and patient effort, it becomes apparent that the student will never make a good welder, the school refunds the tuition balance covering the unexpired instruction hours. Thus the school prevents further waste of the student's money and their facilities. Likewise, if the student becomes discouraged and wishes to discontinue, the unexpired portion of his money is refunded without question.

Course of study will be one evolved out of discussions between school directors and the welding foreman, plant superintendent or welding engineer. Courses that fit in with the needs of all industry include those in arc welding, oxyacetylene welding, and some of the lesser processes suited to specialized applications. Materials encountered must be considered and theory is not to be overlooked completely. Oxygen cutting may also be studied. Finally, courses in blueprint reading are warranted if the graduates are called upon to work from prints.

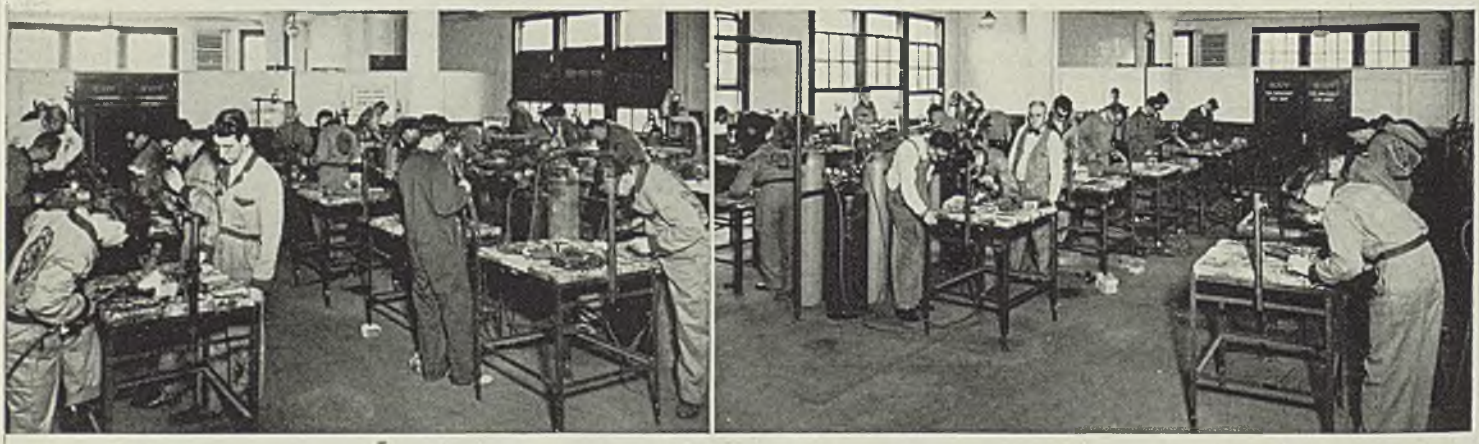
Merely specifying the ability to teach metallic arc welding is not enough. Perhaps the carbon arc method is indicated for certain operations. What about the thickness of material to be welded? Techniques used in a sheet metal plant differ greatly from those in heavy plate fabrication. Do the future employers position all their work? If so, long hours spent in mastering the difficult overhead and vertical welding positions are likely to be wasted.

Quite the same problems come up in oxyacetylene welding courses. Tubing for aircraft construction and heavy pipe for pipe lines are very different problems. Further breaking down of instructional efforts must be based upon definite situations that will confront the student upon graduation into a job.

All types of materials are being welded. Among them are carbon steels, alloy steels, cast irons, nonferrous metals and many others. Today when time is so limited, there is no need to study any but the materials to be found on the job. Usually any change in materials is not likely to be great enough to bother the graduate after he has supplemented his training skills with further ability from daily operations in production.

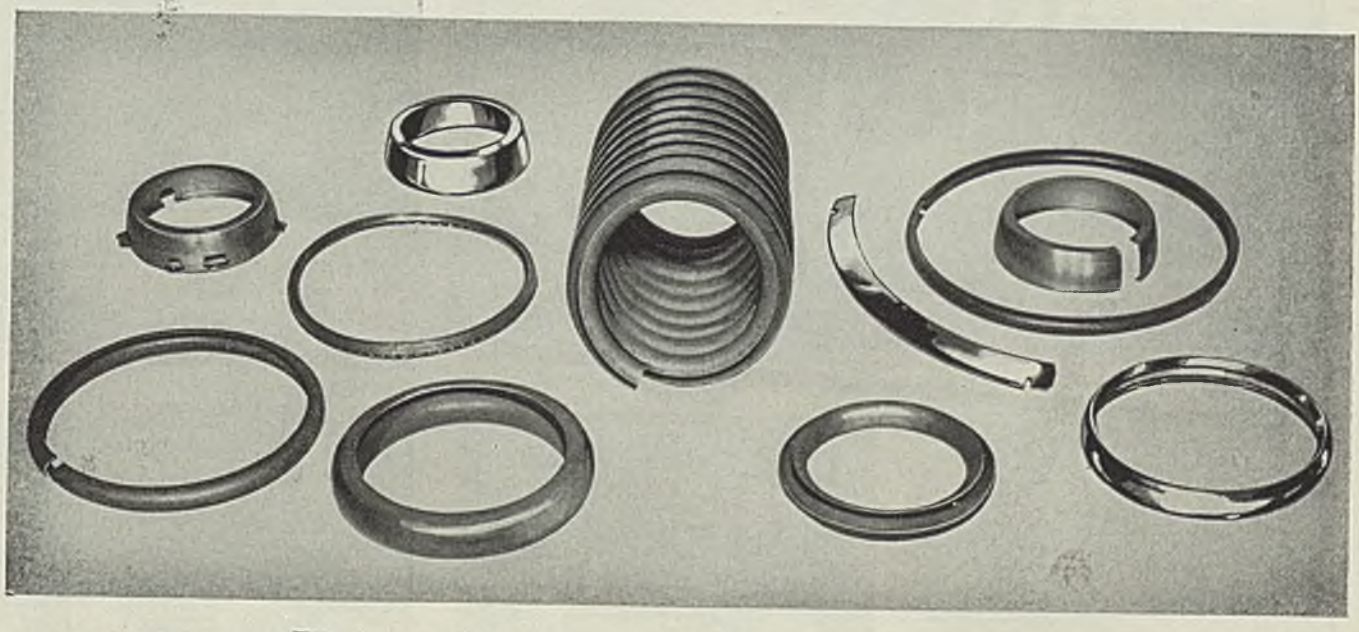
Since the low-carbon steels have been welded for years, the procedures associated with this work are well established. Still the rudiments must be explained to the beginner to whom they represent an entirely new experience. Steels with increased strength from more carbon, more manganese and silicon, require certain precautions that must be recognized in the heavier gages. This fact can be explained by the schools.

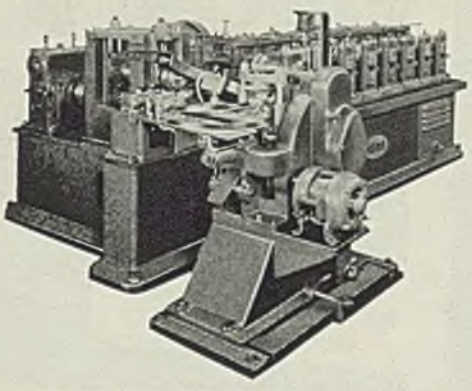
Armament needs cannot be satisfied fully with the low-carbon steels. Alloys are finding their rightful place in aircraft construction that combines high strength with light weight. Pressure vessels for high-pressure and high-temperature service are fabricated of alloy steels. Armor is an alloy plate material.



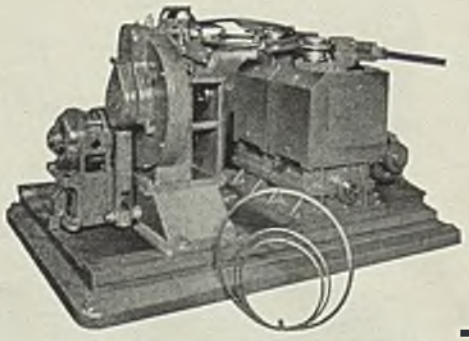
Two views in the oxyacetylene department of New England Welding Laboratories Inc., 88 St. Stephen street, Boston. Left shows welding work, while brazing is being done at the right

"COIL FORMS"
circular shaped parts
ADVANTAGEOUSLY





Set up for cold roll forming, coiling and cutting off of radiator grill part.



Machine for forming and cutting off rings for retaining tops of drums.

Yoder machines are not only capable of forming sheet metal into practically unlimited shapes but of coiling these formed strips and cutting them off in circles or segments while accurately retaining their essential cross sections.

The above group illustrates a few such parts including a starter part for a French car, a paint can top retainer ring, an auto grill part, a chromium headlight band, top locking rings for steel drums and a headlight ring for a popular American car. The coil in the center illustrates a particularly difficult forming operation. To make this open-sided ring of thick metal required exceptionally close coiling and ingenious handling to prevent distortion.

The saber-shaped auto grill at the right of the center is an example of segment forming.

To the left of the coil is a ring with a raised design which was embossed into the flat metal before it passed through the forming rolls.

Yoder engineers are justified by long service, breadth of experience and accomplishments in feeling capable of designing machines to produce many difficult parts now made by slower and costlier methods. They urge you to send parts or blueprints for examination or to request a representative to call and discuss your problems over your own drafting tables.

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UNITED STATES STEEL

Each specialized industry looks to particular properties of an alloy steel, a steel the newcomer must be able to weld.

It is evident from these considerations that this is the point where the plant welding foreman or superintendent can co-operate with the school to help guide them in teaching only those procedures and skills which the new recruit will actually be called upon to use when he becomes part of the plant force. And right here is where the co-operation between school and plant is important today.

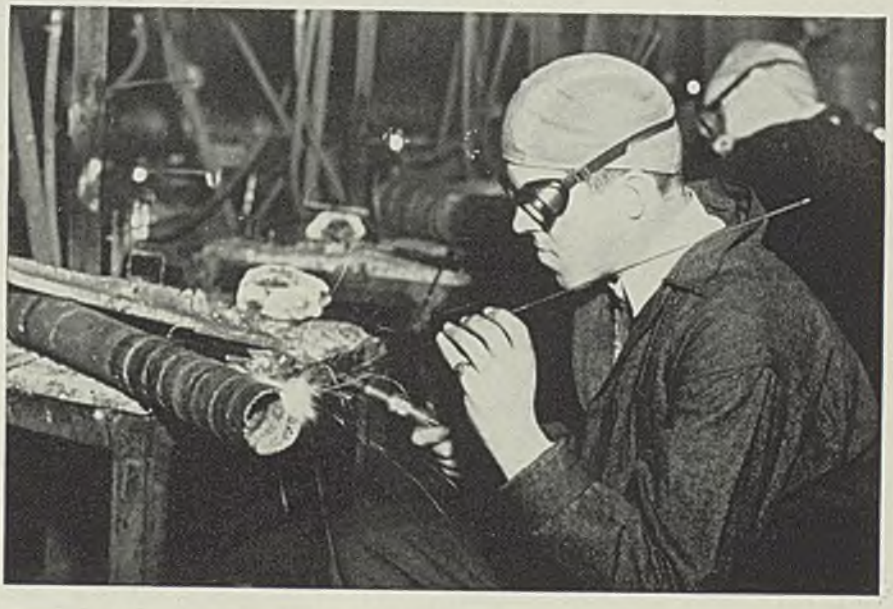
Often certain welding procedures for the newer nonferrous metals and other jobs are matters of recent development. Frequently the manufacturer of these metals or some other outside expert may be needed to supervise the first welds.

All practice and no theory makes a poor foundation for a welder. Most youngsters have a curiosity about the whyfor and the wherefor behind their welding activities that should be answered by discussions of welding theories and simple welding metallurgy. Time spent in such discussion is not wasted. The learner in welding tires rapidly during his first manual exercises. New muscles to precise control become exhausted in a hurry. But the mind of the man is not dulled, and he can absorb the ideas brought out in a discussion period even though his welding muscles have played out.

Frequently a need for instruction in oxygen cutting is pointed out by employers. The normal waste in oxygen cutting by inexperienced cutters is shameful. With cylinders as scarce as they are and with oxygen and acetylene capacities being strained to the limit, continued waste is nothing short of industrial sabotage. Here the schools, through courses in oxygen cutting, can teach the proper use of cutting equipment and gases.

Blueprint Reading: If the student is slated for employment on repetitive work where no blueprints are to be found, why waste his time? Blueprint reading can always be learned later if the student wants the subject for general knowledge. The main idea is to get the embryo welder into production as rapidly as is consistent with good teaching policies.

What Equipment? The matter of equipment for welding schools deserves more attention than it gets. If the school turns out welders for several industries, varied types of equipment should be available for student use. Whereas large plants sometimes standardize on equipment, this same practice is not proper for a welding school. Familiarity with the various common makes enables the student to find his way better in his later productive effort. Valuable production time may be lost while the welder becomes accustomed to the new equipment.



Closeup of student at Cleveland School of Welding Inc., 2261 East Fourteenth street, Cleveland. Note gas line manifolds across bench in background

Variety in equipment applies to electrodes as well as to generators and their auxiliaries. Not only should the basic types be found but also should more than one brand be used. There are variations in the same general types of electrodes dependent upon the maker's interpretation of his customers' needs. Learning to use all of the more prominent types, makes and sizes tends to develop sound ability.

In gas welding, differing brands of regulators can be set up for regular use. In discussion periods these devices may be disassembled and their operation explained. The more the student knows about the inner workings of his equipment, the more apt he is to get good service and long life from it. The same practice can be followed with welding and cutting torches. The equipment for cutting may well include both manual and automatic. Where all cutting is done manually, the knowledge of automatic operation may serve as a goal for proper hand work.

Whenever a survey is made of welding schools, particular heed should be given to the quality of instructors. A welder who has gone into teaching because it demands less effort than working at a welding job is apt to make a poor instructor. The teacher must be able to *teach*. Unless the man is able to get across his explanations so the pupil follows them easily, the instruction is lost. In a welding school, the leader needs a far better background than the mere ability to weld, and this fact cannot be overemphasized.

Instructors, From Where? Good teachers are the product of both large and small shops. Those from the larger plants are better versed in specific kinds of welding while the men who performed most of their work in small shops are likely to have a more diversified ability. It is possible that no instructor will be found for the precise training needed, although more than one school will qualify on all other counts.

Situations similar to these are best met by installing a regular shop foreman or welder as instructor in the school. The aircraft industries in particular have solved their problem by loaning foremen to schools. At the cost of one good foreman, they were able to train hundreds of good welders in the very methods of welding peculiar to their work. Others are sure to follow this clear-sighted lead.

Of interest is the number of instructors in the school. Welding is a personal training problem with only the theory being given in group instruction. There must be enough instructors to provide ample individual instruction for each student. One instructor for each four to six students has been established in one well known school. However, this number is subject to some flexibility. The main consideration is to be certain the instructors are not spread out too thinly.

Definite welding exercises must be established. Too often the welding apprentice practices without any predetermined exercise in mind. Dilatory practicing of this nature may do much more harm than good, for the trainee must observe penetration, build-up, fusion and other elementary factors of making his weld every moment he is welding.

(Please turn to Page 76)

GAS-FIRED OPEN-HEARTH FURNACES

Design of streamlined open hearth firing natural gas involves factors of combustion and output. Combination burner using low-pressure gas for atomizing fuel oil is now under development

By GEORGE M. PARKER
Mississippi River Fuel Corp.
St. Louis

■ LITTLE work has been done in developing an open-hearth furnace that would take advantage of the factors favorable to natural gas. A make-shift arrangement of burners that would somehow put enough gas into a furnace to melt steel has been the general method employed in firing open hearths with natural gas. This has perhaps been true because the competitive prices at which open-hearth gas must be sold are not high, and if this market is considered as a market for firm industrial gas, it may not be particularly attractive. However, if this market is considered as a market for off-peak gas and a design can be developed which will permit the ready substitution of other fuels, the prices that can be secured for gas are attractive and the large volumes involved make this outlet one of primary importance to the natural gas industry.

Considerable experience has been had with the various methods that have been used and it is believed that enough data are available to permit the design of a streamlined gas-fired open hearth that will be efficient and satisfactory and that will successfully burn more than one fuel. It is high time that the industry undertakes this job, for, as the cost of natural gas increases and higher prices must be charged for it, the industry will lose what open-hearth market it has unless more efficient gas-fired furnaces are developed.

Design of such a furnace is not a simple matter for it entails a thorough knowledge of all the elements, both from the standpoint of the burning of fuels and from the standpoint of the production of steel. Regenerator design should be modified to take advantage of the fact that there is much less carry-over of material when natural gas is properly fired. Checker settings and checkerbrick should be considered in the new design, not in the light of past practice, but in the light of latest information. A study must be made of the latest developments in high-temperature recuperators. If a satisfactory recuperator is available that will handle the temperatures reached in the operation of open-hearth furnaces, it would have inherent advantages over the regenerative cycle. The streamlined open-hearth must be able to burn more than one fuel with equal or almost equal efficiency and should be controlled within the same narrow limits as other types of gas-fired equipment. With the hope of securing all available information that would be of value in designing such a furnace, full scale experimental and operating data has been secured covering the operation of furnaces now equipped for natural gas firing in the conventional manner, furnaces equipped for natural gas firing using the reformed gas process and furnaces equipped for firing gas and oil in combination.

Need Velocity for Results

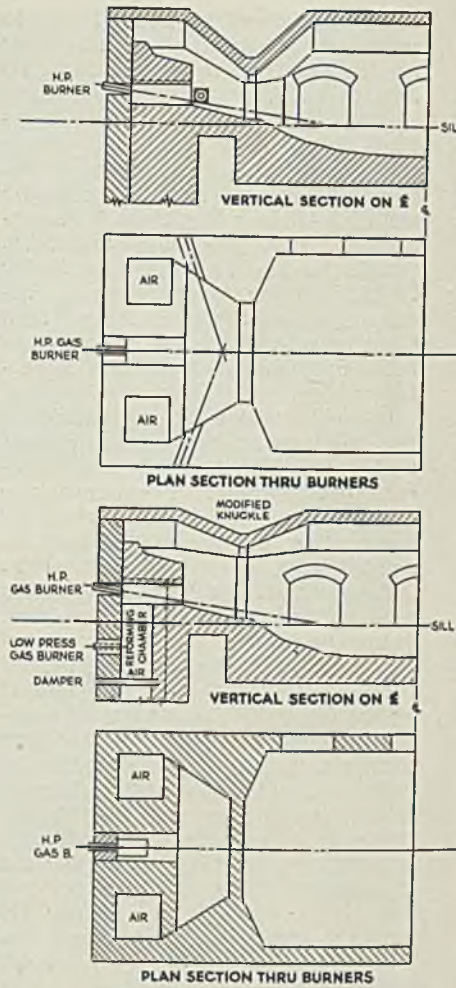
In order to fire natural gas in the conventional manner and get good results, the furnaces must have knuckled roofs and constricted throats in order to give velocity and direction to the burning gases so that they can be held down on the molten bath.

Where the reformed process is used, experience to date indicates that the knuckled roof and throat area can be considerably modified, and it is believed that further modification can be made beyond the point we have now reached. Changes of this sort necessarily are made step by step as radical changes without data to support them invariably cause unforeseen difficulties.

The importance of the modification or elimination of roof knuckles and throat constriction lies in the fact that it would permit the instantaneous substitution of oil for gas in such a furnace. The substitution of oil for gas in knuckled furnaces for extensive periods of time is unsatisfactory because the highly radiant oil flame tends to melt down the knuckle.

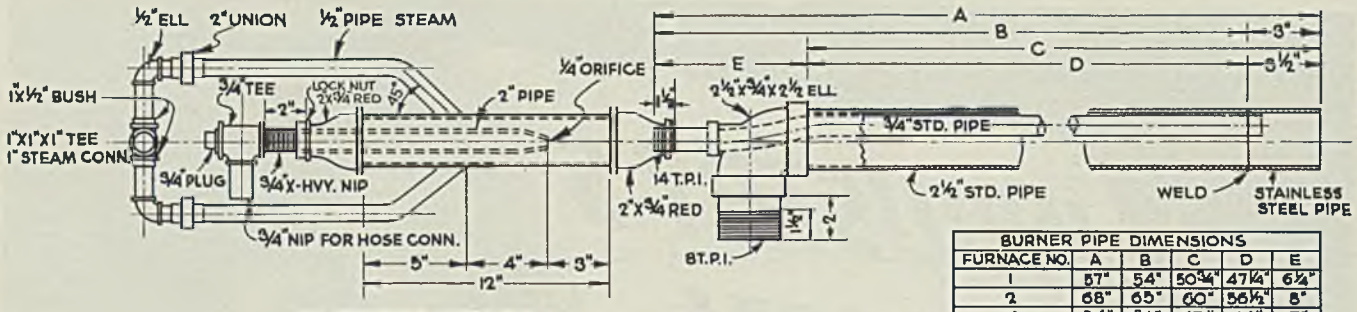
The best practice of firing oil and gas in combination seems to result from a burner designed to fire the oil flame above the gas. The weight and velocity of the oil flame tends to hold the lighter gas flame down on the bath. This combination method of firing lends itself readily to the substitution of oil for that portion of the fuel input ordinarily supplied by natural gas.

Experiment is now going on, working toward a design of a combination burner in which gas



Top view, conventional method of firing open-hearth furnace. Below, arrangement of furnace for reformed process of firing

From a paper presented at the industrial and commercial session of American Gas Association, Dallas, Tex., May 7.



OIL ATOMIZING ASSEMBLY

BURNER PIPE DIMENSIONS					
FURNACE NO.	A	B	C	D	E
1	57"	54"	50¾"	47¼"	6¼"
2	68"	65"	60"	56½"	8"
4	54"	51"	47"	44"	7"

NOTE: D DIMENSION VARIES WITH FURNACE DESIGN

Oil atomizing assembly designed to fire the oil flame above the gas

at relatively low pressure (25 to 50 pounds) will be used to atomize the oil, thus avoiding the expense of steam for atomization and the losses entailed by the carrying into the furnace of a considerable amount of inert steam which must be raised to furnace temperature.

When discussing the fuel economy of open-hearth operation, it is most important to define the factors involved, for so many kinds of steel are made and they vary so greatly in the amount of heat and time required to produce them that it is easy to become confused and make erroneous comparisons.

Too few gas men are well informed and are prone to make such comparisons with the result that most practical open-hearth operators are wary of our statements. We are paying the penalty for the years when natural gas was so cheap that the amount of fuel involved in accomplishing a heating operation was unimportant and little was done to improve the efficiency of gas-fired equipment. The data, experience and standards of those years rise to plague us.

Fortunately, this undesirable situation has been largely overcome in the more refined heating operations. The development of highly specialized heating furnaces which take full advantage of the many factors favorable to natural gas have not only lowered the B.t.u. requirement for a given operation, but they have played a large part in the development of new high-grade products and have been responsible for some of the greatest advances in the steel industry. Going along with the great improvement in furnace design and efficiency, and almost directly proportional to it has been the increased value of natural gas to the steel industry.

Not enough thought or money has been expended by the natural gas industry in the study and design of the large melting furnaces such as open-hearth furnaces and glass tanks where such a large volume of fuel is consumed. The industry should recognize the potential possibilities of this market and through its research committee and in conjunction with some representative steel company undertake to develop a gas-fired open hearth and to build such a furnace to serve as a demonstration of what can be done with natural gas. Perhaps two types of furnaces should be developed, one type which would burn either natural gas or producer gas interchangeably and another furnace which would burn either natural gas or oil interchangeably.

Approves Pluramelt For Pressure Vessels

■ Integral-bonded, alloy-lined plate, called Pluramelt, manufactured by Allegheny Ludlum Steel Corp., Pittsburgh, has been approved by the boiler code committee of the American Society of Mechanical Engineers for use in the construction of fusion-welded, unfired pressure vessels. This recognition was contained in a recent ruling on the re-opening of A.S.M.E. case 896.

An additional provision of the ruling, especially significant to manufacturers of such vessels and similar equipment, extends the list of acceptable armor or liner materials to include nine of the standard corrosion-resisting chromium and chromium-nickel alloys. The ruling also removes previous restrictions on inclusion of armor thickness in design calculations. The interface must develop a minimum shear strength of 20,000 pounds per square inch, and duplicate bend tests are required with the alloy facing in tension and compression.

The nine armor materials which the committee ruled acceptable are stainless types No. 410, 430, 446, 304, 310, 316, 317, 321 and 347. All are produced under the Pluramelt process in accordance with the boiler code materials specifications.

The re-opening and ruling on this boiler code case means that manufacturers of pressure vessels will enjoy greater latitude in selecting alloys most suitable for meeting corrosive conditions and a wider choice of backing steels to meet strength requirements of design.

New Manual Aids in Maintaining Production

■ Trying to do a "plus" job for its customers in aiding them to maintain continuous production, New Departure, Bristol, Conn., recently issued a *Shop Manual* prepared especially for men responsible for the correct installation of ball bearings and their subsequent maintenance.

The manual is available, gratis, to any member of a company's personnel interested. It points out approved methods for handling, mounting and lubricating ball bearings, giving details that affect accuracy. Illustrations throughout aid the reader in understanding the various techniques involved.

Revised Standard To Be Effective Next Year

■ Since receiving signed acceptances from a number of manufacturers, distributors and users, estimated to represent a satisfactory majority, the National Bureau of Standards, United States Department of Commerce, Washington, announces that commercial standard CS17-42, "Diamond Core Drill Fittings," may now be considered effective for new production from Jan. 1, 1942.

This revised standard was circulated in the industry for written acceptance last March in accordance with the action of the standing committee. Printed copies of it will be forwarded to each acceptor of record as soon as available. Nonacceptors also may receive them from the Department of Commerce only on specific request.

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Better Gasoline for Fighting Aircraft Made Possible by Catalysts

Higher anti-knock ratings in the gasoline used improves the fighting power of an airplane. Read here how catalysts—metals and their compounds—are used to put more power into gasoline

By E. A. ARNOLD
Associate Professor of Chemistry
Case School of Applied Science
Cleveland

■ Slightly better gasoline is said to be the answer to Britain's successful resistance to the overwhelmingly superior number of Nazi planes. Gasoline with higher octane values as made by a series of catalytic processes enables the user to fly at higher speeds and to get more power out of the same engine.

Here Professor Arnold in the third article of this series on catalysts tells how airplane gasolines are being further improved to make America's already acknowledged superior aircraft still better. Section one, STEEL, June 16, explained how metals are used as catalysts and some of the problems involved. Section two, last week, showed how catalytic processes are playing an important part in assuring adequate raw materials for explosives.

■ OF VITAL importance in the defense program is our petroleum industry as on it depends the motor fuels so necessary for modern combat. Today's demand for more and better fuels, especially aviation gasoline, is being met successfully by the use of catalytic processes.

When natural petroleum oil, or crude oil as it is called, is subjected to distillation, the various hydrocarbon compounds present distill off in order of their volatility. Thus, the crude oil may be separated into various fractions or "cuts" depending upon volatility. These various cuts or fractions are used for a variety of purposes. One is used for gasoline, another for kerosene, still others for fuel oil and various lubricating oils as well as very volatile dry-cleaning fluids and the like.

But the demand for gasoline far exceeds the amount that would be obtained by straight distillation. Too, the amount of the less volatile fractions would be far in excess of the needs for fuel oil, lubricants, etc. Therefore, the petroleum industry has concerned itself with increasing the yield of that fraction useful as gasoline. This has been done largely by a process known as "cracking." Undoubtedly, some cracking takes place during normal distillation, but now cracking processes have been developed to control the amount of the various fractions to increase yields of that fraction valuable as gasoline.

What is cracking? Cracking is a means of causing those heavier and less volatile constituents to be broken down into compounds containing fewer carbon atoms. These new compounds are more volatile than the more complex compounds from which they are formed. Therefore more of the gasoline fraction is formed at the expense of hydrocarbons that would otherwise have been in the heavier lubricating fractions. But cracking produces a greater percentage of material even too volatile for use in gasoline.

It is in treating these extremely volatile constituents that catalysis has made great strides. Much of the gas coming from a cracking plant is composed of unsaturated hydrocarbons containing two to four or five carbon atoms to the molecule. By catalytic polymerization, these molecules react to form heavier molecules of a volatility useful as gasoline. As an example, if a butylene containing four carbon atoms and propylene containing three combine, they form a heptylene containing seven carbon atoms. Accompanying illustration shows what is called by the Universal Oil Products Co. a "midget catalytic polymerization plant" for converting these gases into high-octane gasoline.

The tall tower in the foreground is a hydrogen sulfide scrubber to remove this constituent from the gases coming from the cracking plant. The gases next pass to the unit at the left where they are heated up to about 400 degrees Fahr. Before heating, the gases have been compressed to a pressure of about 500 pounds per square inch. The heated and compressed gases go to the two catalyst towers in series. These units contain solid phosphoric acid as the active catalyst. The gases leaving the catalyst tower pass into the stabilizer in the right center.

Here the mixture is stripped of those compounds whose volatility is too high to be useful, and the compounds of suitable volatility are condensed.

While the catalyst is inclined to decrease in activity as time goes on, merely increasing the original compression of the gas used tends to overcome this. In a test recently run over a five-month period, the catalyst was found to have changed from 88 to 84 per cent conversion efficiency and during this time had yielded somewhat in excess of 70 gallons per pound of catalyst.

Depending upon the composition of the gas used in the polymeriza-

tion unit, the yield of polymer gasoline varies from 12 to 20 gallons per thousand cubic feet of gas used. In addition, this fuel is of high quality from the standpoint of anti-knock and has what is called a high octane rating with an octane number of 80 to 85.

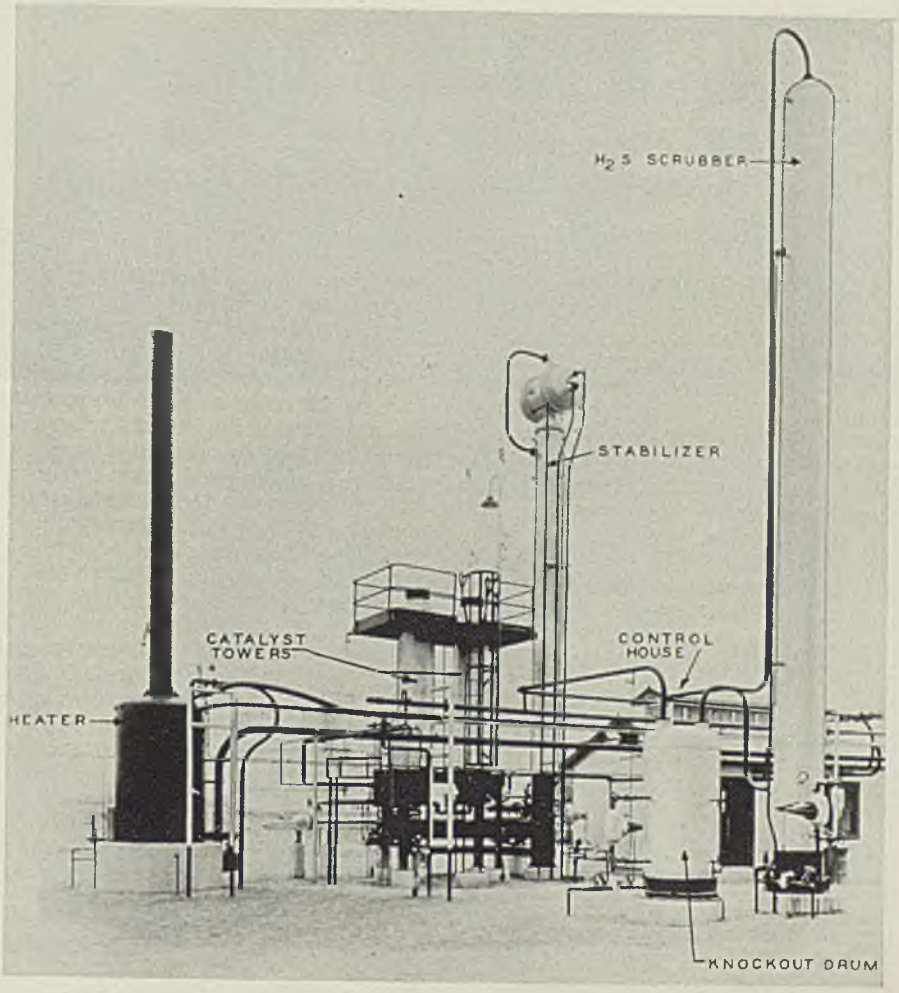
Aircraft demands especially are for high-quality motor fuels. Since 1925 common speeds of an airplane have increased from 80 to more than 250 miles per hour while ordinary automobile speeds have been stepped up from 60 to 100 miles per hour. More efficient fuels such as the high-octane gasolines are largely responsible for this improved performance. But increased speed is not the only gain through using these fuels as 20 to 30 per cent more power at normal speeds may be obtained. With engines properly designed to take advantage of this increase in power, pay loads may be increased.

Another important advantage of these polymer gasolines is their uniformity. The old straight-run gasoline was apt to be quite variable as to the percentages of the various hydrocarbons present as well as the number of different hydrocarbons. In the case of polymer gasoline, the crude oil is cracked to simple hydrocarbon gases and then, in a sense, resynthesized so the product will not only be composed of fewer hydrocarbons but the percentages present will be more uniform.

Processes such as this also tend toward a more efficient use of our crude oil supply since they enable the refiner to control the amount of the various products produced. In days past, the amount of gasoline obtainable through straight distillation was a comparatively small proportion of the crude oil used. This meant that the crude used was to a considerable extent dictated by the amount of gasoline necessary. This in turn caused a condition in which the products obtainable from the distillation of crude oil rather than gasoline were always in excess of the demand.

With the refinements mentioned, the yield of gasoline can be stepped up at the expense of those other fractions. Today, it is possible to obtain a yield of gasoline from a refinery which may run as high as 85 per cent of the crude oil used.

Iso-Octane Gas. Another interesting development in petroleum technology that promises to have an important bearing on our fuel economy is the production of iso-octane gasoline. Certain compounds act as knock inhibitors. Of two hydrocarbons containing the same number of carbon atoms, generally that compound with the carbon atoms arranged in a branched chain is a better knock inhibitor than that in which the carbon atoms are all arranged in a straight chain. Therefore, iso-octane, a branched-chain hydrocarbon, should be a better fuel than octane, the straight-chain hydrocarbon having the same number of carbon atoms but arranged in a straight chain. Therefore gasoline containing iso-octane should be of great importance as a fuel for airplanes.



This midget polymerization unit is made by Universal Oil Products Co., Chicago, and used by Mohawk Petroleum Corp., Bakersfield, Calif., to make high anti-knock gasoline from cracked petroleum gases. Photo courtesy National Petroleum News, Cleveland

The units for making this type of fuel are small, and several of them may be used. The material used is a gaseous mixture coming from the stabilizer of the cracking plant, the composition of which is about 50 per cent butane and 50 per cent butene. Both of these compounds are hydrocarbons containing four carbon atoms in a chain, but the *butane* is saturated with respect to hydrogen whereas the *butene* is unsaturated. If this gaseous mixture, previously compressed to about 700 pounds per square inch, is heated to about 250 to 325 degrees Fahr. and then passed through a catalytic polymerization unit like the one described in the discussion of polymer gasoline, the polymer produced is largely iso-octene which is now an 8-carbon branched-chain hydrocarbon. There are in addition do-decenes and cetenes which are 12 and 16-carbon atom chains. These have a volatility too low for gasoline so the product coming from the polymerization unit must first be distilled to separate the iso-octene fraction.

But iso-octene is a hydrocarbon unsaturated with respect to hydrogen. So to produce the desired *iso-octane,* the *iso-octene* must be made to react with hydrogen. This involves another catalytic process. The mixture of the polymer and hydrogen heated to about 325 degrees Fahr. and compressed to about 70 pounds per square inch is passed over metallic nickel which brings about hydrogenation and yields iso-octane. In this step the metallic nickel used is finely divided nickel on a suitable support to give it porosity.

The iso-octane produced is not of itself a good motor fuel as it lacks volatility, but by blending with straight-run gasoline and iso-pentane, it is possible to produce motor fuels having an octane number of 100 or better.

Portable Stress-Reliever Controlled Automatically

■ SEVERAL units for stress relieving welded joints in the field, as well as for preheating the pieces to be welded, were recently built by H. O. Swoboda Inc., New Brighton, Pa., for use in defense production. Primarily designed for pipe work, these units also can be applied to any small welded joint or through modifications in the design, which is quite flexible, to almost any particular weld.

Consisting of resistance wires encased in refractory unit insulation, the heater units are wrapped around the joint as shown in Fig. 1. It is obvious that any size joint can be stress relieved through this method, whether it is pipe-to-pipe, pipe-to-valve, or pipe-to-fitting, because the heating coils naturally will cover any size. The leads then are connected to a panel mounted on wheels, which carries recording and control apparatus, see Fig. 3.

A number of these heating units can be used on a joint to permit maintenance of the desired temperature for any specified distance on each side of the weld. Temperatures as high as on the weld itself can be maintained by the automatic control. The distance on each side of the weld is usually specified as a minimum of six times the pipe wall thickness.

In practice, there are two steps in the operation. In the preliminary operation, thermocouples are welded to the pipe at either side of the weld and the first two heating coils are wrapped around the pipe and covered with a thin layer of asbestos, approximately 1/16-inch, for protection during the welding operation. These heaters are then connected to two of the three Foxboro potentiometer controllers and

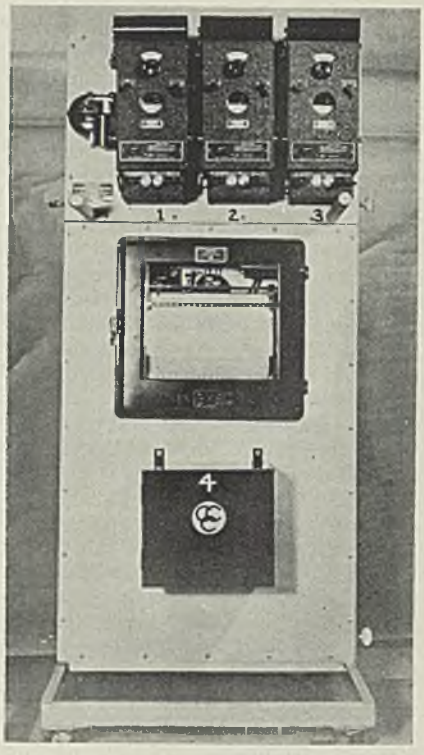
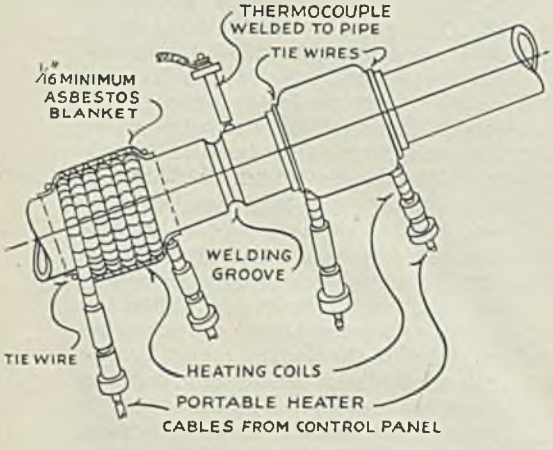
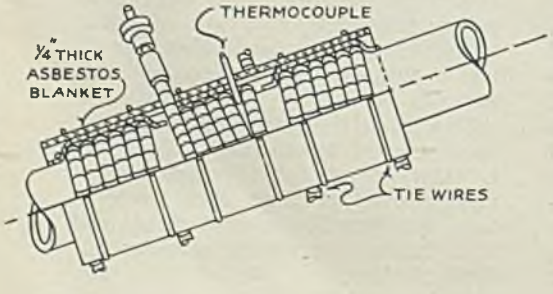


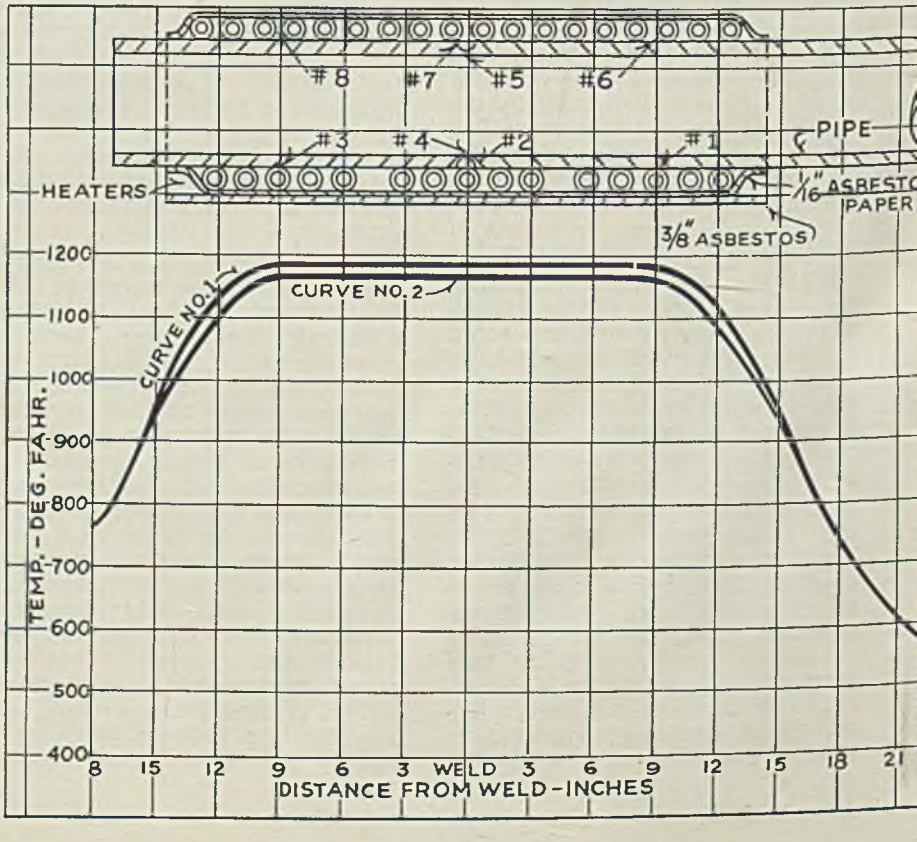
Fig. 3—This is portable control panel for the equipment. It includes three Foxboro potentiometer controllers at top, mounted for group drive by one motor. A 3-pen recorder potentiometer, center, charts the temperatures

Fig. 1. (Left)—Upper section shows how heating coils are installed for preheating the work prior to welding. In lower section, a third coil has been added, giving the setup required for stress relieving

Fig. 2. (Right)—Stress-relieving temperature curve obtained on 12-inch diameter pipe, 1¼-inch thick wall, butt welded. Wrap-around heaters operated through 3-point automatic control. Curves represent temperature distribution obtained from three 9-kilowatt 16-inch pipe coils one-half hour after reaching temperature on all three points of control. Temperature controlled from couples 1, 2 and 3. Temperature difference between inside and outside of pipe was 25 degrees Fahr. Curve 1 shows bottom outside temperature on couples 1, 2 and 3. Curve 2 shows top outside temperature on couples 6, 7 and 8







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the pipe ends are brought up to about 500 degrees Fahr. preparatory to welding.

The weld is then made, and a third thermocouple is attached directly to the weld. The third heating coil is then wrapped around the weld and a ¼-inch layer of asbestos is placed over all three coils to prevent radiation losses. Temperatures are then increased to the stress relieving level and maintained automatically by the controllers, each controller operating one of the heating sections. A three-pen Foxboro potentiometer recorder keeps a continuous record of the temperature. Units are intended for use at working temperatures up to about 1250 degrees Fahr. They have at times been used at higher working temperatures. Usual load is 45 amperes at 220 volts.

The remaining instrument on the panel is a Clark contactor, which must be used when a heavier load is required on one coil, such as when stress relieving a pipe-to-valve joint. The valve body with its considerably larger amount of metal and consequent increased rate of heat dissipation requires a substantially increased load. In this case, the contactor is used to aid the mercury switches of the controller which might not otherwise be heavy enough to carry the current.

Because of the flexibility of the unit and its adaptability to joints of widely varying size, it is obviously impractical to set a definite time cycle by means of the heaters themselves. For this reason an input regulator is included on the control for extending the full capacity heating time of the unit by any desired amount, as well as to permit retarding the cooling cycle.

Johns-Manville Offers New Fire Brick Line

■ A new line of insulating fire brick designed for direct exposure in a wide variety of furnaces, ovens and other heated equipment, except where subject to slag action or mechanical abuse, is reported by Johns-Manville, 22 East Fortieth street, New York. It is suitable for use with temperatures ranging between 1600 and 2600 degrees Fahr.

The brick are produced from a plastic refractory clay and an organic filler. They are furnished in four temperature limits: JM-16, for exposed service to 1600 degrees Fahr. and for back-up service to 2000 degrees Fahr.; and JM-20, JM-23, and JM-26 for exposed or back-up temperatures to 2000, 2300 and 2600 degrees Fahr., respectively.

The new line supplements the company's Sil-O-Cel series of back-up insulating brick. It is being produced in Johns-Manville's newest plant, at Zelienople, Pa., which was rushed to completion to meet the need for such materials in the industrial expansion program for defense.

Announces Rust-Proof Finish for Copper

■ A new Electro-Jetal process which gives a black rust-proof finish by anodic oxidation is announced by Alrose Chemical Co., Providence, R. I. According to the company, it can be used on any metal that can be copper plated.

The process consists of a special electrolytic oxidizing bath which covers the preplated products immersed in it with a velvety black surface in about 2 to 5 minutes. The black surface provides a good base for an after treatment of oil, wax or lacquer.

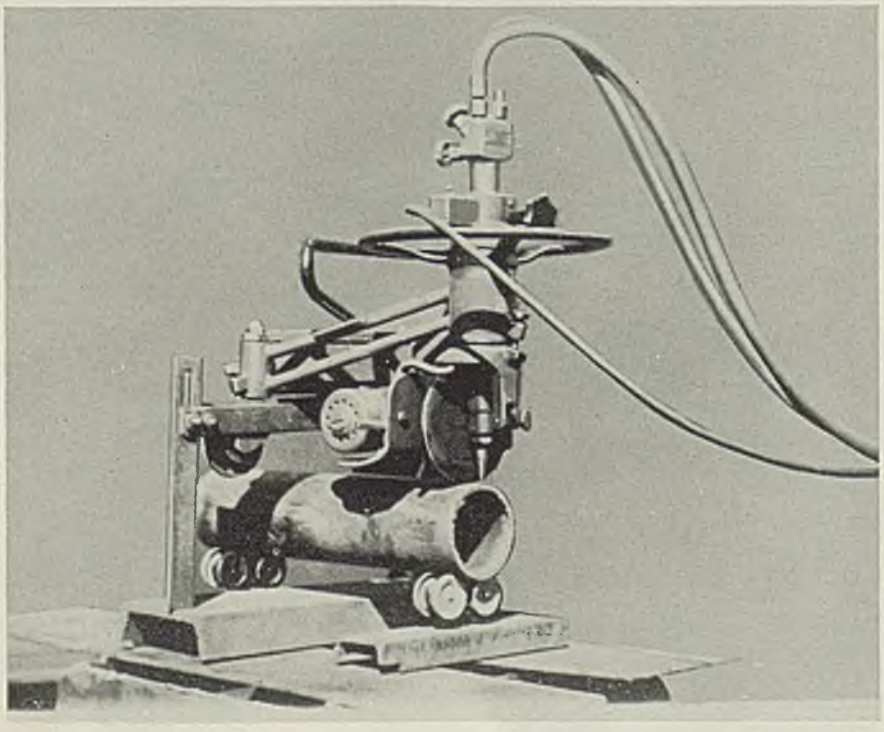
The bath can be operated at any temperature below the boiling point of water, using ordinary steel containers, heated by steam coil. Work can be oxidized on racks, in bulk or in baskets. According to the company, the chemical cost, exclusive of copper plate, is approximately 25 cents per thousand square feet of surface.

How to Safeguard Capital in U. S.

■ *Dollars and Sense,* by Edwin Trent; paper, 88 pages, 6 x 9 inches; published by Kensington Press, New York, for $2.

This booklet is in response to inquiries as to the operation of the economic system of the United States and how to safeguard capital. It is for all who are interested in money. It attempts to present a concise but comprehensive picture of our economic system and to explain methods for safeguarding personal accumulations of capital. In nontechnical language it explains the working of money economy. It also attempts to show what is over the horizon and what can be done about it. It also reveals for the first time a tested investment formula.

Facilitating Cutting and Beveling of Pipe



■ This simple device facilitates the cutting and beveling of pipe with a standard portable cutting machine made by The Linde Air Products Co., New York. Two channel-iron sections, mounting ball-bearing rollers, support the pipe, and a third, heavier channel-iron section mounting vertical angle-iron arms and strap-iron cross members between which the rear wheels of the cutting machine are clamped. Slots in the vertical supporting arms permit adjustment of the rig for various pipe diameters. In the illustration, cutting machine and pipe are positioned for making a square cut. Bevels are made by substituting a bevel-cutting attachment for the standard cutting nozzle shown. Since the cutting machine is rigidly clamped in place, motive power supplied by its electric motor is transmitted through the drive wheel to the pipe, rotating the pipe on the ball-bearing rollers. Speed of pipe rotation is governed by adjustment of the motor

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How To Get Operators

(*Concluded from Page 65*)

Unless these observations are made early, the student is building his learning superstructure on an extremely poor foundation.

One way of making the practice adhere to a definite pattern is to establish a library of correctly completed exercises. Each student may compare his effort with a similar and accepted effort made by one of his predecessors. Properly selected standards that may be excelled by the better students will provide a constant incentive to good work.

Having fixed examples to be worked allows the instructor to classify his groups. He can place the better men in one section and the poorer in another. The pace to be set is neither too slow for the brighter boys nor too fast for the plodders. In this instance, too, a more rapid production of graduates is obtained.

Frequent tests and checks of the work completed are essential to the success of any welding school. In making his report, the foreman or superintendent would do well to detail what checking is done. Unless the instructor examines and discusses each completed project with the apprentice welder, misdirected efforts may easily lead to the formation of bad welding habits. Tensile tests, bend tests and etch tests in addition to thorough visual examination all enable the instructor to impart his message with better force and direction.

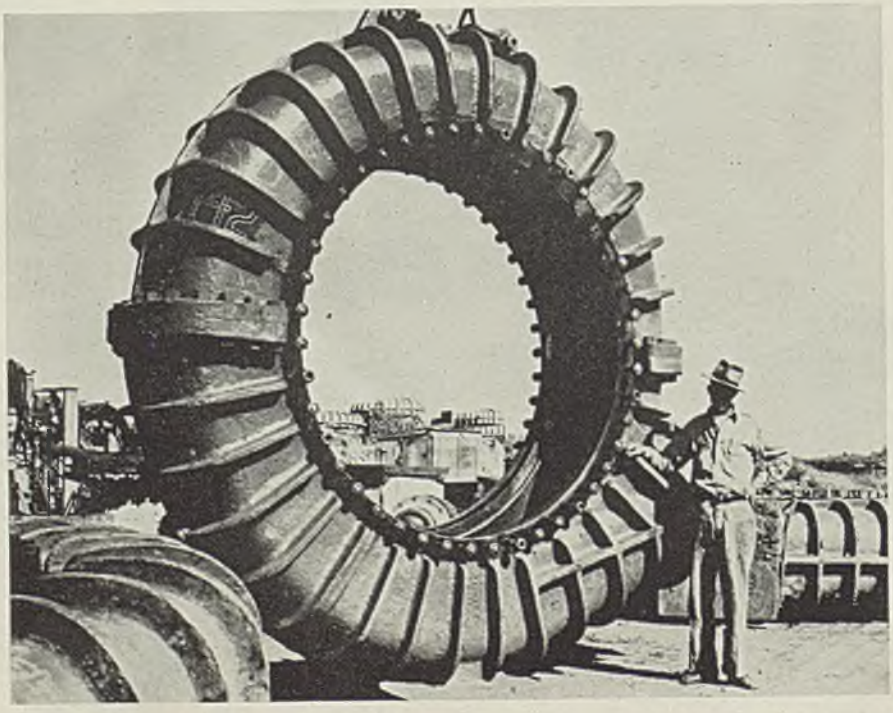
Formerly, even during the production doldrums of the last decade, recognized welding schools had little difficulty in placing their graduates. Today these same schools have an impressive waiting list. New users of welding labor cannot be added to the list while old employers of the graduates are forced to wait. The only solution is to contact a well equipped but less known school and then work out a curriculum designed to satisfy the concern involved.

The plan outlined here is the least expensive of the three available. Thorough co-operation will produce an ample supply of apprentice welders. Of course, these men cannot jump into the middle of production without a further helping hand, no matter how sound and thorough the training job, as there are certain to be some outstanding differences between school work and productive effort.

But the period of readjustment will be short if the basic training upon which the new employe can draw is sound. As soon as the few differences between plant work and school work have been mastered, a regular output of work becomes routine. Foremen will be pleased at the ability of the carefully selected workmen to produce with a minimum of individual attention. If a good training program has been well completed, the quality of the welding will be better than normal.

The new day of co-operation between industry and the public and private welding schools is at hand. An opportunity exists for both to profit. And simultaneously—vital production of defense equipment will be aided.

Welding Saves Time, Money on U. S. Project



■ Pump bodies for dredging operations at Ft. Peck, Montana, formerly had to be replaced every 21 days. Electric arc welding recently was adopted for their repair with resultant large savings in time and money. Centrifugal pumps are the only method used to put dirt in the fill on the project. With 28-inch suction and outlets, each dredge pumped an average of 45,000 cubic yards per day. Photo courtesy, Hobart Brothers Co., Troy, O.

Reports Latest Results Of Nitrogen in Steel

■ Increasing recognition is being given by steelmakers and metallurgists to the pronounced importance of nitrogen on the aging qualities of steel. Results of some new research on this subject were presented recently by C. L. Altenburger, research engineer, Great Lakes Steel Corp., Detroit, before the Detroit chapter of the American Society for Metals.

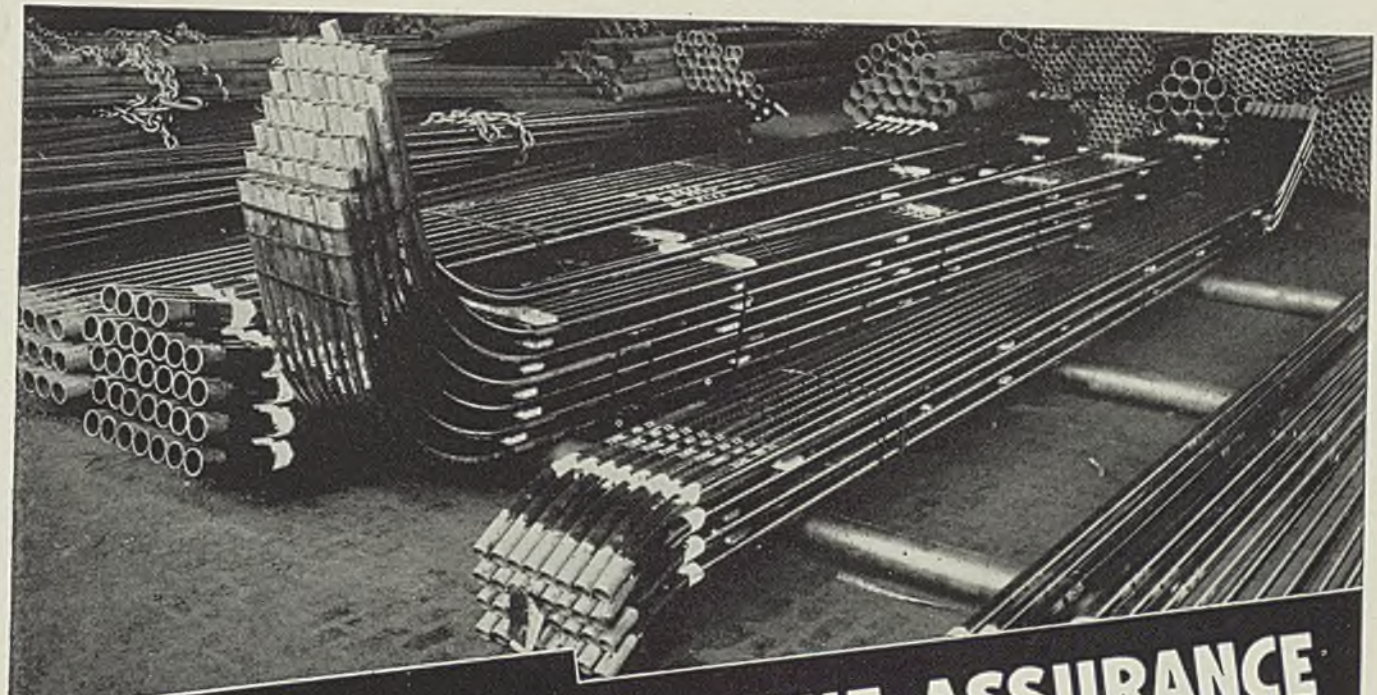
Nitrogen is present in most steels, in infinitesimally small amounts. By varying the degree of nitrogen present, some striking changes are effected in tensile strengths in the range of temperatures up to 1000 degrees Fahr., about 400 degrees being the point at which maximum effect is observed. Maximum increase in tensile strength of nitrogen-treated open-hearth steels was determined to be 28,000 pounds, at 400 degrees.

Mr. Altenburger classified commercial steels into four groups—(1) unstable in both normalized and annealed conditions; (2) unstable in normalized and stable in annealed state; (3) stable in both conditions; and (4) stable in normalized and unstable in annealed conditions.

Example of the first class are rimmed steel and coarse-grained killed steels; of the second class, fine grained killed steel with considerable excess of aluminum used in killing—as much as 5½ pounds per ton; of the third class, fine grained killed steel with excess of zirconium, titanium or columbium used in treatment. There are no known examples of the fourth classification, although they can be produced experimentally.

Stable steels have lower tensile strengths as temperature increases, while unstable steels show just the reverse.

Taking nitrogen into consideration, some entirely new concepts of aging phenomena can be determined. Specification of steel on the basis of aging capacity may prove to be practical.



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Whether for locomotive, stationary or marine boilers, for fire tubes or water tubes, for average pressures or high pressures, for straight tube or bent tube applications, *Pittsburgh* Seamless Tubes will give long and dependable service.

Available in a full range of sizes and wall thicknesses, hot rolled and cold drawn, regular low carbon analysis or with copper or other alloy metals as required. Popular items stocked by distributors in a number of cities. Tubes furnished bent to specifications if desired.

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Industrial

FOR ACCELERATING

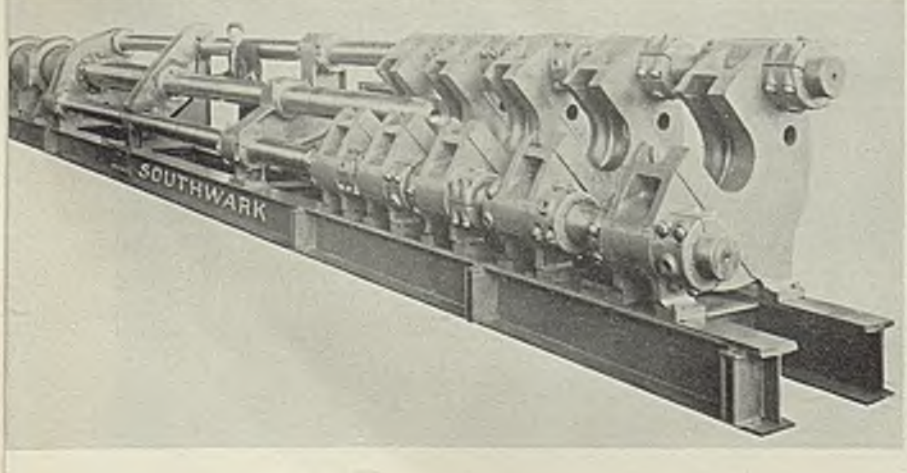
Holder for Markers

■ Acromark Corp., 251 North Broad street, Elizabeth, N. J., has introduced a new hand style Hercules holder for withstanding heavy blows in marking steel parts and castings. It is made of tool steel with the head drawn to prevent peening and dangerous mushrooming. The thumb clip that holds the

type is also made of steel. Each character of the steel type is machine engraved by three dimensional engraving equipment. The extra body to the type not only gives it a shoulder to facilitate positioning but also provides extra strength where needed. This tool is available in all commonly used sizes and also can be made to meet special conditions such as marking in curved lines and on cylindrical surfaces.

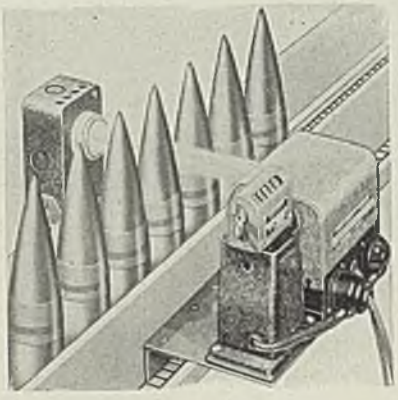
Draw Bench for 15-Inch Shell

■ Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia, recently developed a 340-ton horizontal hydraulic draw bench for drawing 12 to 15-inch shell used in naval and coast defense guns. As shown below, it has 5 die-holders. These are arranged so as to be horizontally adjustable and are designed for quick replacement of the ring dies. The forward end of the hydraulic piston is fixed to a crosshead guided on the columns; the water-cooled drawing mandrel holder moves through bronze bushings fitted on a fixed crosshead. The entire unit is mounted on a structural steel base to ensure proper alignment. The valve and piping arrangement for this unit is designed to give a high drawing speed and a fast return stroke to shorten the time during which the hot shell forging is in contact with the drawing punch.



Photoelectric Counter

■ Durant Mfg. Co., 1945-D North Buffum street, Milwaukee, announces an improved magnetic productimeter which when employed in conjunction with a photoelectric cell and beam projector will operate with great speed and accuracy. It is especially adapted for counting objects of odd shapes and sizes; items that are small and extremely light in weight; and articles the finish of which must not be marred during the process of counting. A feature of the unit is that it need not be installed at the point of contact. It may be placed in an office where the record of production can be taken whenever desired; or, two counters may be used, operated by the one photoelectric control; one at the point of contact, the other in some other strategic spot. The counter has a guaranteed speed of 500 counts per minute, and is available in 5 or 6-figure capacity. The illustration here shows the application of the equipment on a conveyor. The interruption of the light beam by each passing shell actuates the counter. Only three units make up the set—the magnetic counter,



the photoelectric relay, commonly called an electric eye; and the beam projector or light source. The set operates from a lighting circuit of 110, 6, or 220 volts, 60 cycles alternating current.

Machine for Finishing Tail End of Bombs

■ Landis Machine Co., Waynesboro, Pa., has developed a machine for completely finishing the tail end of bombs at one chucking. It also provides turning, facing, chamfering, boring, recessing and threading operations by means of three tools attached to the carriage and cross slides. One tool unit, consisting of a tool head with four tangential type cutters attached to a hydraulically controlled slide, turns, faces and chamfers the end of the bomb. A second tool unit having a hydraulically controlled slide to which is attached an adjustable 6-blade cutter head finishes the bore, and an auxiliary hand-operated tool slide machines the angular face, undercutting on the body of the bomb and the adjacent recess. The third tool unit, attached in a fixed position to the cross slide, comprises a

Equipment

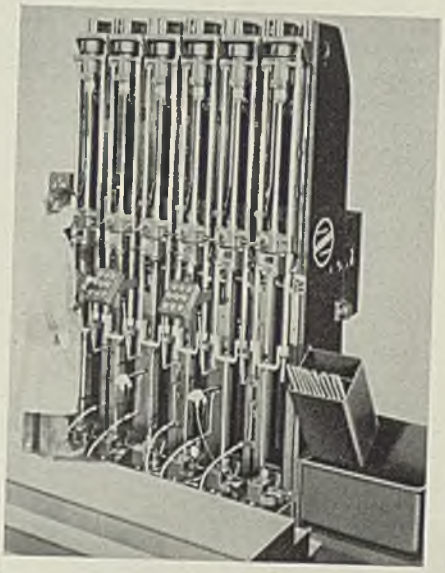
NATIONAL DEFENSE

die head which is especially designed for cutting fine pitch threads on large diameters. A leadscrew mechanism is provided on the machine to be used in conjunction with this. It is employed to propel the carriage along the ways of the machine so that the die head advances onto the work at a uniform rate of speed. All movements of the tool slides as well as those of the cross slide are hydraulically controlled with circuits arranged with interlocks to assure correct operating sequences. The cross slide is hydraulically locked into position on the carriage when any one of the tool slides is in action. Operating controls are centralized at the front of the machine, providing full control from a position permitting the observation of the tools in action throughout the entire machining cycle. The machine is equipped with a variable speed motor-driven headstock which includes a selective sliding gear transmission. This transmission provides 8 speed ranges for almost infinite variations from minimum to maximum spindle speeds. A pneumatically operated chuck is attached to the front end of the machine

spindle for centering and driving the bomb. The leadscrew mechanism is mounted in the bed and is equipped with a pick off geared drive for a range of 6 to 14 threads per inch.

Rifle Drilling Machine

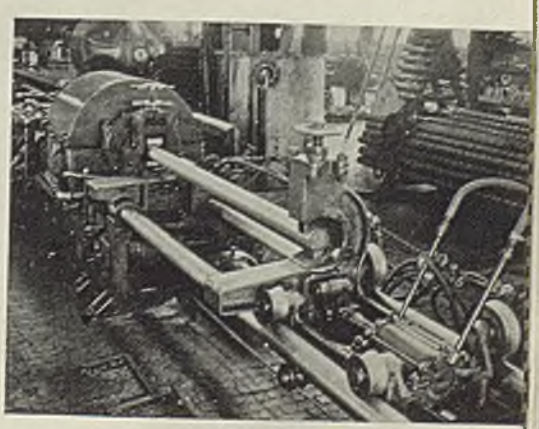
■ W. F. & John Barnes Co., Rockford, Ill., announce a multi-spindle rifle drilling machine which maintains the features of a single spindle unit while providing additional advantages. A 6-spindle vertical drilling machine, it is designed to drill rifle barrels within a minimum of floor space. It is controlled with pushbuttons from a platform in front, and by combining two units (see illustration) one operator can observe and control the drilling of twelve barrels. Each spindle is an individual machine. Each also is provided with individual hydraulic actuation, and has an automatically



actuated 3-jaw self-centering chuck for holding the rifle barrel. In addition, each is individually driven by cartridge motors through V-belts. The revolving barrels are fed down, over stationary single lip drills. Each spindle of the machine is provided with an individual coolant pump and the spindle heads are guided by opposed V-type ways. The headstock is coupled to the tailstock by steel tie-bars, providing alignment at all times. The latter is locked to the tie-bars so that both move as an integral unit. The tool holder is mounted on a slide to accommodate different lengths of drills and manually swings out of position so that a drill can either be withdrawn or placed in the holder. Each tool holder has an electrically interlocked torque overload protector coupled with the hydraulic system. A pilot light on the push-button panel indicates which tool is overloaded. Both the chips and coolant are received in the tailstock and directed to a motor-driven screw chip conveyor. The large particles are thus removed and coolant drains into sump. The main coolant pumps consist of six individual high pressure pumps driven by the same motor that drives the six individual hydraulic feed panels. Each of the spindle heads has an individual hydraulic system consisting of a piston-type feed pump and gear-type rapid traverse pump. All spindle heads are driven by one motor through a common driveshaft and multiple V-belts.

Bar and Tube Turning And Finishing Machine

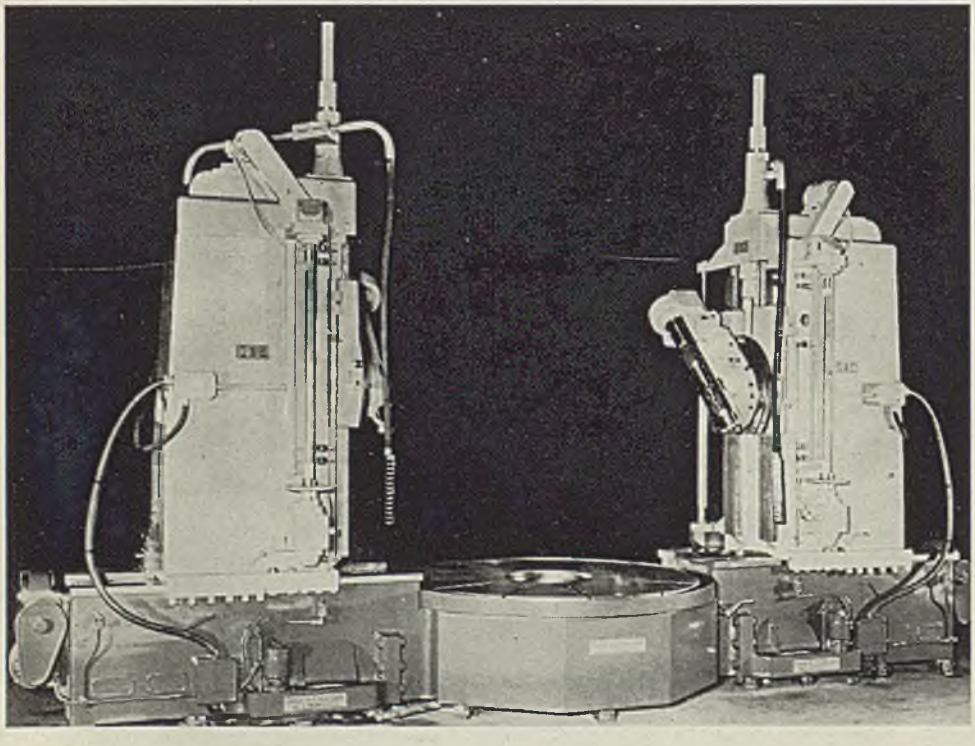
■ Medart Co., Potomac and DeKalb streets, St. Louis, announces several new model bar and tube turning and finishing machines designed to meet specific requirements. These are constructed to turn steel bars at the maximum rate obtainable from modern high speed tool steels. Illustrated is a representative unit of the company's RGF line. It is built for high production, centerless bar turning on bars in any length exceeding 10 feet. The machine's regular bar size range is 1 to 6 inches in diameter but it can be set up for larger sizes. Cutting is done automatically by two cutter heads using multiple tool slots. In operating this particular unit the operator need not leave his post. All controls are located within his reach. Bars may be introduced between the rolls either by means of a hydraulic pneumatic feed-in or by hand. The feeding device is positioned at the input end of the machine to enable the hydraulic cylinder under the table to feed the bar into the roll feed section. The company's new LSF centerless bar turning machine is designed for bars of lengths of 8 feet or more with diameters ranging from 1 to 4 inches or 1 to 6 inches. This unit utilizes lead screws on the feeding and discharging sides which regulate the rate of feed of the bar into the two cutter heads. Cutter heads are similar to those of the machine illustrated. Instead of being carried in a trunion, they are mounted on the outside of the hollow spindle through which the bar passes, one cutter head on each side. Main drive of the machine is a herring-bone gear, and motor connection is through multiple V-belts. Especially recommended for the



peeling of alloy steels such as armor piercing stock, stainless, etc., the HGF machine introduced is designed for handling bar lengths of less than 10 feet. Its diameter range is the same as for other units and can be set up to meet any requirements. This machine also is entirely automatic, the operator's only job is to enter the bar in the auxiliary feed roll. The SF machine announced by the company is designed for extreme accuracy. It is similar to the LSF type unit, except that it is equipped with only one cutter head. The cutter head in this case feeds the work through itself by means of threader cutting tools. The machine features the same bar diameter ranges as on other units, but the minimum bar length can be brought down to 6 inches.

Gear Hobbing Machine

■ Gould & Eberhardt, Irvington, N. J., has developed a new 120 H Universal gear hobber for producing high-speed marine turbine reduction gears on a production basis. It has a nominal capacity of 120-inch diameter, 48-inch face width at 45 degrees and 2½ diametral pitch, but at low helix angles will accommodate gears up to 160-inch diameter. Incorporating the vertical cutting principle, the unit is arranged with two cutter heads oppositely disposed, so



that both right and lefthand portions of double-helical gears may be cut simultaneously. The righthand cutter head feeds downward and the lefthand head upward. The hob slides are mounted on separate stanchions and travel on double rectangular guides provided with independent adjustments. Each stanchion is adjustable. The swivel heads have angular adjustments of 180 degrees for cutting right and lefthand helical gears of any angle. Separate power devices permit swiveling each cutter head to the correct angular hob setting quickly. The main gear mechanism and driving motors are located away from the machine proper for thermal isolation. All driving shafts are journaled outside of the machine to counteract the heat. In addition, to attain uniform temperature conditions the machine is surrounded by an air conditioned enclosure. The work table on the hobber is mounted on tapered roller bearings, while the vertical table load is taken directly on the flat annular bearings. The backlash between the worm and gear is maintained by the application of a new patented worm and gear designated "Dual-Lead worm gearing." The worm is arranged with a different lead on each set of profiles. The mating worm gear likewise is correspondingly modified on each set of its profiles so that a proper conjugate tooth action is attained in either direction of rotation. By axially adjusting this dual-lead worm the backlash is controlled without disturbing the center distance and without affecting the transmission of uniform motion. Accuracy of the final index drive is preserved by two sets of index worms and gears. The one worm gear set of coarse pitch is used for roughing, and by means of a separate individual motor drive it is used for truing the gear blanks for concentricity. When used for truing, the entire table drive is disconnected from the main mechanism of the machine. The other worm gear set is of fine pitch and is used exclusively for finishing. Hob spindles have a reverse-taper bearing with the small diameter at the nose end of the spindle. A circulatory-pressure system of lubrication automatically and continuously supplies filtered oil to the mechanism in the main gear case, to the work table, and to the two index worm-gear sets. Cascade oiling is provided to the change gears enclosed in oil-tight compartments. The hob-drive gears run in individual oil baths. Eleven motors are used to operate the machines. Six of these are direct current and the remaining five are alternating current units.

Inspection Device

■ George Scherr Co., 128 Lafayette street, New York, has introduced a new Comparitol-Inspectoset unit for shops now engaged in the production of parts to very close tolerances. It gives any shop a virtual Bureau of Standards, since it en-

ables the shop to maintain complete control over all gages, mass produced parts, ball bearings, pins and other parts. Included in the unit is the Comparitol which is graduated to read to 1/10000-inch plus and minus 0.002-inch and the Ultra-Chex Inspectoset consisting of 34 gage blocks which will make up all combinations in steps of 1/1000-inch from 0.300 to 8 inches. The Inspectoset comes in a specially designed polished case to hold this and other gages. The Comparitol is first set with the Ultra-Chex in the Inspectoset, after which parts can be checked quickly and easily to 1/10000-inch by unskilled help. The unit has been designed to eliminate rejections, disputes over measurements and to guarantee precision accuracy in interchangeable manufacture and farming out under the defense program.

Automatic Sprayer For Coating Shell

■ DeVilbiss Co., Toledo, O., announces a machine which coats both the inside and outside of shell automatically. Available in several types, it is capable of coating shell ranging in size from 37 to 105 milli-

< < HELPFUL LITERATURE > >

1. Industrial Ovens

J. O. Ross Engineering Co.—20-page illustrated bulletin No. 130 is devoted to industrial ovens. Construction, method of heating, source of heat and material handling are subjects covered. Ovens for lithography, enameling, wire baking, core baking, heat treating, finish drying, and food drying are some of types pictured. Charts show possible methods of material handling.

2. Expanded Metal

Consolidated Expanded Metal Co's.—Two 4-page illustrated bulletins Nos. C-119 and C-120 describe "Steelcrete" flattened expanded metal and expanded metal "Safe-T-Mesh" which are adaptable for use on machine guards and construction of shelves, racks, trays, bins and baskets. Material is free from burrs and sharp edges. Typical applications are shown and described.

3. Steel Information

Doelger & Kirsten, Inc.—Cardboard slide calculator enables user to obtain rapidly such information as weights per foot, stock lengths, sizes, and dimensions of steel shapes. These data are given for wrought iron pipe, rails, structural I-beams, structural channels, and structural angles.

4. Package Conveyors

Lamson Corp.—4-page illustrated bulletin No. 441 describes complete line of package conveyors. Illustrations show installations for handling cartons, boxes, bottles, bales, barrels and other packaged goods in prominent companies. Details of roller gravity conveyors and pneumatic despatch tubes are shown.

5. Shop & Office Equipment

All-Steel-Equip Co.—4-page illustrated bulletin No. G1 pictures and describes briefly line of steel equipment for shop and office. Products covered include lockers, cabinets, dead storage files, shelving, desks, boxes, files, tool stands, tool boxes, stacking boxes and bins, and tool cabinets.

6. Grinding Sparks

Norton Co. — Illustrated folder on "Sparks" explains significance of sparks from grinding. Identification of metals being subjected to equal pressure grinding is possible with chart which shows typical sparks from such metals as wrought iron, machine steel, carbon tool steel, gray cast iron, white cast iron, annealed malleable iron, high speed steel, manganese steel, stainless steel and other ferrous and nonferrous materials.

7. Automatic Roll Feeds

Wittek Mfg. Co.—Illustrated bulletin No. WF-339 contains information on automatic roll feeds that provide simplified method of punch press operation assuring rapid feeding under all conditions. Schematic views illustrate methods of assembly and adjustment. Data are also included on reel stands which provide automatically expanding coil holders that center coil and eliminate looping, tangling and backlash of stock.

8. Hot Die Steels

Vanadium-Alloys Steel Co.—Two-fold bulletin gives characteristics of four "Vasco" hot die steels, — "Marvel," "Choice," "Hotform" and "Extrude Die." Recommended heat treatment and usage are enumerated together with information on chemical composition of each steel.

9. Acidproof Brick

General Refractories Co.—12-page bulletin describes "Acido" acidproof brick for use as tower packing in blast furnace and byproduct coke oven gas washers, sulphuric acid towers, dust scrubbers, and heat exchangers. Illustrations show various designs of brick and point out features and advantages of each. Charts show pressure drop per foot of height for each type.

10. Plunger Pumps

Worthington Pump & Machinery Corp. —6-page folder No. 412-B30 reports on duplex double-acting plunger pumps. Tables give specifications and sizes, and sectional views present details of design and construction. Photographs show typical applications in plastic plant, in refinery, in hydraulic service and in water flooding service in oil fields.

11. Industrial Wiring

General Electric Co.—44-page illustrated wiring manual, "Adequate Wiring for Industry," is published to aid electrical contractor, power salesman and plant engineer in analysis of industrial wiring systems. In addition to providing useful facts and figures, this guide book describes complete line of wiring materials for industry. Guidance is provided for selection of proper materials.

12. Threading Equipment

Landis Machine Co.—8-page illustrated bulletin, "Be Threadwise," covers entire line of threading machines, collapsible taps and die heads. Such equipment as shell tapper, hydraulically controlled threading machine, automatic forming and threading machines, and 4-spindle semi-automatic machines are described.

13. Precision Gages

Sheffield Gage Corp.—160-page loose-leaf spiral-bound illustrated catalog No. 40-1 is presentation of precision gages for practically all industrial measurement purposes. Design, construction and application of gages, together with standards and constants useful in practical inspection work are included. Each device is pictured and described.

14. Transformers

Jefferson Electric Co.—12-page illustrated bulletin No. 401-PCT is devoted to power circuit air cooled transformers. Various types are shown and applications suggested. Winding diagrams, specifications and dimension tables are given for 0.05 to 15 kilovolt-ampere units in double wound type and 0.1 to 25 kilovolt-ampere auto transformer units.

15. Combustion Meters

Hays Corporation—16-page illustrated bulletin No. 40-297 describes combustion meters for carbon dioxide, flue gas, temperature and furnace draft. Importance of proper combustion is reported together with information on Orsat principle of measuring carbon dioxide and how this principle is adapted to line of combustion meters. Line drawings show typical applications of equipment.

16. Heat Treating Furnaces

Drever Co.—Illustrated folder describes annealing furnaces, general purpose furnaces, clean hardening furnaces and auxiliary atmosphere equipment. Series of illustrations show many typical installations. Copper wire annealing machine is also described.

17. Copper Alloys

Revere Copper & Brass Inc.—16-page illustrated catalog, "Copper and Copper Alloys for Power Plants," gives physical properties of condenser tubes, water tube, brass and copper pipe, bus bar, pole line hardware, welding rod and similar power plant products. Various alloys are described and their characteristics outlined.

18. Wire Rope

Hazard Wire Rope Division, American Chain & Cable Co.—24-page pocket-size bulletin discusses safe use of wire rope. It gives tables of breaking strengths for all commonly used rope constructions, safety factors for principal rope applications, effects of acceleration, various constructions and grades of wire rope, and suggestions for correction of operating factors effecting safety such as abrasion, bending fatigue, reverse bends, kinking, spooling, crushing and corrosion.

STEEL

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HELPFUL LITERATURE

(Continued)

19. Tool and Cutter Grinder

Oliver Instrument Co.—12-page illustrated catalog on "Ace" universal tool and cutter grinder explains how machine may be used to grind cutters with standard fixtures, as well as difficult tool grinding operations. Fixtures for handling taps, drills, broaches and other cutters are shown.

20. Water Softeners

Elgin Softener Corp.—4-page illustrated bulletin is devoted to "Double Check" zeolite water softeners. Principle of double check is described, and close-up views of nozzles and other design features show how loss of zeolite is prevented. List of recent installations is included.

21. Lubrication

Sun Oil Co.—Two-fold illustrated broadside, "P-Q, Your Key To Increased Production," discusses variety of industrial lubricants for use in main power equipment, hauling equipment, metal working, and mining equipment. Tables list lubricants and give specific uses for each type.

22. Lifting Magnets

Electric Controller & Manufacturing Co.—Two-fold broadside discusses use of "EC & M" lifting magnets for handling of magnetic scrap, raw and finished products. Action photographs show magnets being used to handle pig iron, steel mill scrap, railroad material, and motor engine blocks.

23. Gate Valve

Koppers Co.—4-page bulletin No. 808 lists features of construction and design of type "AR" low pressure all-iron gate valves for water gas plants, coke oven plants, blast furnaces, power plants, chemical plants and other industrial applications. Schematic views and charts amplify text.

24. Arc Welding Machine

Lincoln Electric Co.—20-page illustrated bulletin No. 412-A presents complete data on the new "Shield-Arc" welder which features self-indicating dual continuous control. How machine operates, outstanding features and results obtainable with this equipment are related in detail. Charts and pictures supplement text.

25. Boring Machines

Stokerunit Corp.—12-page illustrated bulletin describes features and advantages of "Simplex" unit type precision boring machines. Units consist of series of sizes of standardized combinations of spindles, tables, hydraulic feeding systems and electrical control which may be applied singly or in multiple to bed units constructed to suit production requirements. Complete construction and operation details are presented.

26. Materials Handling

American MonoRail Co.—48-page bulletin contains series of action photographs depicting monorail installations in variety of industries. Details of design and construction are presented in text and in pictures.

27. Propeller Pumps

Peerless Pump Co.—8-page illustrated bulletin No. 148 describes design and operating features of "Hydro-Foil" propeller type pumps for drainage, ditch or river irrigation and flood control. Power economy is secured through impeller design which reduces turbulence and friction. Data obtained in wind tunnel research have been applied to water impeller construction.

28. Milling Cutters

Lovejoy Tool Co.—21-page illustrated catalog No. 26 gives details of line of milling cutters for modern metal cutting requirements. Cutters are of positively locked inserted tooth types. Face, side, arbor, grooving, deep slotting and half side milling cutters are described. Alloy and cemented carbide blades, taper shank arbors, special cutters and counterboring tools and turret tool posts are covered also.

29. Standard Measurement

Pratt & Whitney division, Niles-Bement-Pond Co.—16-page illustrated bulletin No. 441-1 gives complete data on latest model standard measuring machine, and also describes "Electrolimit" universal internal comparator and lead tester. Standard of measurement is read directly to 0.00001 inch. Errors commonly attributed to human element are eliminated.

30. Shipping Containers

General Box Co.—12-page illustrated bulletin, "How Research Can Save $$ For You," pictorially presents features of "General" designed shipping crates. Photographs show old and new containers used by many companies to ship their products. These products include copper, fabricated steel furniture, light and heavy machinery, heating and ventilating equipment, valves, automotive accessories and other parts.

31. Worm Gearing

Cone-Drive division, Michigan Tool Co.—44-page illustrated catalog No. CW-41A is entitled, "Design & Rating of Cone-Drive Worm Gearing." Essentials of design, characteristics, and application of worm gearing are given. Data includes worm and gear tables, blank dimensions, mountings, material specifications, tolerances, tool charts and horsepower ratings.

32. Protective Lighting

Holophane Co.—13-page illustrated bulletin, "Protective Lighting for Industrial Yards," gives latest information on design and application of this type of lighting to protect property. Available equipment and its proper application are explained. Distribution curves are given for various types of "Wide-Spred" lighting units.

33. Transmission Belts

B. F. Goodrich Co.—12-page illustrated bulletin No. 2150 is devoted to selection and maintenance of rubber transmission belts. Subjects covered include types, grades, widths, thicknesses, horsepower capacity, corrections of horsepower ratings, importance of bearing capacities in applying rubber belts, belt joints and endless belts. Tables and charts supplement text.

34. Induction Motors

Allis-Chalmers Mfg. Co.—32-page illustrated bulletin No. B-6132 shows induction motor construction for bracket and pedestal types, 250 horsepower and larger. It covers standard motors and those with special protective features such as drip-proof, splash-proof and enclosed designs. Curves showing variations of power factors and starting torques at different motor speeds are included.

35. Design of Concrete

Atlas Lumnite Cement Co.—18-page article is a reprint from trade journal on subject of "Structural Design of Refractory Concrete." Product differs from structural concrete in that calcium aluminate cement and refractory aggregates are used instead of portland cement, sand and gravel or stone. It is used for continuous exposure to temperature as high as 3000 degrees Fahr. Charts, drawings and photographs accompany article.

36. Cutting Compounds

Oakite Products, Inc.—20-page illustrated bulletin No. 5239 is written for those concerned with cutting and grinding operations. Fifty-three formulas for machining ferrous and nonferrous metals are given. Advantages of "Oakite" cutting and grinding compounds for use with cutting, wet grinding, light broaching, milling, drilling, sawing, threading and tapping equipment are explained.

STEEL

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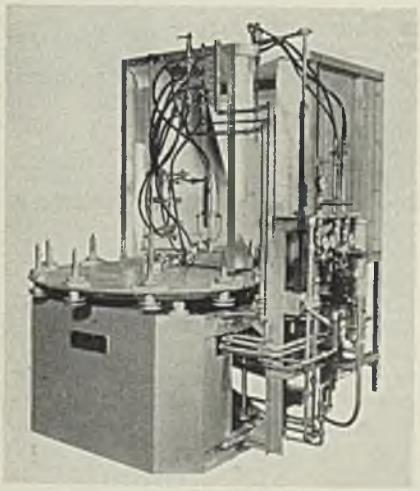
meter, covering practically all sizes used in modern combat. Production rate of machine varies according to the size of shell or shell part. It, however, is designed to coat from 300 to 720 shell an hour with all spindles continually loaded. Operation of the machine is entirely automatic, with the exception of loading and unloading shell on the holding spindles. The spindles themselves are located around the edge of a rotating table. To the rear of this table is an overhead spray gun equipped with an extension nozzle. This is for the interior coating operation. As the shell comes into position, rotating on its spindle, the gun is inserted automatically into the shell and sprays all interior surfaces. This step completed, the gun nozzle moves from the interior of the shell and the table revolves to the exterior painting position. With the shell still rotating on its spindle, a battery of automatic guns goes into operation, coating the exterior of the shell. Synchronization is such that while the interior of one shell is being coated, the exterior of the preceding shell is being sprayed. All auxiliary equipment—air pressure regulators, air pressure gages, air condensers and hand control valves



—are conveniently mounted. The assembly includes two pressure-feed tanks for the finishing material. The spray booths supplied are designed for the removal of overspray and fumes from both internal and external stations. In addition to shell, this machine is being used to coat tail pieces and fragmentary bomb subassemblies. Production on the former is up to 2400 per hour; on the latter, up to 300 per hour.

Gage for Measuring Aluminum Propellers

■ General Electric Co., Schenectady, N. Y., announces a new type electric gage for measuring the wall thicknesses of hollow, aluminum airplane propellers. It is applicable also to the thickness measurement of any nonmagnetic metal when only one side is accessible, even if the nonmagnetic metal is backed up by a magnetic metal. Thicknesses up to 1½ inches, depending upon the electrical resistivity of the metal, can be measured within an accuracy of five per cent. Brass sheeting, copper tanks and large pipes lend themselves to the

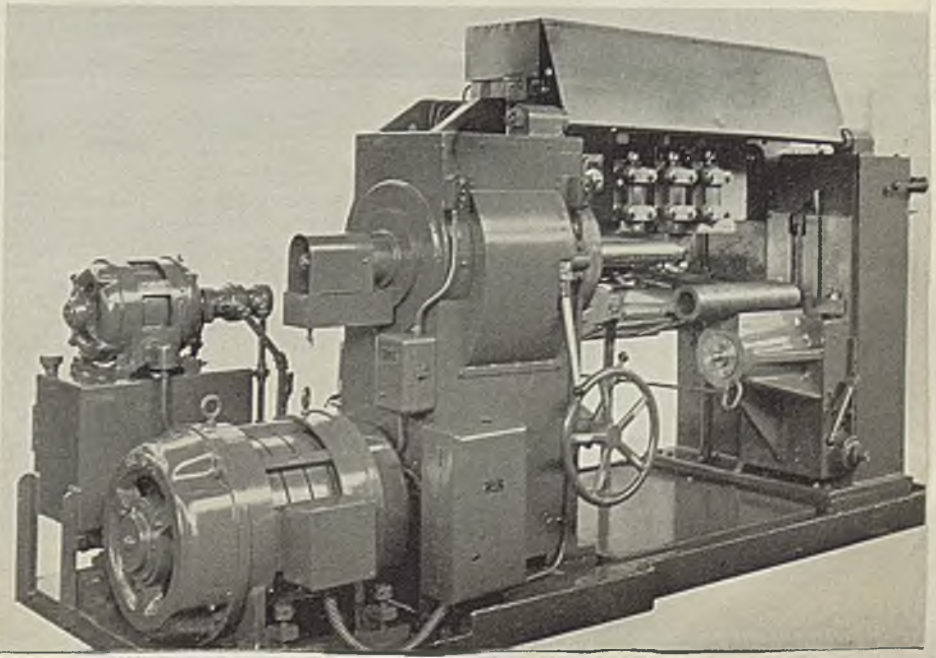
use of the gage. The gage consists of a bridge circuit, voltage amplifying equipment and an indicating instrument. The bridge circuit comprises two inductances with U-shaped cores and a differential transformer. The inductances serve as a gage head and an adjustable balancing head. The gage head, encased in bakelite, can be held in one hand for application against the metal. The remainder of the gage is contained in a steel carrying case and weighs about 30 pounds. The unit operates on 50 to 60 cycle alternating current.

Shell Turning Lathe

■ Federal Machine & Welder Co., Warren, O., announces a special shell turning lathe for use by munition manufacturers. Designed to meet high production requirements, it was completely engineered by the Britannia Machine Co. Ltd., London, England, prior to the beginning of the war. It is capable of turning out shells in large quantities with unskilled help. As indicated by the photo below, many new features are embodied in the design of the lathe. The tool boxes are supported from a bridge overhead to permit the chips to fall clear. In addition, a conveyor for loading and unloading shell without being lifted by the operator enables production to be accelerated at a much faster pace. Production on this machine for large shell is extremely high, for 18 to 20 British 5½-inch shell, 27 inches long, can be rough turned per hour without fatigue by unskilled operators.

Portable Food Truck

■ Kay-Zee Mfg. Co., 5201 Denison avenue, Cleveland, has placed on the market a portable food truck designed to aid the manufacturer with limited cafeteria space in handling increased personnel due to industrial expansion. Measuring 9½ feet front to back, this "traveling cafeteria" is 38⅝ inches wide and stands nearly 5 feet high. It features a hot food section, a bottle goods compartment, an ice cream cabinet, two lower storage compartments, two waste containers, six cold sandwich and pie compartments, one large pastry display and one tobacco, cigarette and glove display. It also carries an 8-gallon coffee urn equipped with a creamer. The outer portion of the truck is covered with a 22-gage steel panel. This is finished in a dark gray synthetic enamel set off by stainless steel trim. Food in the hot food compartment is heated by four heaters having a rating of 500 watts each. This compartment is lined with stainless. The bottle and ice cream compartments are tin copper lined, the former being equipped with two galvanized metal dividers. In winter the ice cream division may be used to carry soup, being insulated to keep the soup at serving temperatures. Sandwich and



pie compartments as well as the coffee urn are lined with stainless. The pastry display cases, however, are enclosed with glass, in front, back and one side and top. Six wheels—four pneumatic type swivel units and two of the solid type enable the truck to be pushed along factory aisles or to negotiate sharp turns. Wheels are mounted directly

to the heavy reinforced frame. A plug-in box embodied under the truck enables it to be hooked up with any electric outlet along the route. Trucks are supplied for use on either 115 or 220 volts.

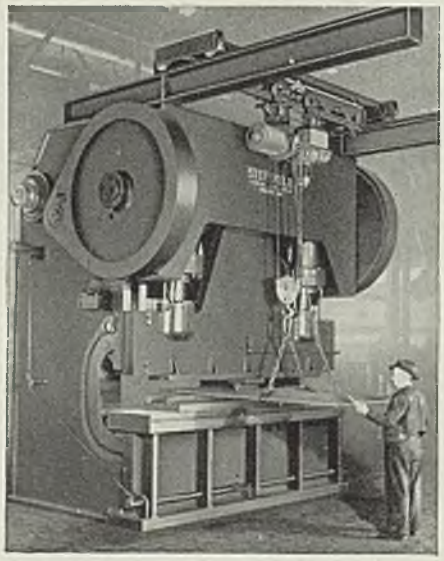
Die Shoe with Adjustable Dies

■ S. B. Whistler & Sons Inc., 752 Military road, Buffalo, has recently developed a die shoe equipped with adjustable dies which offers great versatility and adaptability in perforating work. Measuring 18 inches wide by 120 inches long, the die shoe is for use in a 10-foot power brake. Although the illustration shows 44 punch and die units arranged along the front side only, there is room available for at least twice as many more. Dies of one or several sizes can be arranged in any position to suit the user. Feature of the unit is the saving it offers in time and die expense to

get into production and the additional time saved when actually performing on the job.

Individual Overhead Traveling Cranes

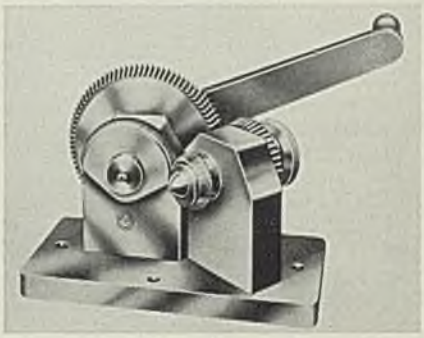
■ Steelweld Machinery Division, Cleveland Crane & Engineering Co., Wickliffe, O., is now equipping some of its larger bending presses with individual overhead traveling cranes to aid the operator in handling heavy plate in and out of a machine as well as to support it during press operations. The cranes are mounted on top of the machines with crane runways extending approximately eight feet in front. See illustration. Both crane bridge and carrier here are hand propelled. The hoist is motor-driven and controlled by a pendant push-button station. It is of 2-ton capacity and has a hoisting speed of 26 feet per minute. The press also is provided with an especially wide bed top and ram bottom to accommodate wide dies necessary for armor-plate straightening. All shafting of the press is located at the rear of the machine away from possibility of being snagged and damaged by crane hooks, heavy plates, etc. This particular press model has a normal capacity of 450 tons. It is powered with a 40-horsepower motor and has a speed of 21 strokes per minute. Its ram may be adjusted as much as 6 inches to accom-



modate various dies, and a tonnage indicator on the left-end housing just above the throat of the machine, keeps both operator and management informed of the loadings to which the press is subjected.

Time Train Ring Marker

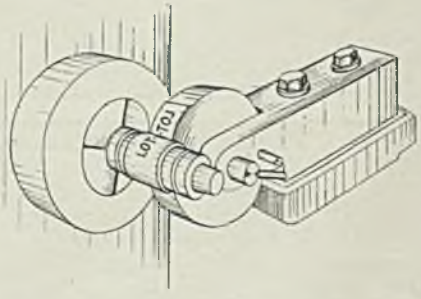
■ Jas. H. Matthews & Co., 3942 Forbes street, Pittsburgh, announces a new bench-type, time train ring marker suitable for marking fuzes, beveled dials, etc., that require graduation marking. Since the angle of the bevel varies greatly with each part that is to be marked, this machine marks but one size part and one size bevel. Its work-holding spindle handles each part to be marked quickly. It cannot be standardized, because the shape of the part determines the holding means, therefore, production will vary from 100 to 600 markings per hour, depending on the part. The part holder shaft runs in an eccentric bushing which can be adjusted for marking any depth. Bevel gears at the rear of the device maintain correct peripheral spacing of the mark. These are of wide face. Bronze bearings are amply oversized, provided with oil holes. The frame of the unit is of heavy



steel and the handle is proportioned to facilitate marking. The marking die is so designed that necessary engraving does not occupy the entire periphery. A portion of it is undercut to permit the removal of the part being marked.

Marking Tool for Shell

■ New Method Steel Stamps Inc., 143 Jos. Campau street, Detroit, has developed a rotary or roll-type marking device with solid die for marking parts such as shell or other ordnance units, indexing rolls, etc., while being produced on automatic screw machines, lathes, etc. As shown in the illustration, which shows the device in use on an automatic screw machine, marking roll fits into a holder which has a fine adjustment for starting the marking operation when the roll is brought into contact with the part. After marking, the roll is returned to initial position by a coiled spring. The roll is designed so that con-



tinuous contact with the part after marking does not cause it to rotate and remark the surface. It makes only a single impression, even though the part continues to rotate before the roll is dwithdrawn from contact. Various forms of holder shanks are available to adapt the device to most applications where the marking of rotating parts in production is required.

Ultra Finish

(*Concluded from Page* 54)

positively by its own weight against the rear neck-rest, which should be set somewhat above the horizontal centerline of the roll to prevent the roll from climbing. A hold-down clamp to steady the roll should be placed directly on top of the roll over the rests. It should be easily adjustable by hand.

Watch Small Rolls: In mounting small rolls on work-centers, it is essential to maintain both the machine centers and the roll centers at a high degree of perfection. Center location and fit should be checked for each grinding operation. When the rolls must be extremely accurate the roll centers should be large in proportion to the roll size, but the length of center contact should be not more than three-eighths of the depth of the center hole. Good lubrication, preferably with white lead, is essential.

A point of vital importance, which is often neglected, is to lubricate the rests thoroughly during grinding. If improperly lubricated, the roll may creep or climb forward and upward, pressing into the wheel. Variations in frictional resistance at the necks during finish-cuts is fatal to ultra surfaces. Oil soaked wool waste or felt pads should be kept on the necks to maintain constant and even lubrication.

No matter how perfect the condition of the roll grinding machine, fine surfaces cannot be generated if the grinding wheel is out-of-balance, for that condition sets up a hammering action which will leave plain marks on the roll.

Balancing—Ticklish Business: For fine surfaces it is not sufficient merely to balance the wheel before mounting. While a wheel is reasonably concentric with the arbor when it is mounted ready for use, it is necessarily out-of-round. Then, when it is trued in the machine the high spots are removed and the wheel mass is thrown out of balance, which of course requires that it be rebalanced. Caution must be used in the second balancing, for the wheel may retain coolant fluid in its pores from previous use. In but a few moments of standing, the liquid will settle at the lowest part of the wheel, thus causing a false out-of-balance condition.

For ultra finish grinding it is advisable to let the wheel dry out thoroughly before starting the second balancing, or better still, do the truing dry. Then, after rebalancing, dress wet.

For a detailed study of factors that influence the grinding of rolls for ultra finish work, see next section of this series to appear in STEEL soon.

Problems of Labor and The Defense Program

■ *Labor and National Defense,* board, 130 pages, 5½ x 8 inches; published by Twentieth Century Fund, 330 West Forty-second street, New York, for $1.

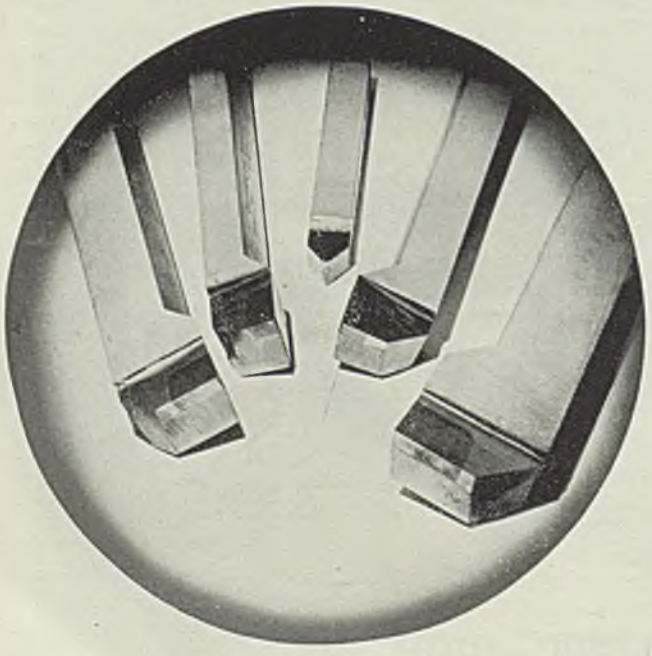
The Twentieth Century Fund report analyzes labor needs, supply and the problems of labor under the armament program. The factual findings and analysis were prepared by a special research staff, headed by Lloyd G. Reynolds. These were reviewed by an impartial committee of authorities, who made a series of recommendations for public policy.

This report is a special project undertaken by the Fund's labor committee. More than a year ago the committee began work on a long-range survey of the history and present status of collective bargaining in the United States. When the international crisis arose in 1940, the committee saw the need for an immediate survey of labor questions raised by the emergency.

Protects Life of Metals Used in Heat Treating

■ A new material called Metlseel, which prevents corrosion and disintegration of metal parts exposed to gaseous atmospheres at furnace temperatures is announced by Porcelain Enamel & Mfg. Co., Eastern and Pemco avenues, Baltimore. It is applied as a liquid coating, and withstands heat in excess of 1500 degrees Fahr.

Announces New Styles of Standard Cutting Tools



These are the five new "standard" tools in 21 sizes and types added to Carboloy line. L. to R.: Righthand facing tool Style 10; a righthand offset turning tool, Style 5; a 2-way turning tool, Style 12; lefthand offset turning tool, Style 9; lefthand offset facing tool, Style 11

■ The addition of five new styles to its low-priced mass-production line of standard tools is announced by Carboloy Co. Inc., Detroit. Available in a total of 21 sizes, the new standard tools are all carried in stock and comprise four "offset" types and a two-way square-shank turning style—each type except the last being available in two grades—one for steel cutting and one for cast iron, etc.—

In addition, revision of Carboloy standard tool prices is also announced. This is effective in materially reducing prices on small quantity orders as well as reducing the number of tools of one kind required (per order) to obtain minimum tool prices. Minimum prices are also reduced on all standard tools above ¾ x ¾-inch shank size.

Announcement of the addition of five new standard tool styles at this time, see accompanying illustration, marks successful completion of the first stage of Carboloy's new manufacturing and merchandising program. Under this program, marking a radical departure in carbide tools, the first group of standard tools was released for "mass-production" last August in a complete line of sizes and in both "steel-cutting" and "cast iron" grades, permitting low prices.

Steel Sales Far Exceed Productive Capacity

Running 135 per cent or more. Gain in priority orders fastest to date. Pig iron quotations are frozen by OPACS. Roll changes are frequent.

MARKET IN TABLOID ★

Demand
Concentrated against defense projects.

Prices
Silicon differentials on pig iron are increased.

Production
Increased ½-point to 99½.

■ INCREASES in steel sales with priority ratings is the most rapid to date, due in part to quickening of defense efforts and in part to the fact that non-defense manufacturers covered their needs previously and are not so much in the market now.

One large company notes that 60 to 70 per cent of its current sales are to holders of such certificates, with the percentage increasing constantly. More and more, too, do non-defense manufacturers take on defense lines, thus swelling the amount of priority steel sales.

Some details of the priority system are yet to be amended for fairness, apparently. Thus a warehouse distributor will be commandeered by a priority slip to furnish a certain tonnage of steel for a defense project, but when this distributor tries to replenish from a mill he is refused because he shows no priority certificate.

Sales are still running at 135 to 150 per cent of capacity, which means that backlogs of orders on books continue to ascend, with no relief in sight. It is probable that many orders on books will never be filled, especially in the case of non-defense projects, many to be cancelled by buyers because of delay in filling orders. Again, despite all precautions doubtless some consumers succeeded in ordering in duplicate, or triplicate from several mills and hence overbought.

For one widely-variegated company orders are running somewhat less than a month ago and June shipments will be less despite efforts to increase them constantly.

Pig iron, which escaped the price freezing order of a few months ago, along with iron ore, has been frozen under a new ruling of OPACS. However, a few concessions have been granted in favor of the producer. Thus price differentials as to silicon grades, previously 25 cents per ton, are allowed to be 50 cents, with also extras for additional manganese content allowed. These concessions are presumably to compensate for some higher costs of manufacture such as coke, which had advanced 75 cents per ton on May 1. Or they may be designed to encourage greater use of the basis grade of pig iron, 1.75 to 2.25 silicon, which is more economical to produce.

The pig iron supply promises to be better in a few weeks because of resumption after relining and because of proposed rehabilitation of several stacks, long idle and obsolete. Since June 1 eleven relined furnaces have started with six more due soon.

Makers of fire brick, such as used for lining furnaces, have advanced prices 8 per cent, as of July 1, because of raising wages 10 cents per hour on April 1. Prices of wrought washers are working higher gradually because of extreme scarcity of raw material, plate discards.

An unavoidable inefficiency of steelmaking these days is the necessity of changing rolls frequently. Though orders on books of one size and description are so large as to allow for record-breaking runs without roll changing, the necessity to parcel out steel to a maximum number of customers and in short intervals makes such economies impossible.

Makers of merchant pipe say that June sales probably are an all-time record. The large warehouse stocks which producers keep in normal times are depleted and deliveries are now being made from current production as in the case of most steel products. Black pipe, which has been used as a substitute for galvanized pipe, has also become scarce and some makers are allocating it among customers as in the case of galvanized.

The number of inquiries and sales of fabricated steel and reinforcing bars in June was much larger than usual, though small average tonnages per project made for no great aggregate tonnage.

Automobile production for the week ended June 28 is 127,926 units, down 5639 for the week, comparing with 87,550 a year ago.

Steel ingot production last week gained ½ point to 99½ per cent of capacity. Advances took place as follows: Chicago ½ point to 102½, Detroit 2 points to 96, Pittsburgh 1 point to 100, Cleveland 3 points to 98 and New England 6 points to 100. Declines were at Cincinnati, 91, and Wheeling, 84, both down 1 points. Unchanged were: Youngstown at 98, eastern Pennsylvania at 97, Birmingham at 95, St. Louis at 98 and Buffalo at 90½.

STEEL's three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	June 28	June 21	June 14	One Month Ago May, 1941	Three Months Ago March, 1941	One Year Ago June, 1940	Five Years Ago June, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.27	$37.69	$32.79
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	52.20
Steelworks Scrap..	19.16	19.16	19.16	19.16	20.04	19.03	12.55

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

	June 28, 1941	May 1941	March 1941	June 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	2.15	2.225	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	June 28, 1941	May 1941	March 1941	June 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.09	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.18	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	115.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.75	$19.90
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	18.65	18.10
Heavy melting steel, Chicago	18.75	18.75	19.43	18.00
Rails for rolling, Chicago	22.25	22.25	20.75	22.22
No. 1 Cast, Chicago	20.00	20.00	21.35	16.60

Coke

Connellsville, furnace, ovens	$6.25	$5.70	$5.50	$4.75
Connellsville, foundry, ovens	7.25	6.30	6.00	5.75
Chicago, by-product fdry., del.	12.25	12.25	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-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
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

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Duluth, base	2.25c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail	2.59c
Pac. ports, dock	2.80c
All-rail	3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail	2.59c

Pac. ports, dock 2.80c
All-rail 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 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 .15-25 Mo. 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr. 0.45
5100 Spr. flats 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T 1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base..... 2.15c
Gulf ports, dock..... 2.50c
All-rail 2.59c
Pacific ports, dock 2.80c
All-rail 3.25c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail 2.59c
Pacific ports, dock..... 2.80c
All-rail 3.25c
Detroit, del. 2.25c

Iron Bars

Philadelphia, del. 2.37c
Chicago 2.25c
Pittsburgh, (Ref.) ...3.50-8.00c
Terre Haute 2.15c

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

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....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.
Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller .....64 off

Square Head Set Screws

Upset, 1-in., smaller.....71 off
Headless set screws.....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
½ inch and under.....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.25 off

Tool Steels

Pittsburgh base, cents per lb.

Carb. Reg. 14.00
Carb. Ext. 18.00
Carb. Spec. 22.00
Oil-hardening .. 24.00
High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
1.5	4	1	8.5	54.00
.....	4	2	8	54.00
5.5	4	1.5	4	57.50

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	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64

Boiler Tubes

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

Lap Welded

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

Seamless

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

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$45.00-46.00
4-in., Birmingham.. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00
Class A Pipe $3 over Class B
Stnd. 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 ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅝ to ¾-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... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. ... 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered . 12.25
Terre Haute, del. .. 11.75
Milwaukee, ovens.. 12.25
New England, del... 13.75
St. Louis, del. 12.25
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. ... 11.75
Cleveland, del. 12.20
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 13.75c
Do. (1000 lbs. or over) 12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia ...$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	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

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	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	.....	23.12	.....
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.

	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.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

†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 not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	45.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

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 paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

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., 2½ per cent carbon 118.00
1½% carbon 128.00
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

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 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	5.26	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	3.52	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	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	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	4.85	5.25	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	4.24	4.99	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	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	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	4.10	4.10	5.50	4.20	....	5.25	....	6.90	....	....
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	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	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	6.05	10.60	9.60	9.45	10.10

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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, 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; 1 to 1499 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; any quantity 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.

EUROPEAN IRON, STEEL PRICES

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	$ 6.20	1	10	9

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 15s on certain conditions.

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.	$24.00-25.00
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%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced June 18 by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Weirton, Steubenville(a)	Youngstown, Canton, Sharon	Chicago	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	.....
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50
Stove plate	19.00	.....	17.00	18.00	18.50	18.00	18.00	19.00	17.50
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00
Medium heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50

	St. Louis	Toledo, O.	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$.....	$17.85	$18.00	$17.00	$.....	$.....	$16.50	$14.50
No. 1 hyd. comp. black sheets	17.50	.....	17.85	18.00	17.00	.....	.....	.....	14.50
No. 2 heavy melting	16.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
Dealer No. 1 bundles	16.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
Dealer No. 2 bundles	15.50	.....	15.85	16.00	15.00	.....	.....	.....	12.50
Mixed borings and turnings	12.75	.....	13.10	.....	12.25	.....	.....	.....	9.75
Machine shop turnings	13.00	.....	13.35	15.50	15.00	.....	.....	.....	10.00
Shoveling turnings	14.00	.....	14.35	16.50	.....	.....	.....	.....	11.00
No. 1 busheling	17.00	.....	17.35	17.50	16.50	.....	.....	.....	14.00
No. 2 busheling	13.00	.....	13.35	13.50	12.50	.....	.....	.....	10.00
Cast iron borings	13.25	.....	13.60	13.75	12.75	.....	.....	.....	10.25
Uncut structurals and plate	18.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
No. 1 cupola	20.00	.....	20.35	18.00	20.00	20.50	21.00	22.00	18.00
Heavy breakable cast	18.50	.....	18.85	16.50	18.50	.....	.....	20.50	17.00
Stove plate	17.00	15.60	14.10	.....	17.00	17.50	18.00	14.00	14.00
Low phos. billet and bloom crops	22.50	.....	22.85	23.00	22.00	.....	.....	.....	.....
Low phos. bar crops and smaller	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....
Low phos. punch. and plate scrap**	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....
Machinery cast cupola size††	21.00	.....	21.35	19.00	21.00	21.50	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	.....	21.85	19.50	21.50	22.00	22.50	23.50	19.50
Clean auto cast	21.50	.....	21.85	19.50	21.50	22.00	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	.....	19.85	20.00	19.00	.....	.....	.....	.....
Punchings and plate scrap§§	18.50	.....	18.85	19.00	18.00	.....	.....	.....	.....
Heavy axle and forge turnings	17.00	.....	17.35	17.50	16.50	.....	.....	.....	14.00
Medium heavy elec. furnace turnings	15.50	.....	15.85	16.00	15.00	.....	.....	.....	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Seattle; **¾-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ¾-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

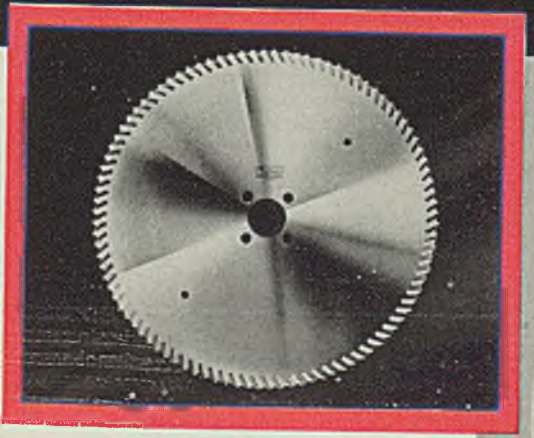
	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago	Kokomo, Ind.	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$19.25	$19.75	$19.75	$20.50	$20.25	$20.50
Scrap rails	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	21.50
Rerolling quality rails	23.50	23.50	22.25	21.75	22.25	22.25	23.00	22.75	23.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	22.75	22.75	23.50	23.25	23.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	23.00	23.00	23.75	23.50	23.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	23.25	23.25	24.00	23.75	24.00

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Minnequa, Colo.	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$17.50	$.....	$.....	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	18.50	.....	.....	16.50
Rerolling quality rails (a)	21.00	19.50	21.35	21.50	20.50	20.00	.....	.....	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	20.50	.....	.....	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	20.75	.....	.....	18.75
Scrap rails 18 inches and under	22.00	20.50	22.35	22.50	21.50	21.00	.....	.....	19.00

*Philadelphia, Wilmington, Del., Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa.; †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Seattle. (a) also Johnstown, Pa., Warren, O.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such basing points shall be the maximum price at consumer's plant at any point on the railroad's line, except that switching charges of 84 cents per gross ton shall be subtracted from the maximum price of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago. (a) Re-laying quality $5 higher.

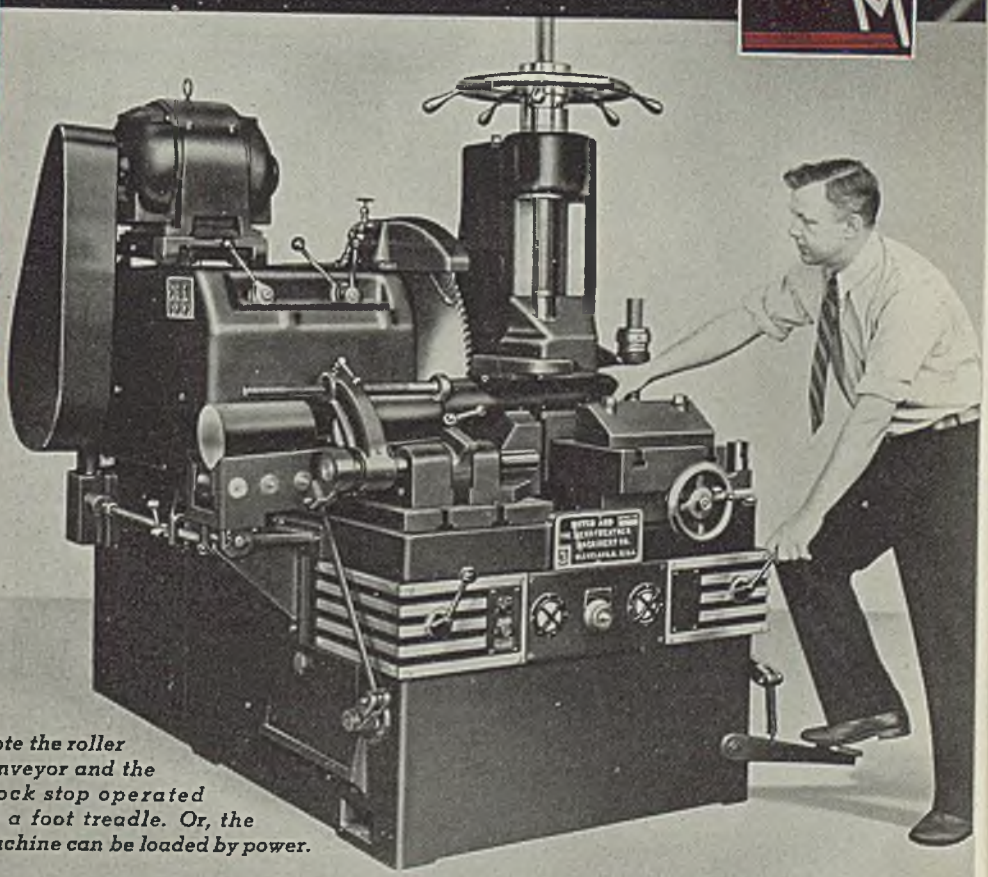
ONE MAN OPERATING 3 MOTCH & MERRYWEATHER COLD SAWING MACHINES ON 4½" ROUND SHELL STEEL AVERAGES 4320 SLUGS PER 24-HOUR DAY WITHOUT SCRAP SLUGS, WITHOUT BURRS, AT AN EXCEEDINGLY LOW COST • • • • • •



To insure the best results, use M & M Saw *Blades* with the M & M Cold Saw. Blade features are: reinforced teeth radially ground to lengthen intervals between sharpenings; high grade tool steel segments fitted to heat-treated center; tooth pitch suiting any material; segments forming closed ring to stiffen blades; blade can be reset with new segments without lessening diameter.

* * *

For longer service, sharpen your blades on the Motch & Merryweather Saw Grinder. Features: rigidity—no overhang, no chatter, no vibration; automatic indexing; dust-proof drive; easily grinding high and low teeth; all operating controls actuated while running.



Note the roller conveyor and the stock stop operated by a foot treadle. Or, the machine can be loaded by power.

"Easy on the man." Just set the machine and feed the stock—that's all your operator has to do—and from one position at that—thanks to the features shown above. Speed? Plenty of it, *with accuracy and certainty*—no back-tracking, no lost motion, no slugs to throw away. A cut every minute—clean, sheer, and burrless. Get all the facts about this amazing performer, especially on shell slugs and like exacting work.

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING :-: CLEVELAND, OHIO

MOTCH AND MERRYWEATHER MACHINERY CO.
CLEVELAND CINCINNATI DETROIT PITTSBURGH

Ask for our illustrated story of the Motch & Merryweather Cold Sawing Combination

Built by **MOTCH & MERRYWEATHE**

Sheets, Strip

Sheet & Strip Prices, Pages 88, 89

Exceptionally high preference rating is necessary to obtain delivery this year on sheets and strips, and such tonnage is only at the expense of other orders of less priority. Much tonnage placed earlier will be carried over into 1942. On this business, though the situation is known to the buyers, no cancellations have been made.

Sheet production is beginning to feel the effect of conversion of sheet mills to plate rolling and this is expected to be more marked as this process expands. Demand for automobile sheets is slightly less, marking the model changeover, though this is less than usual.

Galvanized sheet production continues to drop, due to shortage of zinc, and substitutes, largely painted sheets, are being sought.

Narrow cold-rolled strip, confronted by dwindling inventories and difficulty in obtaining replacements for nondefense products, are seeking contracts commanding priorities on steel. Current bookings are heavy, with some mills being about equal to shipments, though blacklogs are not being reduced. Hot-rolled strip deliveries are less certain. Shipments are sufficient to maintain operations, but some sizes, width and finishes are subject to frequent temporary delay.

Plates

Plate Prices, Page 88

Difficulty is experienced by plate users in obtaining material as fast as needs require, even with priorities. Tank fabricators have been given A-1-B rating as the best obtainable but have not been able to ascertain how good this will be. Much of the work in hands of eastern tank builders under this rating is for Atlantic Coast military bases. By co-operation with platemakers in the past they have been able to get deliveries of ten to 12 weeks. In some cases tanks can be fabricated from steel in stock but these supplies are becoming depleted.

Tank buying is heavy and builders are unable to accept all that is offered. Most have sufficient work for six months. Some of this probably will be deferred several months.

Platemakers are confronted by increasing demand from railroads to meet the exceptionally large number of freight cars on order. Better priority on material for these has placed them in better position for preferential treatment.

Shipyard work is held of primary importance and is given highest preference, with the result that other consumers are being pushed further back.

Mills in the East are being given allocations for 45,000 tons of plates and shapes, mainly the former, for six heavy cruisers to be built at Camden, N. J., by the New York Shipbuilding Co. Carnegie-Illinois Steel Corp. and Bethlehem Steel Co. are given most of this tonnage, and Lukens Steel Co. and Worth Steel Co. the remainder. The contracts provide for unchanged prices to the end of the year with adjustment after that, if necessary.

Pennsylvania railroad is seeking to place 75,000 tons of steel for its carbuilding program. The road is said to be unable to draw on its own stocks for any of the rolled steel, but has some axles available.

Oil storage tanks in connection with the Portland, Me., Montreal 20-inch pipe line will require about 3500 tons of plates, most to be erected at Portland.

Floor plates are in strong demand and, while deliveries are lengthened from a few weeks ago they can be obtained in six to seven weeks.

PLATE CONTRACTS PLACED

400 tons, three elevated steel water tanks, 400,000-gallon each, United States engineer, Mobile, Ala., to Chicago Bridge & Iron Co., Chicago, $141,900, pro. 459, bids June 17.

100 tons, 100,000-gallon elevated steel water tank, Camp Forrest, Tenn., to R. D. Cole Mfg. Co., Newnan, Ga., $18,165, inv. 118; bids June 6 to U. S. engineer, Nashville, Tenn.

100 tons or more, water storage standpipe, Fort McKinley, Portland Harbor, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh; bids June 23, pro. 7040-3, constructing quartermaster, Fort Preble, Me

PLATE CONTRACTS PENDING

7000 tons, welded lighters and car floats,

navy, delivery Brooklyn, Norfolk, Va., and Mare Island, Calif., bulk to Brooklyn, contracts now being allocated with J. K. Welding Co., Brooklyn, awarded initial lot.

3570 tons, six 140,000-barrel oil storage tanks, Portland, Me., in connection with the pipe line between Portland and Montreal for Standard Oil Co., (N. J.)

400 tons, 500,000-gallon tanks and towers, military airport, Victorville, Calif. and Mesa, Ariz., for United States engineer office, Los Angeles; bids opened.

Bars

Bar Prices, Page 88

Ruling by OPACS permitting bar producers to quote delivered prices in terms of basing point price nearest the mill will mean little with respect to delivered prices at most points except where consumers engaged in special rearmament work draw on sources of supply at a distance. It is believed some freight will be absorbed by mills in servicing regular customers but for some time they have not been taking business from consumers at a distance. Where definite allocation is made by Washington to meet a special need the new ruling probably will be applied.

With increased priority tonnage coming out, civilian consumers and warehouses, having no priority rating, find their stocks dwindling rapidly. Deliveries against orders placed some time ago are running behind promises and on current business little can be done for delivery this year.

Buying of carbon and alloy steel bars has slackened materially as producers are pressed to meet deliveries, notably on alloys for defense. A substantial part of bars, alloy, carbon and forging, now being consumed and on order is covered by high priority ratings. Alloy bars are relatively more active than carbon bars and specifications are heavy, deliveries fairly well maintained, despite difficulty in speeding up processing. The steel bar situation is practically on a complete defense priority basis.

Navy purchasing officer, New York, closes July 3 on 350 tons of steel bars, while at Washington under schedule 7495, bids close July 1 on 1200 tons of pearlitic-manganese steel for delivery at the Washington yard.

Pipe

Pipe Prices, Page 89

For some large producers June sales of merchant pipe are at an all-time high. The chief difference is that current sales must be satisfied out of future production, instead of being drawn from producers' warehouse stocks as in normal times. One maker of black pipe is starting to allocate it among customers. Previously, only galvanized pipe had been allocated, with black pipe sold freely. Demand for line pipe and casings is as brisk as any time this year.

Fueling systems at air fields give substantial demand for black steel pipe, while construction and miscellaneous requirements maintain volume above normal for this period. Stocks are ample for current demand, but resellers anticipate growing problems for replacements, especially in galvanized, which has already tightened materially. Most distributors took in shipments somewhat heavier than usual at the time steel pipe was more available than other products and from this tonnage buying is being filled.

CAST PIPE PLACED

540 tons, 12 and 16-inch, cement-lined Panama, sch. 5225, to American Cast Iron Pipe Co., Birmingham, bids June 24, Washington.

537 tons, 4 and 6-inch, United States engineer office, South Pacific division, San Francisco, 434 tons to United States Pipe & Foundry Co., Burlington, N. J., and 103 tons to Pacific States Cast Iron Pipe Co., Provo, Utah.

200 tons, 14 to 18-inch, Puyallup, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

150 tons, various diameters, Panama sch. 5168, class 2, to U. S. Pipe & Foundry Co., Philadelphia; bids June 9.

150 tons, housing project, Manette, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

123 tons, 8 and 10-inch, Fresno, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, or more, 6 and 10-inch, Waltham, Mass., to Warren Pipe Co., Everett, Mass.

100 tons, 6-inch, cement-lined, Lynn, Mass., to Warren Pipe Co., Everett,

Mass.

100 tons, 6 to 16-inch for Alaska Railroad, to Marckman & Williams, Seattle, for Central Foundry Co., New York.

CAST PIPE PENDING

1175 tons, 4 to 12-inch, water system for flying school near Lemoore, Calif., for United States engineer office, Sacramento, Calif.; bids opened.

550 tons, 8 to 16-inch, Avalon Way project, Seattle; bids in.

538 tons, 3 to 12-inch, water system for flying school near Merced, Calif., for United States engineer office; bids opened.

395 tons, 3 to 12-inch, airport, Fresno, Calif.; contract to United Concrete Pipe Corp., Box 1, Station H, Los Angeles at $401,874.

390 tons, 6, 8 and 10-inch, water line extensions, Boston harbor defense area; bids in.

325 tons, Sand Point and N. W. 195th street project, Seattle; bids in.

Wire

Wire Prices, Page 89

Finishing departments producing wire specialties are congested with work requiring long processing on which difficulty is experienced in reducing period of completion if quality is maintained and specifications met. Numerous items require at least four to six weeks. Six and even seven-day 24-hour production schedules prevail in some departments, despite additional finishing equipment for specialties installed by most wire mills and now in production. Covering a broad range of products, demand for wire continues in excess of shipments and production with operating schedules keyed for the output of every pound possible.

Consumers without defense contracts fabricating goods now considered nonessential are more concerned as to immediate supplies. Manufacturers of fishing tackle, to illustrate one group, find difficulty in obtaining steel for retail replacements. At least one button-fastener maker in the East, using wire specialties, is confronted by curtailment or complete shut-down unless inventories of wire are replenished. Fabricators of these materials are being urged to take on defense contracts when possible, to assure them of some steel under priority ratings. Meanwhile the automotive trade, including parts-makers, while not seeking to place additional tonnage, are specifying heavily against orders. Rod supplies continue tight and some finishing departments could produce at a higher rate were rods more abundant.

American Steel & Wire Co. has published a revised list of extras and deductions covering manufacturers' drawn wire, both high carbon and low carbon. Dated March 31, 1941, the list supersedes the issue dated Oct. 1, 1940. Extras for size and spooling on low carbon round wire have been revised. New extras are listed for tempered black high carbon basic and acid steel wire in coils, in diameters larger than 7 gage. Piano wire extra table has been revised; and base size changed from 15 to 26, inclusive, to 26 only.

Rails, Cars

Track Material Prices, Page 89

Car and locomotive buying continues in the heaviest volume in years and orders on builders' books are sufficient for capacity production for months. Better priority, in recognition of pressing needs for transportation, places carbuilders on a better basis than formerly, though it has not been demonstrated yet how much this will help in deliveries as against shipbuilding and other pressing defense projects.

Rail buying is appearing, Chesapeake & Ohio and subsidiaries having distributed 57,041 tons to three producers, the Reading 7000 tons and Lehigh & New England 1725 tons. Other carriers are formulating their rail programs for next year and some heavy tonnages probably will be awarded later in the year.

New York Central is taking bids June 30, under the Clayton act, for its quarterly requirements of plates, shapes, bars and other miscellaneous steel products. Pittsburgh & Lake Erie will take bids July 8 on an unspecified tonnage of wheels and brakeshoes.

LOCOMOTIVES PLACED

Army Ordnance, Aberdeen Proving Ground, Md., one diesel-electric locomotive, to H. K. Porter Co., Pittsburgh, inv. 583.

Canadian National, 10 4-8-4 type steam engines, to Montreal Locomotive Works, Montreal; these are in addition to 25 previously ordered from this builder.

Great Northern, 18 Diesel-electric locomotives, with 16 ranging from 600 to 4050-horsepower going to Electro-Motive Corp., La Grange, Ill., and two 1000-horsepower, going to Baldwin Locomotive Works, Eddystone, Pa.

Louisville & Nashville, 12 660-horsepower Diesel-electric switch engines, with three each going to the American Locomotive Co., New York, the Baldwin Locomotive Works, Eddystone, Pa., and the Electro-Motive Corp., La Grange, Ill.

Navy, two 50-ton Diesel-electric switch engines for Charlestown, Mass., to General Electric Co., Schenectady, N. Y.

LOCOMOTIVES PENDING

Central of New Jersey, ten diesel-electric switch engines, eight of 600 horsepower and two of 1000 horsepower; bids asked.

Navy, ordnance, delivery Yorktown, Va., one 50-ton diesel locomotive and spares, Atlas Car & Mfg. Co., Cleveland, low; bids June 24, sch. 7375; Vulcan Iron Works, Wilkes-Barre, Pa., low on one 25-ton, delivery New York, sch. 7477.

New York, Susquehanna & Western, two 1000-horsepower diesel-electric locomotives; bids asked; also asking federal court authority for the purchase of additional six diesel-electric units of this size.

RAIL ORDERS PLACED

Chesapeake & Ohio, 38,041 tons; Carnegie-Illinois Steel Corp., Pittsburgh, 20,162 tons, Inland Steel Co., Chicago, 14,075 tons, Bethlehem Steel Co., Bethlehem, Pa., 3804 tons.

Lehigh & New England, 1725 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Nickel Plate, 11,000 tons; Carnegie-Illinois Steel Corp., Pittsburgh, 7150 tons, Inland Steel Co., Chicago, 1980 tons, Bethlehem Steel Co., Bethlehem, Pa., 1870 tons.

Pere Marquette, 8000 tons; Carnegie-Illinois Steel Corp., Pittsburgh, 2475 tons, Inland Steel Co., Chicago, 2200 tons, Bethlehem Steel Co., Bethlehem, Pa., 825 tons, Algoma Steel Corp., Sault Ste. Marie, Ont., 2500 tons.

Reading, 7000 tons, to Bethlehem Steel Co., Bethlehem, Pa.

CAR ORDERS PLACED

Army and Navy Munitions Board, Louisville Ordnance Division, four 70-ton flat cars, to Greenville Steel Car Co., Greenville, Pa.

Central of Georgia Railway, 150 fifty-ton automobile box cars, to American Car & Foundry Co., New York.

Chicago & Eastern Illinois, 500 fifty-ton steel sheathed box cars, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

Pennsylvania, ten light-weight streamlined coaches, to Edward G. Budd Mfg. Co., Philadelphia.

Southern Pacific, 2100 fifty-ton box cars; distribution not announced.

Wabash, 15 seventy-ton cement cars, to General American Transportation Corp., Chicago.

CAR ORDERS PENDING

Delaware, Lackawanna & Western, 250 fifty-ton gondolas, in addition to 250 box cars, now pending.

Wabash, 100 70-ton gondolas, bids asked.

Structural Shapes

Structural Shape Prices, Page 88

Inquiries and awards this month have been extremely large in number, though not outstanding in tonnage, usually lacking the five-figure tonnages, such as appeared in early spring. More and more is work confined strictly to defense and less to civilian. Moreover substitutes are sometimes being used for steel, as instanced by stone for a breakwater at Rocky River, O., in place of sheet piling.

Dry docks and defense construction, aircraft hangars and facilities notably, account for an increasing inquiry. Contracts include 9000 tons of tremie trusses for two dry docks at Brooklyn, and estimates are in on a group of hangars and field shops to be erected in widely scattered sections of the country. On less important projects, fabricating shops are quoting deliveries up to 20 weeks and beyond, but are able to better this if the need is urgent and shop plans are complete. Most are not attempting to estimate apartments and nonessential contracts.

Plain material deliveries are lengthening to around 14 weeks on the average with allocations to shipyards exerting an influence. Shipbuilding is also affecting the labor market in some districts, shop welders and other help entering the yards. Some larger projects

Behind the Scenes with STEEL

Available

■ We hope you enjoyed Editor Kreutzberg's pinch hitting here last week with his interesting story of the origin of the distribution of steel to the consuming industries, this year for the first time handled by the Institute and published as a special insert in the June 16 issue. Incidentally, additional copies of the figures are available free of charge through the Readers Service Dept.

Style Note

■ We understand the "brass hats" down in Washington are now turning to plastics to conserve the precious metal for cartridge cases, etc.

Shades of Izaak Walton

■ When the bass season opened over in Indiana recently, Jack Davis, superintendent of the Rochester Metal Products Co., tacked up a welcome notice on the bulletin board and the plant's 100 employes found themselves with the day off to try their luck in nearby Lake Manitou. Needless to say, Mr. Davis was among the first to get his line wet.

Grim Reaper

■ And speaking of our aquatic friends—death, as it must to all fish, came a few weeks ago to the last of the three famed goldfish who worked for a living in the lab of the GE plastics department at Pittsfield, Mass. A year ago the three little fishes were put on the company payroll when it was discovered they could adequately save seven hours a week of a man's time by devouring the algae which accumulated on the sides of a viscosity measuring bowl and which prevented chemists from watching reactions. After five months of faithful duty, goldfish No. 1 contracted a mysterious disease and passed on. No. 2 met his death more harshly not long after that, when he got caught in a drain pipe and broke his back. No. 3 wasted away and died of plain old-fashioned loneliness.

Squelching Saboteurs

■ One big company, at least, is being realistic about this 5th column business. On the verge of spending a tremendous sum for an identification system for its employes, the top boys had a meeting, decided the worst enemies were already employes. Some of them had already been convicted in connection with un-American activities; how many more there were it was impossible to ascertain. So an elaborate and complicated system was set up which keeps employes in their own departments, makes it impossible for them to go into any departments not specified by their badges. Visitors, however, are given big, orange badges which immediately spot them as outsiders. The system really works, as one of STEEL's editors will attest. On a recent trip to the plant, he was tagged with the orange badge, and received the fishy stare from workers everywhere. Upon reaching the prime objective of the visit, the value of the identification system was immediately apparent. The STEEL man was readily admitted, but his guide, who was from the main office, was barred and had to go back for a special visitor's pass for himself.

Progress

■ If the thought of increased prices bothers you, perhaps you would like to feel good about the fact that in 1816 a farmer had to trade a bushel of corn for a pound of nails, but that now a bushel of corn will buy 30 pounds of nails. Of course, on the other hand, maybe 1816 was a little before your day.

Like Hotcakes

■ In the last sixty days we've sold over 600 copies of "Modern Shell Production" and the orders still keep flowing in. The supply is dwindling but they're still available at a buck apiece if you don't tarry too long.

SHRDLU

involving impressive tonnage, are being split between several shops; the J. G. White Engineering Corp., New Orleans, placing contracts for structural steel entering into ways and shops of the Louisiana Shipyards, New Orleans, with five fabricators: Missouri Valley Bridge & Iron Co., Jones & Laughlin Steel Corp., Kansas City Structural Steel Co., the Steel Construction Co., Birmingham, Ala., and Bethlehem Steel Co.

Fabricated shape orders in May at 165,186 tons were the smallest for the year to date, according to the American Institute of Steel Construction, comparing with 212,320 tons in April and 126,815 tons in May of last year. May shipments were relatively better at 172,730 tons against 181,747 tons a month before and 115,617 tons a year before. The backlog of orders scheduled to be shipped within the next four months totals 718,897 tons.

SHAPE CONTRACTS PLACED

9000 tons, tremie trusses, dry docks 5 and 6, navy yard, Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Dry Dock Contractors, Inc., New York, contractor.

6800 tons, building, Sperry Gyroscope Co., Long Island City, N. Y., to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston, contractor.

3650 tons, warehouse, Rock Island arsenal, Rock Island, Ill., to Worden-Allen Co., Milwaukee; Permanent Construction Co., Chicago, contractor; bids June 14.

2200 tons, warehouses, proving ground, Savanna, Ill., for government, Mississippi Valley Structural Steel Co., Decatur, Ill., Manhattan Construction Co., Okmulgee, Okla., contractor; bids June 20.

1800 tons, warehouse, Oakland, Calif., for navy, to American Bridge Co., Pittsburgh.

1700 tons, foundry, navy yard, Brooklyn, N. Y. to American Bridge Co., Pittsburgh; Thompson-Starrett Co. Inc., New York, contractor.

1662 tons, piling, flood wall, Cairo, Ill., for U. S. engineers: 540 tons sheet piling and 582 tons bearing piling to Carnegie-Illinois Steel Corp., Chicago, and 540 tons sheet piling to Bethlehem Steel Co., Bethlehem, Pa.; Lake States Engineering Co., Chicago, contractor; bids June 5.

1010 tons, 10 warehouses, Augusta, Ga., arsenal, to Ingalls Iron Works, Birmingham; bids June 10 to U. S. engineer, Atlanta.

1000 tons, buildings, Linde Air Products Co., Tonawanda, N. Y., to American Bridge Co., Pittsburgh; John W. Cowper Construction Co., Buffalo, contractor.

925 tons, six warehouses, Camp Stanley,

SHAPE AWARDS COMPARED

	Tons
Week ended June 28	37,930
Week ended June 21	37,195
Week ended June 14	11,926
This week, 1940	19,837
Weekly average, 1941	32,243
Weekly average, 1940	28,414
Weekly average, May, 1941	29,872
Total to date, 1940	472,132
Total to date, 1941	838,312

Includes awards of 100 tons or more.

Texas, to Mosher Steel Co., Dallas, Tex.

910 tons, highway overpass, St. Johnsbury, Vt., to Phoenix Bridge Co., Phoenixville, Pa., through Charles I. Hosmer Inc., Greenfield, Mass., contractor.

850 tons, Lincoln tunnel, MHT-55, Plaza, etc., New York, for Port of New York authority, to American Bridge Co., Pittsburgh.

570 tons, storage warehouse, air depot, Middletown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Ritter Bros., Harrisburg, Pa., contractor; 44 tons reinforcing bars to Truscon Steel Co., Youngstown, O.

569 tons, Ohio state bridges; 359 tons, Lake county and 210 tons, Wayne county, both to American Bridge Co., Pittsburgh.

550 tons, state highway bridge, Norton, W. Va., to American Bridge Co., Pittsburgh.

500 tons, Cleveland Hobbing Machine Co., Cleveland, to Rogers Structural Steel Co., Corry, Pa.

500 tons, 17 bulkhead gates, Coram, Calif., for U. S. bureau of reclamation, to Southwest Welding & Mfg. Co., Alhambra, Calif.

425 tons, grade crossing elimination, Dansville-Conesus, N. Y., to American Bridge Co., Pittsburgh, through Hornell Construction Corp., Hornell, N. Y.

350 tons, state bridge 5777, Duluth, Minn., to American Bridge Co., Pittsburgh.

300 tons, shop buildings, Augusta, Ga., arsenal, to Ingalls Iron Works, Birmingham.

280 tons, hangars and boilerhouse, Ft. Lewis, Wash., for war department, to Paxton & Vierling Iron Works, Omaha, Nebr.

259 tons, addition Battelle Memorial Institute, Columbus, O., to Case Crane Co., Columbus, O.

206 tons, state bridge, contract 2173, Austin, Scott county, Indiana, to Vincennes Steel Corp., Vincennes, Ind.; R. P. Olinger, contractor.

206 tons, state bridge, contract 2172, Austin, Scott county, Indiana, to Vincennes Steel Corp., Vincennes, Ind.; R. P. Olinger, contractor.

200 tons, warehouse addition, Bliss & Laughlin Inc., Buffalo, to the Lackawanna Steel Construction Co., Buffalo.

200 tons, five small buildings, naval base, Newfoundland, to Belmont Iron Works, Philadelphia.

190 tons, administration building, Republic Aviation Corp., Farmingdale, N. Y., to Weatherly Steel Co., Weatherly, Pa.

165 tons, addition, open hearth shop, American Locomotive Co., Latrobe, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

150 tons, state bridge, Western Maryland railroad, Elkins, W. Va., to American Bridge Co., Pittsburgh.

133 tons, bridge, route 6, Sect. 21 A, Denville relocation, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, housing project, Providence, R. I., to Lehigh Structural Steel Co., Allentown, Pa., through Psaty-Fuhrman Co., Inc., New York.

125 tons, bridge, New Haven railroad, Shelton, Conn., to Phoenix Bridge Co., Phoenixville, Pa.

115 tons, viaduct, Pittsburgh, Pennsylvania Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, industrial and shop building, state institution, Green Haven, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, bridge, Fairview, N. J., to American Bridge Co., Pittsburgh, through J. P. Burns, Dumont, N. J., contractor.

100 tons, O'Reilly general hospital, War Department, Springfield, Mo., to Builders Steel Co., North Kansas City, Mo.; 40 tons reinforcing bars to Truscon Steel Co., Youngstown, O.; Swensen Construction Co., Kansas City, contractor.

Unstated tonnage, shapes and bars, plant addition, Perkin-Elmer Corp., Glenbrook, Conn., to New England Iron Works Inc., New Haven, and Fireproof Products Co., New York; Buono Construction Co., Stamford, Conn., contractor.

SHAPE CONTRACTS PENDING

15,000 tons, 27 units, quartermaster supply depot, Oakland, Calif.; bids soon by contractors.

6000 tons, sheet piling, graving dock, Hunters Point, San Francisco; bids being taken.

2800 tons, low lift pumping station, filter building, and administration building, south district filtration plant, City of Chicago; Strobel Construction Co., Chicago, low; bids June 26.

2200 tons, materials warehouses, ordnance depot, Proving Ground, Ill., for government.

1980 tons, 4 aircraft hangars at Victorville, Calif., and 3 at Mesa, Ariz., for United States Engineer Office, Los Angeles; bids opened.

1950 tons, power house addition, navy yard, Brooklyn, N. Y.; J. G. White Engineering Co., New York low.

1500 tons, highway bridges, State of Oklahoma; bids June 24.

1500 tons, warehouses, general depot, Columbus, O., for war department.

1300 tons, power house, Electric Illuminating Co., Bridgeport; Westcott & Mapes, Bridgeport, engineers; steel bids in.

1200 tons, several small buildings, Ft. Belvoir, Va.

1200 tons, seven 184-foot demountable hangars; bids to U. S. engineer, Mobile, Ala., three delivered Dothan, Ala.; one Hattiesburg, Miss., and three Tuskegee, Ala.

1100 tons, manufacturing building, Emerson Electric Co., Ferguson, Mo.

1000 tons, engine equipment building, Fort Belvoir, Va.; bids in.

965 tons, including 640 tons shapes and 325 tons piling, bridges, flood protection, Massillon, O., U. S. Engineers, Huntington, W. Va.; E. J. Albrecht

Co., Chicago, sole bidder; bids June 21.

850 tons, storehouses 201 and 202, Philadelphia, for war department.

675 tons, Frankford arsenal, Philadelphia; Hughes-Foulkrod, Philadelphia, low.

650 tons, state bridge FAGM-414, Burlington, Iowa.

550 tons, state bridge FAGH-419, Belleview, Iowa.

500 tons, power plant extension, Southern Indiana Gas & Electric Co., Evansville, Ind.

400 tons, storehouse, Puget Sound navy yard; bids June 26.

400 tons, roof framing, Shasta power plant, specification 1520-D, Coram, Calif., for Bureau of Reclamation.

375 tons, steel sheet piling, flood protection, Merrimack river, Lowell, Mass.; bids July 16, U. S. engineer, Boston.

350 tons, warehouse, arsenal, Watertown, Mass., for government.

321 tons, elimination, Riverview drive grade crossing at Delaware, Lackawanna & Western railroad, Totowa, Passaic county, New Jersey; bids July 11, E. Donald Sterner, state highway commissioner, Trenton.

300 tons, storage and magazines, Oyster Bay, Wash.; bids to Com. R. E. Thomas, Puget Sound navy yard, June 28.

300 tons, quartermaster warehouse, transit shed and steel bridge, Seattle depot; bids to Capt. H. L. Morian, Seattle, June 28.

280 tons, aircraft hangar, Taft Field, Taft, Calif.; bids opened.

255 tons, bridge, East Dubuque, Ill., for Illinois Central system.

240 tons, Main street bridge, Beckett, Mass., for state.

225 tons, Beans crossing, New York, New Haven & Hartford railroad, Northbridge, Mass., for state.

200 tons, sewage disposal plant, Brighton, N. Y.

200 tons, coal bunkers, navy yard, Brooklyn, N. Y.; steel bids in.

200 tons, ordnance building, Fort Lewis, Wash.; Sound Construction & Engineering Co., Seattle, contractor.

185 tons, warehouse addition, Sault Ste. Marie, Mich., for government.

170 tons, factory and office building, Thermoid Rubber Co., Trenton, N. J.

170 tons, reconstruction, underpass, Pennsylvania-Reading Seashore Lines, Woodbury, N. J.; bids July 11, E. Donald Sterner, state highway commissioner, Trenton.

168 tons, state bridge 538, Dancy, Portage county, Wisconsin; P. W. Ryan Sons' Co., low; bids June 17.

165 tons, reconstruction bridge G-3, Lewiston, N. Y., for New York Central railroad.

160 tons, bulb angle curbing, Brooklyn, N. Y., for treasury department.

150 tons, preparation building, Defense Plant Corp., Akron, O.

115 tons, building, Phelps-Dodge Corp., Bayway, N. J.

110 tons, pontoon treadways, etc., Ft. Knox, Ky., and Ft. Benning, Ga., for army engineers.

Unstated, 513-foot state bridge, Clearwater river, Idaho; bids to Highway Commission, Boise, July 2.

Unstated, transmission towers, radio stations, Homer and Cold Bay, Alaska; bids to C. A. A., Washington, D. C., June 26.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Makers of bolts and nuts believe that they have as large a percentage of defense orders as any branch of the steel industry, perhaps more, since their product is common to so many forms of fabrication, tanks, airplanes, trucks, docks, etc. Usually securing of raw materials has not been much of a problem because of the standard specifications year after year. However the situation tightens and supply becomes more of a problem. Unfilled orders on books of bolt and nut producers are usually 60 to 90 days.

Reinforcing Bars

Reinforcing Bar Prices, Page 89

Steelmakers show less interest in concrete bar inquiries because of difficulty of getting steel. Only defense projects are sure of receiving attention and bidding on such is not lively. In northern Ohio are some pending projects which will require large tonnages, such as a $3,500,000 power plant for the Cleveland Electric Illuminating Co. at Avon, O., and some 4000 tons for the Edgewater Park breakwater at Cleveland.

REINFORCING STEEL AWARDS

6500 tons, additional requirements, buildings, naval depot, Bayonne, N. J., to Bethlehem Steel Co., Bethlehem, Pa. and Truscon Steel Co. Youngstown, O., with some likely to be allocated to other fabricators.

2000 tons, navy yard storehouse, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

1700 tons, relocation Atchison, Topeka & Santa Fe railroad, Durand, Okla., for U. S. engineer, to Sheffield Steel Corp., Kansas City, Mo.

851 tons, flood protection, Paducah, Ky., for U. S. engineer, to Laclede Steel Co., St. Louis; G. E. Tillman, contractor.

800 tons, bomber plant, Tulsa, Okla., to Sheffield Steel Corp., Kansas City, Mo.

800 tons, pier, Puget Sound navy yard, Washington, to Bethlehem Steel Co., Seattle; General Construction Co., Seattle, contractor.

512 tons, flood wall, Cairo, Ill., for U. S. engineer, to Laclede Steel Co., St. Louis; Lake States Engineering Co., Chicago, contractor; bids June 5.

299 tons, highway bridge, state of Minnesota, to Paper-Calmenson Co., St. Paul; Polans Construction Co., contractor; bids June 6.

240 tons, naval operating base facilities, Norfolk, Va., to Bethlehem Steel Co., Bethlehem, Pa.; McLean Construction Co., contractor.

200 tons, silos for Lehigh-Portland Cement Co. plant, Spokane, Wash., to Bethlehem Steel Co., Seattle.

190 tons, mesh, highway project, RC-41-18, Ulster county, New York, to Wickwire-Spencer Steel Co., Buffalo; John

CONCRETE BARS COMPARED

	Tons
Week ended Jue 28	8,861
Week ended June 21	14,915
Week ended June 14	7,679
This week, 1940	10,500
Weekly average, 1941	11,684
Weekly average, 1940	9,661
Weekly average, May, 1941	10,521
Total to date, 1940	218,397
Total to date, 1941	303,780

Includes awards of 100 tons or more.

Arborio Inc., Poughkeepsie, N. Y. contractor.

180 tons, mesh, highway project, SS-41-2, Jefferson county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Bero Engr. & Constr. Corp., North Tonawanda, N. Y., contractor.

180 tons, bars and mesh, apron and taxiway, air field, Manchester, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Central Construction Co., Lawrence, Mass., contractor.

176 tons, WPA 57253, Chicago, to Olney J. Dean Steel Co., Cicero, Ill.

143 tons, FAP-36 (A5) Orleans, Neb., to Ceco Steel Products Corp., Omaha, Neb.; Orshek & Christensen, contractor.

122 tons, S. H. D. proj. 37, Richland county, Ohio, to Builders Structural Steel Co., Lombardo Brothers, contractors.

120 tons, water intake, Alton, Ill., to Laclede Steel Co., St. Louis; Grabbe Construction Co., contractor.

113 tons, highway bridge, state of Minnesota, to Concrete Steel Co., New York; Andrews Construction Co., contractor; bids June 6.

104 tons, Epiphany church, Chicago, to Olney J. Dean Steel Co., Cicero, Ill.; Henry Bros., Chicago, contractor; bids May 20.

103 tons, highway bridge, state of Minnesota, to Duluth Building Materials Co., Duluth; Nelson, Haffner & Lundin, low; bids June 6.

100 tons, addition, Saint Bedes Abbey, Peru, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; T. S. Willis Co., Janesville, Wis., contractor; bids June 10.

100 tons, inert storage units, Western Cartridge Co., Weldon Springs, Mo., to Joseph T. Ryerson & Son Inc., Chicago; Fraser-Brace Engineering Co., contractor; bids June 19.

100 tons, mesh, highway project, RC-41-21, Cayuga county, New York, to Wickwire-Spencer Steel Co., Buffalo; Mohawk Paving Co. Inc., Buffalo, contractor.

REINFORCING STEEL PENDING

10,000 tons, army defense base, Jamaica, B. W. I.

7000 tons, buildings, Puget Sound navy yard, Wash.; bids to Com. R. E. Thomas, June 28.

5425 tons, warehouse, Philadelphia navy yard; bids June 27 on 425 tons for foundation; bids Aug. 27 on 5000 tons for superstructure.

2350 tons, Anderson Ranch dam, Idaho; bids July 7.

2000 tons, war department warehouse, Seattle; bids to Capt. H. L. Morian, June 28; also 1000 foot pier, Seattle; bids soon.

2000 tons, U. S. treasury department, Houston, Tex.; Southern States Steel Co. only bidder on maximum of 1000 tons; bids June 11.

1800 tons. Keswick dam, Central Valley project, Calif.; bids July 14.

1500 tons, housing project, Charlestown district, Boston.

1200 tons, navy yard quay wall, pier 5, Norfolk, Va.; Drydock Associates, contractors.

985 tons, mesh, highway projects, New York state; bids July 16, Albany.

800 tons, bars and mesh, mostly latter, highway construction, Westchester County, New York; bids in.

475 tons, state procurement office, treasury department, Montgomery, Ala.; bids in.

450 tons, 14 inert material warehouses, proving ground, Savanna, Ill., for government; Manhattan Construction Co., Okmulgee, Okla., low; bids June 20.

400 tons, Pennsylvania state highway work, Berks county.

350 tons, addition Frankford arsenal, Philadelphia; Hughes-Foulkrod, Philadelphia, low.

150 tons, Bureau of Reclamation, Denver, Inv. A-4435-A-1; bids July 2.

135 tons, ordnance building, Fort Lewis, Wash.; Sound Construction & Engineering Co., Seattle, contractor.

100 tons, plant addition, Linde Air Products Co., Tonawanda, N. Y., John W. Cowper Co., Buffalo, contractor.

100 tons, elimination, Riverview drive grade crossing at Delaware, Lackawanna & Western railroads, Totowa, Passaic county, New Jersey; bids July 11, E. Donald Sterner, state highway commissioner, Trenton.

100 tons or more, central library building, Washington, D. C., to Bethlehem Steel Co., Bethlehem, Pa.; Ross Engineering Co., Washington, contractor, $894,165, bids June 10.

Unstated tonnage, 375 housing units for ordnance workers and two management and maintenance buildings, ordnance plant, Burlington, Iowa, for government; bids June 30.

Pig Iron

Pig Iron Prices, Page 90

Maximum prices on pig iron have been issued by OPACS, setting basing point prices on five major grades and differentials on silicon, phosphorus and manganese contents. The prices are those which have been in effect for several months and include a differential of 50 cents at Sharpsville, Pa., and Youngstown, O., where the Pittsburgh Coke & Iron Co. and Struthers Iron & Steel Co. are allowed to quote above the base prices. This action removes previous uncertainties as to third and fourth quarter prices.

While some producers have been booking for third quarter delivery others had not opened books at the time of the announcement but are expected to begin booking at once for that period.

Pig iron sellers are hard pressed to keep melters supplied and shipments are frequent, usually in small lots, to meet urgent needs, as stocks at foundries are small. Most current shipments are going into immediate consumption. Sellers allocate shipments for most part, to spread their production as widely as possible in respect to urgent need. Foundries have slackened their specifications somewhat in view of difficulty in obtaining exact analyses. While some melters fear they may be forced to shut down for lack of iron no instances have been met where such action has been necessary. Broad allocation by OPM is expected by some interests, as a solution of distribution problems.

Scrap

Scrap Prices, Page 92

Although revised regulations and changes in ceiling prices have solved some difficulties in the steel and iron scrap market sufficient time has not elapsed to give full

effect to the new provisions. Supplies are still scarce in many grades but better collection and distribution is expected to ease the situation somewhat, though it is believed some stringency will continue until conditions are more settled.

Dealers find supplies slow but are shipping all they can gather, yard stocks being limited to material in process, for most part. Railroads are offering much less than usual in the market and melters relying on this source find themselves cramped for material.

Ford Motor Co. has closed for about 10,000 tons and is seeking further tonnage. The purchase consisted of heavy melting steel, bundles, foundry scrap and other grades. Summer tapering of automobile production will reduce tonnage of the company's own scrap and this purchase is regarded as seasonal and precautionary.

Southern Ohio interests feel beneficial effect from Portsmouth and Middletown, O., and Ashland, Ky., being made basing points with higher prices. This enables procurement of scrap from a wider area. Cincinnati consumers find some difficulty in obtaining cast scrap and rails, as that city is not a basing point.

Discontinuance of ceiling prices on steel grades for New England delivery enables consumers there to buy at ceiling f. o. b. prices further afield, but they would have to pay substantially more than former maximums.

Buffalo consumers have been receiving heavy shipments but in view of record steel production have been unable to replenish reserves. Current supplies have been sufficient to match consumption and heavy lake shipments will continue this situation through the summer. Shortage is feared after navigation closes.

Sale of imported scrap and secondary materials containing nickel at prices above the OPACS maximum will be permitted by the price administrator. The order provides that such scrap may be purchased ahead at not more than the schedule for sales in this country and the importer may ask permission to sell above the ceiling. Such sales will not be permitted above the maximum price in this country, plus duty, freight, insurance, etc., plus the premium allowed to converters of the same grades handled domestically.

Pacific Coast

Seattle—Important industrial expansion is planned, including enlargement of steel production. O. P. M. program includes $2,000,000 for three Seattle plants as follows: Addition of open hearth furnace to four now in operation at local plant of Bethlehem Steel Co., reheating furnace and expansion of storage and shipping facilities; new foundry for Pacific Car & Foundry Co. and enlargement of heavy forging facilities of Isaacson Iron Works.

Army and navy projects are developing rapidly. Warehouses at Puget Sound navy yard and quartermaster depot and pier at Seattle, bids within the next two weeks involve an estimated 9000 tons of concrete bars and probably 1000 tons of structurals. Plants are swamped with orders but are giving preference to defense contracts and refusing to bid on many private jobs.

Jobbers report stocks are badly broken and replacements difficult. Practically all items are now coming by rail as water space is unobtainable. This has resulted in a general price increase of .75 cents to overcome freight differential, applying to all Eastern items but excluding as far as possible items of local origin. Portland is reported to have applied the increase to the entire list. Volume of sales is steady and of large proportions.

San Francisco—Numerous structural projects are expected to be released for figures soon. Important among these are 15,000 tons for 27 warehouse units for the quartermaster supply depot, Oakland, Calif., sub-bids to be taken by the general contractors, and 6000 tons of sheet steel piling for a graving dock at the Hunters Point drydock, San Francisco.

Cast iron pipe lettings totaled 660 tons and brought the year's aggregate to 28,693 tons compared with 15,292 tons for the same period a year ago.

While few large plate inquiries have developed recently bids have ben opened on 400 tons for 500,000-gallon tanks and towers at Victorville, Calif., and at Mesa, Ariz.

Practically all reinforcing bar bookings were in lots of less than 80 tons. To date 47,381 tons have been booked, compared with 78,636 tons for the same period last year.

Canada

Toronto, Ont.—The Canadian government is arranging for further substantial expansion in war materials production, giving special attention to steel, bomber planes and ships, according to word from Ottawa. Announcement also is made that there will be further curtailment in production of automobiles, oil furnace equipment, household equipment, and other materials not associated with the war effort. In the iron and steel markets war buying is developing along broader lines. During the week the government placed an order with Atlas Steels Ltd., Welland, for stainless steel valued at more than $45,000. Companies working on war contracts also are heavy buyers of steel, with backlogs already covering practically all production by primary producers to the year-end and additional large orders are pending.

Demand for sheets continues to expand and representatives of the various producing companies, both Canadian and United States, report numerous inquiries, with many consumers seeking early delivery. Canadian mills, however, are fully booked to the end of the year, with large carryover into 1942 and some now are declining new business.

Plate demand is gaining steadily

and many inquiries are appearing. Some government contractors are said to be trying to buy in the United States in excess of former deliveries. Canada's expanding shipbuilding program calls for much greater quantities of plate than is being produced in this country. In addition sales and demand for armor plate is advancing rapidly and larger orders are said to be pending for production of the new Canadian M.3 Cruiser tank under construction at Montreal Locomotive Works.

Orders for merchant pig iron are increasing and numerous inquiries reached the market during the week, all of which are going through the department of the Canadian Steel Controller for approval.

Scarcity of pig iron continues to stimulate sales of iron and steel scrap, where demand is gaining at a rapid rate. Consumers are endeavoring to place orders and contracts for much larger tonnages of cast scrap and stove plate than are available at this time and premium prices are being offered by some for quick delivery.

Steel in Europe

Foreign Steel Prices, Page 91

London—(*By Cable*)—Great Britain's steel supply now is satisfactory and imports of raw and semi-finished steel from the United States have been reduced, making room for finished munitions products. Output of hematite pig iron is improving. Demand for shipbuilding steel continues intense, including boiler plate, sheets and special steels. Demand for heavy structurals is increasing.

Nonferrous Metals

New York—Emphasis still is on production but metal prices now are the subject of one of the widest discussions in some months. Due to booking of business at prices higher than "suggested" levels by an unorganized minority, pressure has increased steadily for official maximum price schedules.

Copper—Total consumption of both domestic and foreign copper in domestic mills established a new all-time high in May at 139,164 tons. At the end of the month consumers were short 264,850 tons. A subsidy of ½ to 3 cents a pound will be paid soon to Michigan high-cost miners in an effort to increase domestic production.

Lead—Supplies available for consumption in this country are tightening and the government may provide for purchases of lead in its pending economic defense pact with Mexico. Consumers probably will take delivery on about 80,000 tons of lead this month against 90,000 tons in May. Total stocks as of June 1 totaled only 105,197 tons, a drop of 11,664 tons in one month.

Zinc—Defense "hot spots" are still being corrected by shipments from the OPM pool, accumulated by monthly allocations of certain percentages of total production. The pool will get about 16,000 tons in June against 15,000 in May.

Tin—Importers continue to bring

Nonferrous Metal Prices

June	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
21	12.00	12.00	12.25	53.00	52.50	5.85	5.70	7.25	17.00	14.00	35.00
23	12.00	12.00	12.25	53.00	52.55	5.85	5.70	7.25	17.00	14.00	35.00
24	12.00	12.00	12.25	52.87½	52.12½	5.85	5.70	7.25	17.00	14.00	35.00
25	12.00	12.00	12.25	53.00	52.25	5.85	5.70	7.25	17.00	14.00	35.00
26	12.00	12.00	12.25	52.87½	52.12½	5.85	5.70	7.25	17.00	14.00	35.00
27	12.00	12.00	12.25	52.87½	52.25	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	9.25
Cleveland	9.50-10.00
Chicago	9.00-9.25
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.25-10.37½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	10.00

Composition Brass Turnings

New York	9.00

Light Copper

New York	8.25-8.37½
Cleveland	8.00-8.50
Chicago	8.00-8.25
St. Louis	8.00

Light Brass

Cleveland	4.50-5.00
Chicago	6.25-6.50
St. Louis	5.00

Lead

New York	4.85-5.00
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

in all the tin available, selling it last week at about 53.00c, or 3 cents above the Metals Reserve Co's standing bid. If MRC takes over tin importation, it will be only to consolidate shipping and to stabilize prices, probably at 50.00c.

Metallurgical Coke

Coke Prices, Page 89

Some lower grade beehive ovens are being taken out of production in the Connellsville district because of declining demand. Conversion of better grade coals is increasing and this is satisfying demand so that marginal producers have lost their market.

Large buyers have notified suppliers to cut down shipments, presumably because of increasing output of captive ovens. The entire situation is becoming better balanced, although the by-product market is still tight.

Refractories

Refractories Prices, Page 90

Refractory backlogs are holding steady, various grades running from a few days to four or six months. However, production is pacing new business, and refractory makers are confident that within the next few months they will be able to make headway against backlogs. Delivery promises are being kept in most instances. Heaviest backlogs are in blast furnace brick, although incoming business along this line has shown a tendency to drop.

Indictment of six refractory firms in Philadelphia district Federal court last Monday for alleged price control will have no effect on the announced price increases, scheduled for July 1, according to some sources. There is some doubt in the matter, however, according to other quarters. Action is expected shortly by most producers.

Indicted were the Harbison-Walker Refractories Co., Pittsburgh, Raymond Willey, president, and W. B. Coullie, vice president; General Refractories Co., Philadelphia, Floyd L. Greene, president, and Drew M. Thorpe, vice president; A. P. Green Firebrick Co., Mexico, Mo., and H. B. Plunkett, vice president; North American Refractories Co., Cleveland, and H. H. Hopwood, sales manager; Laclede Christy Clay Products Co., St. Louis; the American Refractories Institute and W. J. Westphalen, St. Louis, president.

Equipment

Cleveland—First inquiries on a project which eventually may require a large quantity of machinery and machine tools, the Erie proving ground at Lacarne, O., near Sandusky, have appeared. The initial inquiry is for a small lathe and a drill press.

Seattle—Volume of sales continues high but agencies report delays and difficulties in obtaining some items. Electrical equipment, heavy construction machinery and shipyard items are particularly strong. Denver has called bids July 1 for three 150,000-horsepower turbines and July 9 for three generators for Coulee power plant, increasing that unit to 900,000 horsepower, new equipment to be installed by Sept. 1, 1943, the additional power planned to serve proposed aluminum plants in this area. General Electric Co. is low to Bonneville Project, $936,998 for 115-kv. and 230-kv. circuit breakers. Same office has awarded Ne-Page Electric Co., Seattle, a $53,688 contract for the Colfax-Lewiston, Idaho, single circuit transmission line, opened bids June 27 for water system at Longview, Wash., and has called bids July 7 for 1,620,000 feet of conductor and accessories, Spec. 2015. War department has allotted $138,400 for fences at Fort Lewis, $43,950 for harbor defenses on Columbia river and $5500 for non-climable fences and floodlights at Seattle. American Steel & Wire Co. will furnish a chain link fence for Seattle lighting department.

Construction and Enterprise

Ohio

ASHTABULA, O. — Ward Products Corp., 1523 East Forty-fifth street, Cleveland, has bought two buildings from Aetna Rubber Co. at Ashtabula and will expand its facilities for manufacturing automobile accessories. Cleveland plant will not be moved. Ralph N. Weisenberger, Cleveland, is president.

CINCINNATI—Corcoran-Brown Lamp Co., 4890 Spring Grove avenue, has given contract to Frank Messr & Sons Inc., for a 63,000-square foot addition, costing $500,000, including equipment. Company is subsidiary of Electric Auto-Lite Co., Toledo, O., and is making blackout lamps for army vehicles.

CLEVELAND—Acro Electric Mfg. Co., 3167 Fulton road, J. McComb, president, will start production of precision electric switches for automotive and aircraft use.

CLEVELAND—Neo Mold Co., 2729 Prospect avenue, R. A. Weise, president, is setting up equipment for production of plastic molds. Company was organized recently.

CLEVELAND—Foundry Equipment Co., 1831 Columbus road, will build steel fabricating shop addition of 2600 square feet costing about $10,000. Charles A. Barnett is president.

CLEVELAND—E. W. Bliss Co., 22501 St. Clair avenue, manufacturer of punch presses, is adding 12,300 square feet to plant, at cost of $25,000. L. H. Carter is manager.

CLEVELAND—Waterway Mfg. Co., 1193 Holmden avenue, John B. Plekenpol, manager, will move to new plant at Triskett road and West 129th street, covering about 3250 square feet. Company manufactures plumbing supplies.

CLEVELAND—Cleveland Electric Illuminating Co., 75 Public Square, Eben G. Crawford, president, has placed order for 50,000-kilowatt generator for its Avon Lake power plant, entire plant expansion to cost about $3,500,000.

Connecticut

BRIDGEPORT, CONN.—Stanley Works, Seaview avenue, will build a two-story

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 99 and Reinforcing Bars Pending on page 101 in this issue.

plant extension to cost about $145,000, with equipment.

MERIDEN, CONN.—New Departure division, General Motors Corp., 290 Pratt street, has let general contract to H. Wales Lines Co., 134 State street, for a four-story 44 x 65-foot plant addition costing about $40,000.

NAUGATUCK, CONN. — Naugatuck chemical division of United States Rubber Co., Maple street, will build a rubber factory with 2500 tons annual capacity, eventually to have 10,000 tons annual capacity. Cost is estimated at $1,250,000, with equipment.

NEW BRITAIN, CONN.—Corbin Screw Corp., division of American Hardware Corp., is building a two-story addition 60 x 95 feet, costing $65,000, with equipment.

NEW BRITAIN, CONN.—Fafnir Bearing Co. is building a four-story addition and top story extension, to cost $100,000, with equipment.

NEW BRITAIN, CONN.—Eastern Machine Screw Corp. is building a one-story 50 x 105-foot addition with foundation for second floor later, to cost $60,000, with equipment.

Massachusetts

INDIAN ORCHARD, MASS.—Monsanto Chemical Co., 600 Monsanto avenue, Springfield, Mass., will build a power plant costing about $40,000. General contract has been given to Adams & Ruxton Construction Co., 1387 Main street, Springfield, Mass. Charles T. Main Inc., 201 Devonshire street, Boston is engineer.

WORCESTER, MASS.—Sun Oil Co., 711 Statler building, Boston, will build a bulk oil terminal, including 23 x 56-foot warehouse, 72 x 80-foot garage and office and storage tanks, costing about $45,000.

WORCESTER, MASS.—American Steel & Wire Co., 94 Grove street, will build a substation addition at Kane square and also a duct line, at cost of about $40,000.

WORCESTER, MASS.—Thompson Wire Co., 115 Stafford street, will build a four story 65 x 180-foot addition, general contract to Fiske Carter Construction Co., 8 Norwich street, at cost of about $115,000. (Noted June 9.)

New York

BUFFALO—Niagara Blower Co. Inc., Ontario street, has let general contract to Edw. C. Boehm Inc., 110 Franklin street for a plant addition to cost over $40,000.

BUFFALO—Otis Elevator Co., 775 Main street, has let general contract for an annealing oven building to Charles H. Everitt Inc., 295 Auburn avenue, at about $60,000.

POUGHKEEPSIE, N. Y.—International Business Machine Co., 590 Madison avenue, New York, has let contract to L. H. Swenson Co., 2 Cannon street, for a plant addition costing $100,000.

SIDNEY, N. Y.—Scintilla Magneto Co. Inc. has let general contract to Frank Lewis & Son, Bainbridge, N. Y., for a plant addition costing over $100,000.

New Jersey

BELLEVILLE, N. J.—Walter Kidde & Co., manufacturer of high-pressure gas specialties, ship and airplane equipment, plan an addition to cost over $2,000,000, to be financed by Defense Plant Corp.

PATERSON, N. J.—Wright Aeronautical Corp. plans further plant expansion to give 35 per cent increase in engine output by the year end. Small addition will be built and machine tool equipment installed.

TRENTON, N. J.—Thermoid Co., Whitehead road, will let contract soon for a 100 x 200-foot plant addition costing $50,000. Mucklewright & Mountford, 224 East Hanover street, are architects and engineers.

Pennsylvania

ELLWOOD CITY, PA.—Ellwood City Forge Co. will build an 85 x 200-foot forge shop addition costing $40,000 to $50,000.

LANCASTER, PA.—Hamilton Watch Co., Columbia avenue, will build four-story plant additions 42 x 200 and 47 x 100 feet. General contract let to D. S. Warfel, North Main street, at about $150,000. Prack & Prack, Masten building, Pittsburgh, are architects.

Michigan

BIRMINGHAM, MICH.—Detroit Suburban Foundry Co. has been incorporated with $7500 capital to manufacture castings, by Anthony E. Furman Jr., 32900 Telegraph road, R. F. D. No. 1.

DETROIT—Ludwig Tool Inc. has been incorporated with $1000 capital to manufacture tools and jigs, by John Ludwig, 666 East Columbia street.

DETROIT—St. Claire Tool Co. is having plans drawn by H. E. Beyster Corp., Detroit, for an addition to its plant on Beaufait street.

DETROIT—Redford Tool & Die Co. is having plans drawn by Jensen & Keough, architects, for a plant addition.

GRAND RAPIDS, MICH.—National Brass Co. has given general contract to Strom Construction Co. for an addition to its plant, on plans by Harry Mead, architect.

GRAND RAPIDS, MICH. — Federal Mogul Corp., Detroit, is having plans drawn by Robinson, Campau & Crowe, architects, Grand Rapids, for a foundry building in Greenville, Mich.

KALAMAZOO, MICH.—Kalamazoo Mill Supply Co., 504 Hanselman building, has been incorporated with $25,000 capital to deal in steel, copper, by Albert V. Kimball, 915 Dayton avenue, Kalamazoo.

Illinois

CHICAGO—Rheem Mfg. Co., 3425 South Kedzie avenue, has let contract for a second plant unit to Brown & Matthews Inc., 122 East Forty-second street, New York, to cost about $300,000.

CHICAGO—Certified Core Oil & Mfg. Co., 5526 West Sixty-Sixth street, has sold its present property and is building a new plant at West Thirty-third street and Cicero avenue, which it will occupy about August 1.

CHICAGO—Poray Inc., 3403 West Grand avenue, manufacturer of tool and die work, metal plating and spraying and stamping, is replacing its burned plating and spraying unit, providing 10,000 square feet more than original plant. Considerable new equipment, including conveyors, will be installed, total cost to be about $100,000. Company also operates plant at 3345 West Grand avenue.

JOLIET, ILL.—War department has given contract to Sanderson & Porter, 52 William street, New York, for a $5,774,000 addition to Elwood ordnance plant.

ROCK ISLAND, ILL.—War department will award contracts soon for a $300,000 sewage disposal plant at Rock Island arsenal. Plans are being drawn.

ROCK ISLAND, ILL.—War Department has awarded a contract to Permanent Construction Co., Chicago, for a one-story 540 x 1420-foot concrete and steel warehouse at Rock Island arsenal.

SAVANNA, ILL.—C. A. Hooper & Co., Madison, Wis., is low bidder at $95,300 for electric distribution system for street lighting for Savanna ordnance depot, Proving Ground, Ill., contract to be closed soon.

SKOKIE, ILL.—Public Service Co. of Northern Illinois, 72 West Adams street, Chicago, will let contracts soon for a 43 x 82-foot addition to steam department of power plant here. Sargent &

Lundy Inc., 140 South Dearborn street, Chicago, are consulting engineers.

Indiana

MARION, IND.—Anaconda Wire & Cable Co., 26 Broadway, New York, T. Jackson, plant manager, will build a plant costing $100,000.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids as follows: July 1, schedule 7422, 14 motor-driven hack saws, for east coast delivery; schedule 7437, 13 motor-driven hack saws, for east and west coast delivery; schedule 7479, three motor-driven sensitive bench drilling machines, for San Diego, Calif.; schedule 7480, one motor-driven hacksaw, for San Diego, Calif.; schedule 7531, 1807 pressure gages, for delivery at Washington; schedule 7556, power actuated portable tools, for east and west coast delivery; schedule 7557, motor-driven profiling machine, for Norfolk, Va.

Tennessee

MILAN, TENN.—War department has allotted additional $5,395,000 for ammunition loading plant here, being constructed by H. K. Ferguson Co., Hanna building, Cleveland, and Oman Construction Co., Nashville, Tenn. Plant will be operated by Procter & Gamble Defense Corp., Cincinnati.

Louisiana

MONROE, LA.—War department has selected site here for anhydrous ammonia plant to cost $16,750,000.

Missouri

KANSAS CITY, MO.—City, K. K. King, director of water department, will take bids July 1 for water softening plant. Burns & McDonnell Engineering Co. is engineer. (Noted April 7.)

LEEDS, MO.—Chevrolet Motor division of General Motors Corp. has awarded contract for a powerhouse addition here to Miller-Stauch Construction Co., Railway Exchange building, Kansas City, Mo., work to start at once.

LOUISIANA, MO.—War department has selected site here for anhydrous ammonia plant costing $16,750,000.

ST. LOUIS—Emerson Electric Mfg. Co., W. S. Symington, president, 1824 Washington avenue, has a letter of intent from the war department in connection with construction of a $10,000,000 airplane gun turret manufacturing plant adjacent to the Emerson plant, 8100 Florissant road. Proposed plant would have 700,000 square feet floor space.

ST. LOUIS—American Can Co., New York, is negotiating for 17-acre tract for a can manufacturing plant of 500,000 square feet or more.

WELDON SPRINGS, MO. — Fraser Brace Engineering Co. Inc., 10 East Fortieth street, New York, will be in charge of $5,000,000 additional work recently authorized by Washington in connection with TNT plant being erected here for the war department.

Oklahoma

STILLWATER, OKLA. — Legislature has appropriated $60,000 for power plant at Oklahoma A. and M. College, A. L. Crable, superintendent of education, State Capitol building, Oklahoma City.

TULSA, OKLA.—City, W. R. Wooten, city engineer, will build a sewage disposal plant costing $200,000, bonds for which have been approved. W. R. Holway and Victor H. Cochrane, Tulsa, are engineers.

Minnesota

ANOKA, MINN.—City, Wayne Ridge, clerk, has completed plans for a sewage disposal plant, estimated to cost $120,000. Ralph D. Thomas & Associates, 1200 Second avenue, Minneapolis, are engineers.

ST. PAUL, MINN.—Dobbins Mfg. Co., metalware specialties, has let contract to Lawrence Peterson Construction Co., St. Paul, for rebuilding burned plant, at cost of about $60,000. (Noted May 12.)

Kansas

WICHITA, KANS.—Austin Co., Cleveland, will design and erect the $1,000,000 addition to plant of Stearman Aircraft Co., 300 x 1000 feet. Company is a division of Boeing Aircraft Co., Seattle.

South Dakota

BROOKINGS, S. DAK.—City, C. B. Herreman, auditor, is considering construction of sewage disposal secondary settling tank, costing $20,000. Dakota Engineering Co., Mitchell, S. Dak., is consulting engineer.

HURON, S. DAK.—City commission, M. F. Walt, auditor, has approved plans for sewage disposal plant improvements to cost about $30,000. E. H. Dunmire, 2774 South street, Lincoln, Nebr., is consulting engineer.

Iowa

BURLINGTON, IOWA—War department has allotted additional $7,200,000 for shell loading plant, increasing total cost to $27,200,000. A Guthrie & Co. Inc., 424 Endicott building, St. Paul, and Al Johnson Construction Co., 608 Foshay Tower, Minneapolis, are contractors. Plant will be operated by Day & Zimmerman Inc., Philadelphia.

ORIENT, IOWA—Voters have approved $16,000 bond issue for municipal waterworks plant. E. J. Carlyle is town clerk.

California

LOS ANGELES—Southern California Gas Co., H. L. Masser, executive vice president, will build 10,000,000-cubic foot storage gas holder costing $750,000, requiring 2000 tons of steel. Will store natural gas during night for use in peak daylight hours.

LOS ANGELES—Sampson Motors, 6031 Grammercy place, will build machine shop costing $11,500 at 1950 West Sixty-second street.

LOS ANGELES—Utility Fan Corp., 4851 Alameda street, is building a plant addition 73 x 74 feet, costing about $15,000.

LOS ANGELES—General Metals Corp. will erect a plant building at 5701 Boyle avenue, costing $2500.

LOS ANGELES—Franklin Steel Products has been formed by John C. Polokoff and will conduct business at 338 Azusa street.

LOS ANGELES — Pixweve Aviation Corp. has been incorporated with $25,000 capital by Curtis L. Bates, Richard C. Hart and John B. Myers, Los Angeles. R. B. Murchison, 620 West Olympic boulevard, Los Angeles, is representative.

SAN FRANCISCO—Autometric Machine Tool Co., Ninth street and Dwight way, has plans by L. H. Nishkian, 525 Market street, for a one-story 100 x 200-foot machine shop addition.

Washington

PASCO, WASH.—Port of Pasco has signed agreement with River Terminal Co. for construction of petroleum depot, including 50,000-barrel storage capacity, railroad spur and other facilities.

SEATTLE—Alaska Copper Works, 3600 East Marginal Way, will build a plant addition 34 x 90 feet.

TACOMA, WASH.—Pacific Boatbuilding Co. has been incorporated with $50,000 capital by M. I. Broback and associates, 1410 Puget Sound Bank building.

TENINO, WASH.—Universal Powder Co. has bought 900 acres and plans factory for production of black powder, mostly under defense contracts.

Canada

VANCOUVER, B. C.—Vancouver Iron Works Ltd., 1155 West Sixth street, will build a $30,000 addition to its boiler shop, general contract to Dominion Construction Co. Ltd., 509 Richard street.

CROWLAND, ONT.—Page Hershey Tubes Ltd., 100 Church street, Toronto, Ont., has given contract to Dickie Construction Co., 17 Yorkville street, for plant addition to cost about $60,000. Cranes have been awarded to Dominion Bridge Co. Ltd., 1139 Shaw street, Toronto.

HAMILTON, ONT.—Canadian Westinghouse Co., 286 Sanford avenue, will build a plant addition on Wentworth street, to cost $50,000, general contract to W. H. Yates Construction Co. Ltd., 400 Wellington street North, Hutton & Souter, 36 James street South, are architects.

KINGSTON, ONT.—Aluminum Co. of Canada Ltd., 1155 Metcalfe street, Montreal, Que., will build a laboratory and plant addition here, to cost $275,000. General contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal.

NIAGARA FALLS, ONT.—Canadian Carborundum Co. Ltd., Stanley street, will build plant addition costing $15,000, general contract to Robertson Construction & Engineering Co. Ltd., 2 Clifton avenue.

PORT COLBORNE, ONT.—Canadian Furnace Co. Ltd., Lake Shore road, is considering plans for additions and improvements to its blast furnace equipment, to cost about $15,000.

PORT COLBORNE, ONT.—International Nickel Co. of Canada Ltd. plans a plant addition to cost $100,000. H. H. Waters is local manager.

SAULT STE. MARIE, ONT.—Algoma Steel Corp. Ltd., Wilde avenue, is considering bids for a blooming mill addition to cost about $4,000,000, with equipment.

TORONTO, ONT.—Davis Automatic Controls Co., 145 Wellington street West, will build factory on Niagara street for manufacture of automatic control equipment, to cost about $60,000, with equipment.

ARVIDA, QUE.—Aluminum Co. of Canada Ltd., 1155 Metcalfe street, Montreal, Que., has given contract for 12 pot rooms to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, Montreal, to cost about $3,000,000, with equipment.

MONTREAL, QUE.—Montreal Locomotive Works, manufacturer of war tanks, etc., will build a $30,000 plant at Longue Pointe, general contract to Douglas Bremner Construction Co. Ltd., 2049 McGill College avenue.

THREE RIVERS, QUE.—Canada Iron Foundries Ltd., 227 St. Maurice street, will build a plant addition costing about $100,000, with equipment, contract let to Joseph Renaud, 145 Laviolette street.

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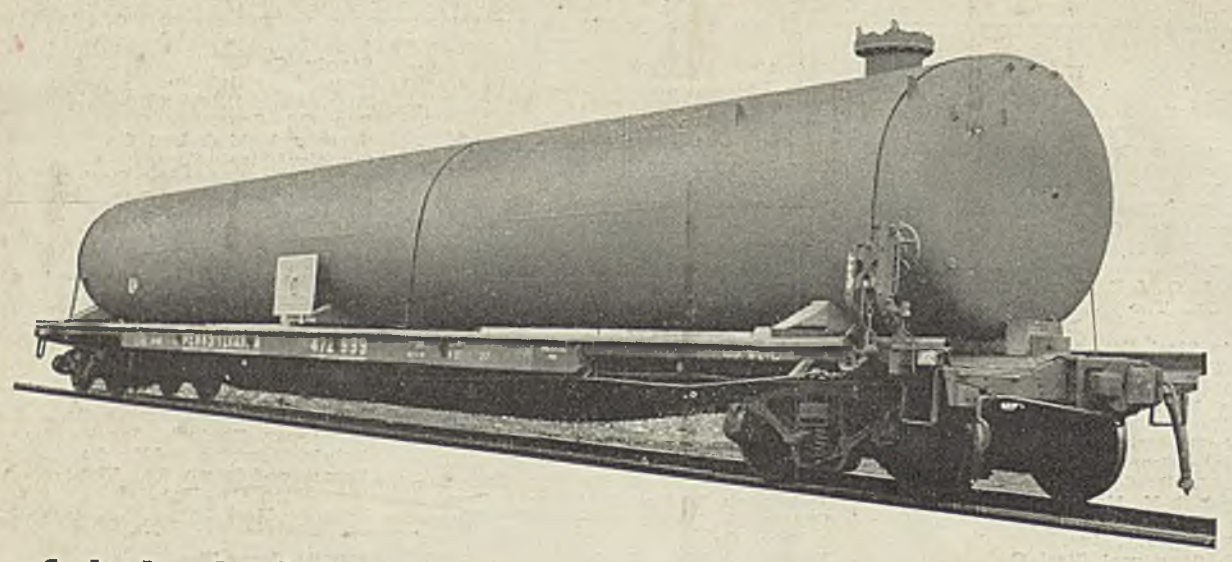

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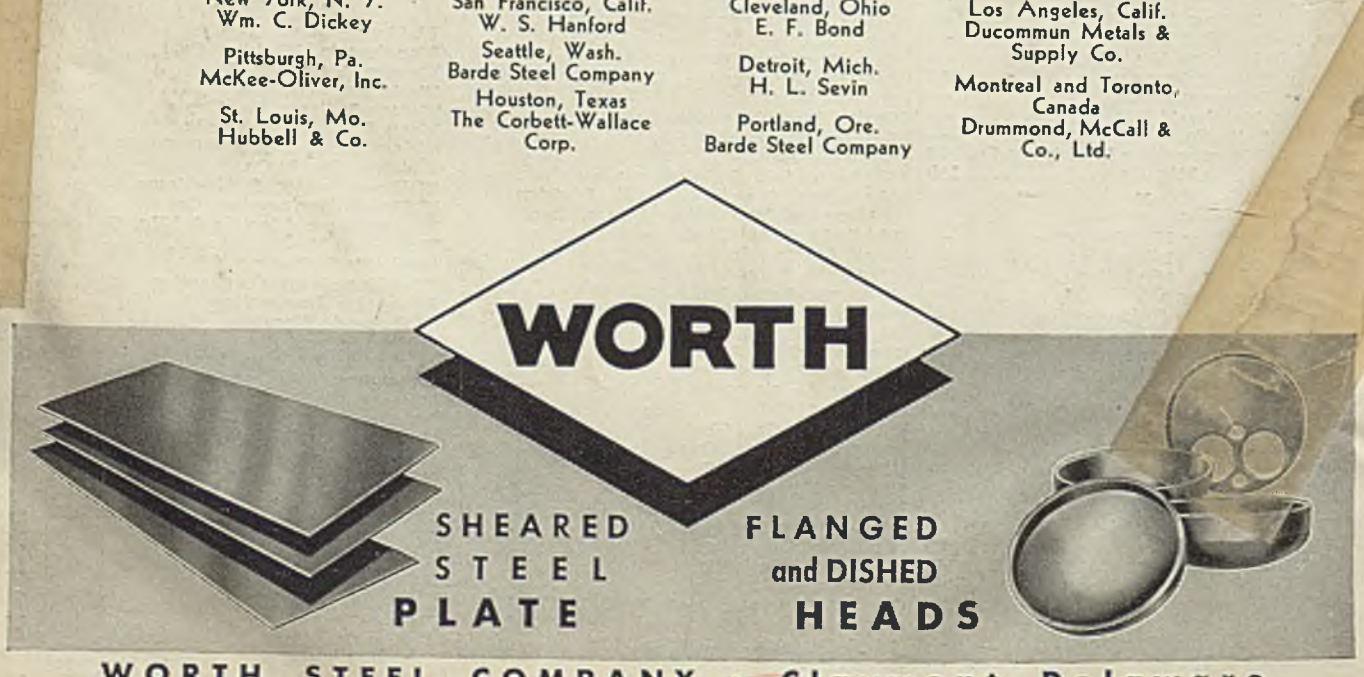

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