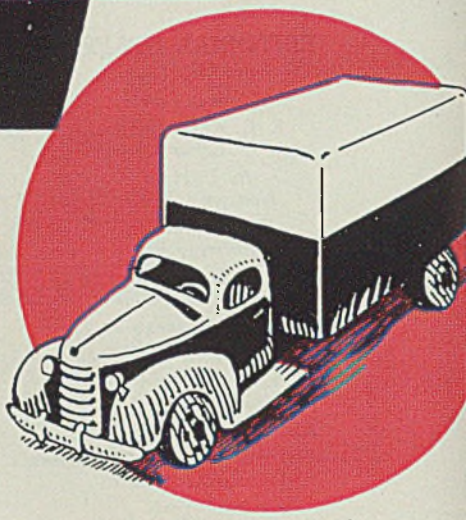
STEEL

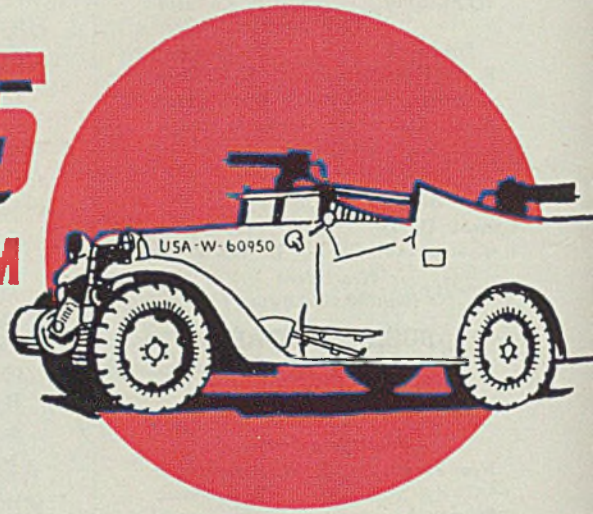
ESTABLISHED 1882

Contents

Volume 109—No. 3 **July 21, 1941**

From COMMERCIAL RUCKS TO RUCKS FOR DEFENSE PROGRAM





The Transue deep drawn presses that only a short time ago were turning out oil pans for trucks to be used for a dozen diversified industries—are now pushing these same parts for trucks in the Defense Program.

Uncle Sam is our priority customer. We were one of the first plants to be called from our peace time production to help with the vital program of preparedness.

We are proud that Transue's skilled workmen and excellent facilities for producing precision products in pressed steel can do their part.

TRANSUE & WILLIAMS · ALLIANCE, OHIO.

SALES OFFICES · New York · Philadelphia · Chicago · Detroit · Indianapolis · Cleveland

TRANSUE & WILLIAMS

HIGHLIGHTING
THIS ISSUE OF
STEEL

■ THOUGH steel shortage has not yet proven a major difficulty for consumers, it threatens to become one shortly. Last week **(p. 97)** regular customers of some large mills were advised that they hereafter will receive only 50 per cent of the steel hitherto shipped to them for nondefense use. This move will reduce sharply the output of civilian goods, an effect that should become apparent in the very near future. Many companies that hitherto have not booked defense work now are scrambling to get such business as a means of keeping their plants going and their organizations intact. The outlook also is tinged by threat of reduced steel output in the near future because of scrap and pig iron shortages.

. . .

Scrap May Be Bottleneck

Incensed scrap dealers **(p. 24)** hold government officials to blame for the impending crisis in scrap. Had the government acted on recommendations made by the scrap industry on June 10, they hold, scrap would not have become a bottleneck. . . . Eventually size o fthe defense effort is foreshadowed by the fact that defense obligations entered into in the month of June alone **(p. 39)** aggregated five billions. . . . Long awaited price control legislation is expected **(p. 30)** to be introduced in Congress this week. . . . The projected 20 per cent cut in automobile production, estimates A. H. Allen, **(p. 35)**, will throw 155,000 men out of work, thereby causing grave dislocations.

. . .

Carrying Coals To Newcastle

Labor under the defense program already has become big business. STEEL **(p. 21)** estimates that the annual union take now is somewhere between one-quarter and one-half billion yearly. Items prominent in last week's labor news: Loss of 2,500,000 man-hours to the War Department **(p. 22)** through strikes; Republic Steel Corp.'s agreement **(p. 23)** to deal with SWOC; appointment to the post of first assistant secretary of labor **(p. 23)** of Dan Tracy, former union head, indicted last spring on charges of conspiring to keep prices of electrical equipment at a false high level. . . . On the order of carrying coals to Newcastle is the news **(p. 29)** that South American-made machine tools are being imported here.

. . .

New Lathes for Shell Work

New industrial offerings include: Two new types of lathes **(p. 80)** to expedite machining of shell; improved **(p. 84)** "hot spot" indicators; a resin treatment **(p. 95)** for reducing porosity in castings; a new photometer **(p. 88)** which offers a rapid and precise means of studying spectrographic plates; a new electro-blackening process **(p. 60)**. . . . A new church **(p. 79)** features an unusual steel roof. . . . An incentive plan based on instrument chart records encourages welding operators to do more and better work **(p. 74)** and reduces total overall welding cost, says Erwin C. Breckelbaum. . . . A streamlined paint handling system is a notable feature **(p. 71)** of the new plant of the Berger Mfg. Division.

. . .

Big Guns and Tube Steel

Prof. Macconochie **(p. 50)** continues his discussion of big guns, examining into the characteristics of gun tube steel, methods of manufacture and inspection of guns, the theory of auto frettage. He covers the new 37-millimeter antitank and automatic anti-aircraft guns and other advanced units. . . . H. J. Wills **(p. 56)** analyzes the factors that must receive proper consideration in order to obtain desired results in ultra-finish grinding. . . . E. T. Saxer and R. E. Minto **(p. 66)** describe an improved method for quick determination of tin in cast iron and plain steel, using an iron-antimony alloy. . . . Caterpillar diesel cylinder liner bores **(p. 62)** now are induction hardened.

From Sand Dunes to Millions of Tons of Steel

Inland Steel Company now produces millions of tons of steel, where less than 40 years ago a single railway tower house stood in a wilderness of sand dunes and scrub oak trees.

The turn of this century found Inland operating its rail steel mill at Chicago Heights. At that time the Middle West was beginning to show signs of phenomenal growth. Those with vision foresaw that it was destined to grow and continue to grow into an ever more important market.

Inland saw the growing need for steel in this area of expanding industry, and in 1901 began building its Indiana Harbor Plant on the sand dune shores of Lake Michigan. Commending this location were its easy access to vast stores of the finest raw materials, and its central location from which to reach the great Middle Western market.

In the first year of operation, Inland made less than a quarter of a million tons of steel. By 1906, output had been doubled. Ore, limestone and coal properties, and lake freighters, were soon acquired, to give Inland full control over all materials and steelmaking operations.

In 1916, Inland made enormous increases in its capacity. It not only prepared to produce 1,000,000 tons of steel per year, but it acquired adjacent property and built new furnaces and mills for rolling a wider range of products. The year 1932 saw the opening of Inland's first continuous sheet and strip mill. In the following year tin mills were installed. In 1938, Inland added more open hearth furnaces and built a second continuous mill.

Today, output is at the capacity rate of 3,300,000 tons of ingots per year. Not only has Inland added to its facilities, but also has recently rebuilt and modernized entire departments. Now, with one of the most modern steel plants in the world, Inland is able to do its full share in the present national emergency.

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

INLAND STEEL CO.

Quarter to Half Billion Dollars "Take"

For Unions, in Peak of Power

Friendly government, record employment and wages, pressure for armament combine to sweep organizations into unparalleled prosperity—The only "big business" that is permitted to conceal its resources

■ TRADE unionism has become Big Business, with an annual "take" estimated at $250,000,000 to $500,000,000. Apparently it is destined to become an even larger and more profitable business, under protection of a labor government during these years of sharply increased employment and high wages.

Regardless of its effect on the national economy as a whole, the present emergency has been a tremendous boon to trade union organizers.

Total employment is at an all-time peak, offering a large field of prospects.

Wages are at the highest levels in history, making the collection of substantial initiation fees and dues relatively easy.

Employers are striving for uninterrupted production for defense and are granting many concessions to the unions that would have been bitterly contested a year or two ago.

Thus many large employers who have strongly resisted organization efforts in the past recently have granted recognition, and in some cases a closed shop, to avoid interference with defense production.

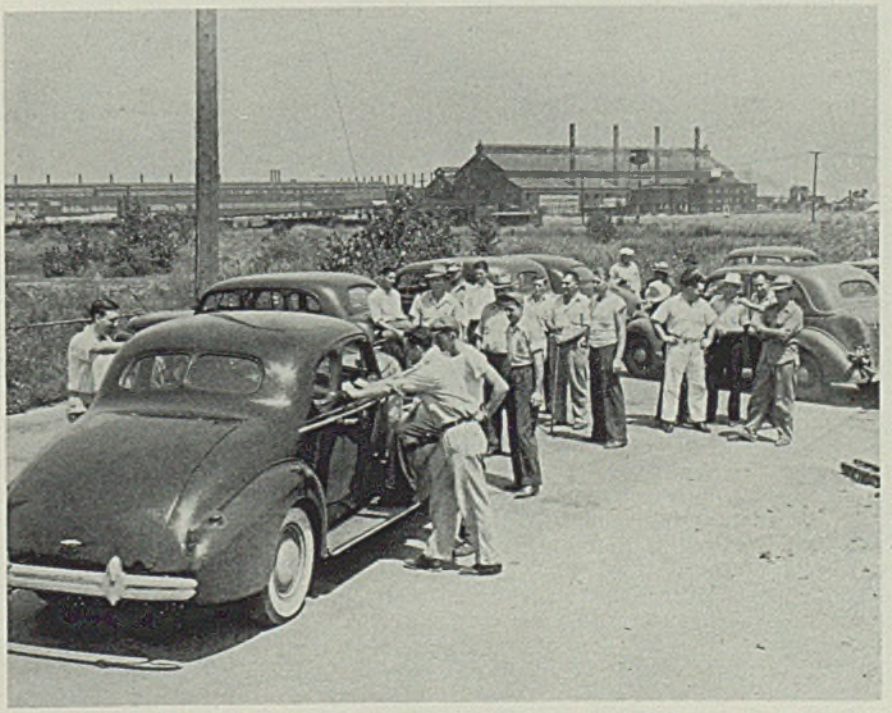
The situation is without parallel in American history. The two large unions are in clover, with their own internecine warfare as their only serious problem.

Claimed membership in 1940 was about 9,000,000. The American Federation of Labor reported 4,247,443; the Congress of Industrial Organizations, 4,000,000; the railroad brotherhoods approximately 500,000; and other unions enough to raise the total to 9,000,000. Employment increases and the recognition of unions by more employers indicates membership may have increased sharply during the first six months this year.

Presumably all members now are paying dues. The new members are paying initiation fees. In some cases, nonmembers are contributing to union coffers by paying a substantial portion of their wages for temporary "work permits," especially on the government's defense construction projects.

Refusal by union officials to discuss their finances and the lack of laws compelling them to issue financial statements makes a complete

Holdup on the Highway



■ Pickets barricaded a road leading to the Great Lakes Steel Corp. plant, Ecorse, Mich., last week to prevent workers from entering the plant. Strong hints of defense sabotage were heard as a "wildcat" strike, throwing 8000 out of work and halting production of 5000 tons of steel daily, was called shortly before a contract was scheduled to be signed. NEA photo

and exact picture of the "take" impossible.

No other large enterprise in the United States is permitted to cover up its financial operations as is trade unionism.

CIO last year made no financial report "upon the advice of counsel," this to avoid embarrassment in present and potential litigation.

The AFL reported 1940 income as $1,938,483, including a $629,499 carryover from 1939. This, however, is only a "drop in the bucket," as the parent union receives only a small portion of the locals' revenue.

Expenditures for hiring organizers, paying office and hall rents, publishing union newspapers and other literature and for officials' salaries run into impressive figures. To obtain these funds, the "benefits of membership" are marketed for a price. Idealistic though the unions' slogans may be, their charges are based solidly on practical economics.

Legitimate union income mainly is derived from three sources: Periodical dues; initiation fees; and special assessments. Income received from "shakedowns" of employers or other forms of graft generally is not officially recognized.

CIO Dues Lower

CIO dues and initiation fees ordinarily are considerably lower than those of the AFL, for two reasons: Craft union members in the AFL contain a larger percentage of skilled workers who receive higher wages and are able to pay higher dues and fees; AFL craft unions often have mutual insurance plans which necessitate higher charges.

Thus while CIO dues in the newer unions may be as low as $1 monthly, and initiation fees only a few dollars, the AFL charges fees ranging to above $1000, so high that it is almost impossible for the average man to break in, no matter how well qualified. The truckers in Seattle, for example, charge $500; the motion picture operators in Cleveland, $1000; the glaziers in Chicago, $1500.

Competition between the CIO and AFL sometimes determines the amounts charged members. When the CIO was launching its Construction Workers Organizing Committee, it advertised that it levied no initiation fees and charged only $1.50 a month dues. This, of course, was in marked contrast to the excessively high fees and dues charged by the entrenched AFL building trades unions.

Dues and fees often are determined by the local unions, although an upper limit sometimes is established by the parent union.

With charges varying from local to local and from industry to industry, the average cost to the worker for union membership is impossible to obtain. Some experts who have made extensive investigations estimate the overall average at $5 a month. This would mean the yearly income of the unions is more than $500,000,000—nearly twice the steel industry's profit in 1940.

Known established dues and initiation fees of the large unions would indicate the estimate of $5 monthly is larger than actually collected, despite whopping initiation fees and special assessments in some cases.

An estimate of $2 per month average is conservative, and with a total trade union membership swollen to nearly 10,000,000 through government policies and the exigencies of war, the yearly revenue is at least a quarter billion dollars.

The Steel Workers Organizing Committee and the United Automobile Workers and other large and new unions of the CIO generally have dues amounting only to $1 a month and moderate initiation fees. Nor have these unions levied large special assessments to date. On the other hand, the older unions were assessed to finance the organization drives of the past few years. The SWOC, for example, cost CIO about $2,000,000 before it became self supporting.

Experts' investigations, however, have revealed some curious methods employed by the unions to gain revenue and cite these in substantiation of the $5 figure. Thus at Ft. Meade the electricians' union charged nonmembers a daily fee of $1 or $2 for a working permit, instead of admitting new members. A carpenters' union went to the other extreme with profit; large numbers of untrained and incompetent men were admitted, to be discharged soon after paying high initiation fees. It has been reliably estimated the union made $400,000 on the deal.

Obviously, such practices of exploitation have nothing to do with the legitimate objectives of organized labor; nevertheless they are common—and profitable.

Strangely, the government, instead of controlling or prosecuting such abuses of power has virtually erected an umbrella over the or-

Editor Puzzled-Wuzzled, But Sees How It Works

"This puzzles us—does it you?

"Dan Tracy, former head of the International Brotherhood of Electricians, has been second assistant secretary of labor for nearly three years.

"Among labor leaders allegedly involved, he was indicted this spring in San Francisco, at the behest of Assistant Attorney General Thurman G. Arnold, on charges of conspiracy to keep the prices of electrical equipment in the San Francisco area at a false high level, Tracy being accused specifically of letting no union workmen do work for concerns which did not subscribe to the agreed high prices.

"He wasn't fired or suspended from his labor post when the indictment was returned.

"This week, he was promoted by President Roosevelt to first assistant secretary of labor, with a raise of $334 a year.

"It must be wonderful to have an employer who gives you a nice, fat job, then indicts you, then promotes and raises you, and shortly will bring you to trial.

"Or DOES this puzzle you?"—*The Cleveland News*, July 17.

Strikes Cost War Department 2,458,150 Man-Hours in 6 Months

■ Strikes in factories working on War Department orders and among workmen on army construction projects resulted in a loss of 2,458,150 man-days during the first six months of 1941. Army contracts were delayed by a total of 187 strikes involving 213,900 workmen. Not included in the department's survey were the month-long shutdown of the soft coal mines or the 1,000,000-man-days strike at Ford Motor Co. The coal industry held no defense contracts and the department was unable to determine the extent of delay to army orders in the Ford strike.

War Department charts indicate three peaks in work stoppages during the period. The first occurred in March when the Allis-Chalmers Mfg. Co. 75-day tie-up, resulting in a loss of 421,000 man-days, was at its height. Second peak came in late May when the total man-days lost was increased by the "wildcat" General Motors stoppages. Third peak was in early June, caused the Communist-inspired strikes at North American Aviation Co., Inglewood, Calif., and the Cleveland plants of the Aluminum Co. of America.

Comparative peace has prevailed since the middle of June. Last week 21 strikes, involving about 11,000 workmen, were in progress.

ganizers. Trade unionism is the only big business that needs not submit to myriad government controls—in the form of financial reports, taxation, price regulations, form of organization and many others.

Union Officials Not Barred From Positions in OPM

The rule barring paid trade association executives from OPM does not apply to labor union officials, of whom there are more than 100 in the various subdivisions. Some of these are on the government payroll and some are spending only part time in Washington. Sources in the OPM Labor Division say that although they do not have accurate information, they believe those paid by the government are on leave of absence from their union positions and union salaries.

"Wildcat" Strike Slows Steel Production in Detroit Area

An unauthorized work stoppage at the Ecorse, Mich., plant of Great Lakes Steel Corp. a few hours before a new contract was scheduled to be signed last week was attributed to obstructionists who have been hampering negotiations since they were first started several weeks ago. Both company and SWOC officials agreed the strike was a "wildcat" demonstration.

After a contract was signed on Wednesday, resumption of work was marred by a sitdown strike in the cold mill.

Republic Steel To Recognize SWOC as Bargaining Agent

Republic Steel Corp., Cleveland, last week entered into a stipulation with the National Labor Relations Board whereby the company agreed to recognize SWOC as exclusive bargaining agency in any of its plants where the labor board certifies a majority of employes are members of the union in good standing.

The corporation, SWOC and the labor board also entered into stipulations disposing of all charges of unfair labor practices now pending against Republic, and agreed to a formula to settle all questions of back pay.

A stipulation providing for settlement of the labor board case pending before the United States Court of Appeals, Philadelphia, is subject to the approval of the court. With the court's approval of that, all other stipulations also will become effective.

T. M. Girdler, Republic chairman, was quoted as explaining the procedure as follows:

Membership in any plant will be established by union records checked against company payrolls and verified by the National Labor Relations Board.

This procedure will eliminate the necessity of plant elections. It was adopted in the furtherance of collective bargaining in the plants and in the interests of national defense as it will avoid any interference with production that might result from plant electioneering campaigns.

Republic is operating at top speed and a good share of its output is for defense needs. It wants to avoid any letdown in production.

Interunion Rivalry, Wage Demands Cause Work Stoppages

Rivalry between the CIO and AFL and demands for higher wages halted production in numerous plants and precipitated some violence last week.

At Cleveland, a jurisdictional dispute between the two unions at the Patterson-Leitch Co., steel fabricators, resulted in street fighting and rioting. There was no dispute between employer and the unions, no issue of wages or working conditions.

At Birmingham, Ala., a threatened strike at the Tennessee Coal, Iron & Railroad Co. plant was canceled when the dispute was certified to the National Defense Mediation Board. Workers had asked a 10-cent hourly increase.

At Warren, O., an unauthorized strike at the Copperweld Steel Co. ended when attempts to dissuade workers from entering the plant failed. Only issue was the furloughing of several men for inefficiency.

Wage increases averaging 11½ cents an hour were awarded workers at two Buffalo plants of Curtiss-Wright Corp.

Negotiations to eliminate wage differentials between the north and south were sought by the International Union of Aluminum Workers from the Aluminum Co. of America.

United Aircraft Corp., Hartford, Conn., signed a contract with the AFL machinists unions granting wage increases amounting to $4,200,000 a year to 25,000 employes.

Six persons were injured when police clashed with pickets at the Bendix, N. J., plant of Air Associates Inc. in a dispute over the dismissal of nine workers.

Work on two iron ore carriers being built for the Pittsburgh Steamship Co., United States Steel Corp. subsidiary, were held up when employes at the Great Lakes Engineering Works, Ecorse, Mich., went on strike. Hull for one of the vessels is now being built up and the keel for the second has just been laid.

Night Scene in Burbank

■ Twelve thousand of 29,290 employes at Lockheed aircraft plant in Burbank, Calif., are on the night shift, building the P-38 Lightning interceptors, and Hudson bombers. Lightnings, considered to be the deadliest fighting planes produced in this country, attain a speed of 400 miles an hour in level flight. The rush at Lockheed is so great a considerable number on night shift work in the open. NEA

Scrap Industry Blames Government For Scarcity Threatening Steel

■ ACUTE shortage of scrap will force a reduction in steel mill operations before year's end, suppliers and steelmakers said last week. In some instances, lack of scrap already is limiting steel production.

Responsibility for the shortage was placed directly on the Office of Price Administration and Civilian Supply by the Institute of Scrap Iron and Steel, in midyear convention in Detroit last week.

Institute members pointed out that the scrap industry in conjunction with the army and navy presented a list of recommendations to increase the flow of scrap to consumers June 10. The recommendations are said to have been ignored by OPACS.

The recommendations in part provide: Establishment of a $12 shipping point price for No. 2 heavy melting steel west of the boundaries of Minnesota, Iowa, Missouri, Arkansas and Louisiana, designed to bring more western scrap into the market. Recommendation was ignored in the scrap price ceiling ordered by OPACS Administrator Leon Henderson a week later.

Country-wide salvage week, which, it was estimated, would bring out 1,000,000 tons.

Wrecking of 1,000,000 old automobiles, rusting in "graveyards."

Cessation of hoarding by the army and navy.

Scheduling of scrap needs for defense and lease-lend aid to Britain for six months ahead.

Elimination of direct dealing between producers and consumers.

"Getting Alarmed"

The failure of OPACS and OPM to act on these recommendations is criticized by members of the industry. One authority said:

"We are getting very much alarmed over the scrap situation and fear that some consumers are going to lose production for lack of scrap. It may be there is not enough scrap in the entire country to support the extraordinarily high rate of steel mill operation.

"But whatever scrap there is in the country, and even though it be isolated in small amounts, should be made available. We are not going to let the blame for any shortage be pinned on us without being given the necessary authority to corral what material is available."

OPM officials were made aware of the situation last week by numerous reports of scarcity. Some mills, it heard, have only a two weeks' supply on hand, where 60 days' supply is normal. Mills ordinarily would be accumulating scrap at this season; now, supplies are being depleted.

Railroads are shipping in lower than normal volume. In August the automobile producers will be producing in reduced volume and this source will supply less scrap, accentuating the shortage.

Government May Commandeer Scrap, Pig Iron Stockpiles

Stockpiles of pig iron and iron and steel scrap held by consumers may be commandeered to meet a serious shortage in these materials. This is reported to be the belief of defense officials who canvassed the possible methods of expanding production or freeing tightly held supplies at a meeting with industry representatives in Washington.

If the drastic action of requisitioning is decided upon, it can be carried out through the Department of Justice or through the OPM priorities division, defense officials believe. Commandeering is being considered because OPACS is anxious not to disturb these scrap prices.

The meeting also considered plans to expand production of scrap.

Present at the meeting were C. A. Bishop, OPACS; Edward A. France Jr., OPACS; A. D. Whiteside, chief of iron and steel section of OPM; W. A. Hauck, OPM steel consultant; Robert Ridgeway, OPM scrap expert; and Walter S. Tower, president, American Iron and Steel Institute.

Tool Steel Statistics Added to Institute Report

■ Three new sets of figures are included in the 1940 or twenty-ninth annual report of the American Iron and Steel Institute, now being issued. One shows production of tool steel bars; another, shipments of products to principal consuming industries for last year; and the third, a complete record of production of ingots and steel for castings by months for the years beginning with 1917.

Study of steel consumption was the first of its scope undertaken by the institute, and was done in the interest of uniformity and elimination of duplicated effort. Annual study of this character was inaugurated by STEEL in 1922.

General report includes statistics for the iron and steel industry of the United States and Canada, with other data concerning related industries. Some information contained in the report has already been published in preliminary form in statistical bulletins or compilations issued by the institute.

Juggernauts at Play

■ Heavy tanks of a new type called "Valentines" are seen in exercises "somewhere in the British Isles." NEA photo passed by British censor

FINANCIAL

$324,435 Net Income Earned by Continental Steel in June Quarter

■ CONTINENTAL STEEL CORP., Kokomo, Ind., reports consolidated net profit in the quarter ended June 30 totaled $324,435 after federal income and excess profits taxes at the current rates, plus $193,675 provision for expected increases under the proposed law. This was equal, after dividend requirements on the company's 7 per cent preferred stock, to $1.45 per share on common.

Net earnings in the corresponding period of 1940 totaled $141,339 or 54 cents per share on common. In the first quarter, 1941, net profit was $313,123 or $1.40 per common share.

Acme Steel Co.'s Second Quarter Net Earnings $920,707

Acme Steel Co., Chicago, steel finisher, reports net profit in second quarter was $920,707. Equal to $2.81 per share on the company's par $25 capital stock, this compared with net income of $661,149 or $2.02 per share in the period last year. In March quarter, 1941, net earnings totaled $963,474 or $2.94 per share.

Indicated net profit in first half was $1,884,181 or $5.74 per share, against $1,045,403, equal to $3.19 per share, in the corresponding period of 1940.

$494,072 Net Profit Earned in June Quarter by Otis Steel Co.

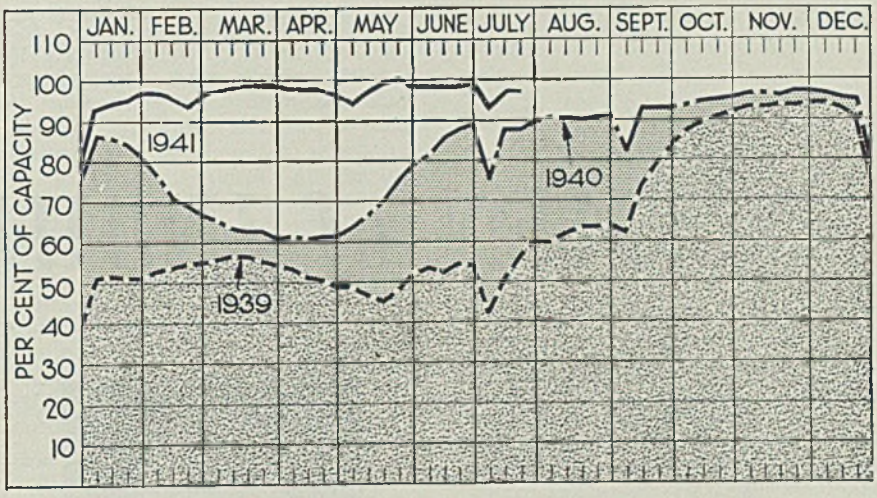
Otis Steel Co., Cleveland, reports net profit in second quarter was $494,072 after all deductions, including provision for estimated federal taxes. This compared with $594,183 net earnings in first quarter this year and $196,629 net loss in the second period of 1940.

Copperweld Reports $919,952

Copperweld Steel Co., Glassport, Pa., earned $919,952 net profit in the six months ended June 30. Equal to $1.68 per share on common, this compared with net income of $521,314 or $1.05 per common share in the corresponding period in 1940.

Warner & Swasey Nets $1,263,356

Warner & Swasey Co., Cleveland, last week reported net earnings in the second quarter, after all deductions including provision for estimated federal taxes, were $1,263,356. This was equal to $1.55 per share, and compared with net profit of $1,040,077 in first quarter, 1941, and $1,126,011 in second period of 1940. Provision for estimated federal taxes included allowance for possible additional taxes and contingencies.



PRODUCTION . . . . Down

■ NATIONAL steel rate last week eased one-half point to 97 per cent of capacity, due in part to a brief strike at Great Lakes Steel Corp.'s plant, and also to furnace repairs in some centers. In the comparable week in 1940 and 1939 the ingot rate was 88 and 56.5 per cent respectively.

New England — Gained 5 points to 95 per cent, two works reporting 100 per cent operations.

Detroit — Down 10 points to 86 per cent, due to one-day interruption to open hearth operations at Great Lakes Steel Corp. caused by strike. Entire plant, except blast furnaces, was idle.

Pittsburgh — Unchanged at 99.5 per cent. Gains at some plants were offset by curtailment at others resulting from necessary furnace repairs.

Wheeling — Steady at 91 per cent.

Cleveland — Off 1.5 points to 95 per cent, caused by repair work.

Youngstown, O. — Held at 98 per cent. No change is expected this week.

Buffalo — Remained at 93 per cent. Pig iron output continued at 100 per cent.

Central eastern seaboard — Continued at 97 per cent, following an advance of 5 points in the preceding week.

Chicago — Off one-half point to 100 per cent, due to repairs.

Birmingham, Ala. — Ninety per cent, with 22 open hearths active.

Cincinnati — Declined 2.5 points to 85.5 per cent. A slight gain is indicated for this week, on completion of furnace repairs.

St. Louis — Rate held unchanged at 98 per cent, with 27 out of 28 open hearths active.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 19	Change	Same week 1940	Same week 1939
Pittsburgh	99.5	None	81	48
Chicago	100	— .5	95	53.5
Eastern Pa.	97	None	86	41
Youngstown	98	None	84	53
Wheeling	91	None	94	79
Cleveland	95	— 1.5	63	56
Buffalo	93	None	90.5	46.5
Birmingham	90	None	88	81
New England	95	+ 5	75	40
Cincinnati	85.5	— 2.5	84	31
St. Louis	98	None	65	47.5
Detroit	86	—10	95	64
Average	97	— 0.5	88	56.5

Welding Ships "Saves 500,000 Tons of Steel"

■ More than 500,000 tons of steel is being saved and an increase of 500,000 tons in cargo-carrying capacity over conventional methods of construction is being accomplished in the 705-ship building program of the United States Maritime Commission by welding, it was reported last week by the James F. Lincoln Arc Welding Foundation, Cleveland. Statement was based on a report issued by the commission.

Value of the steel saved totals $24,300,000, and is sufficient to construct 227 extra cargo vessels, the commission declared. Under World war conditions, when welding was not used, the current program would require 2,775,000 tons, it was said. Tonnage required today, utilizing welding, is 2,196,000.

■ New orders for 1372 steel boilers were received by 62 manufacturers in May, compared with orders for 1336 boilers in April, it was reported last week by the Census Bureau, Department of Commerce. The May orders represented 2,559,910 square feet of boiler heating surface.

MEN of INDUSTRY

■ **HERBERT J. WATT** has been named manager of sales, western area, Carnegie-Illinois Steel Corp., with headquarters in Chicago. Mr. Watt will co-ordinate sales activities of offices in Chicago, Denver, Detroit, Indianapolis, Milwaukee, St. Louis and St. Paul. Since December, 1939, Mr. Watt has been manager of sales for the central area of Carnegie-Illinois.

♦

J. M. Bowlby has been elected president, Eagle-Picher Lead Co., Cincinnati. He succeeds **Joseph Hummel Jr.,** who has become chairman of the board. Since 1928 Mr. Bowlby has been a general partner of Barrow, Wade, Guthrie & Co., Chicago, accountants and auditors. He will assume his new duties Sept. 1.

♦

Frank H. Adams, the past 15 years vice president and general manager, Surface Combustion Corp., Toledo, O., has been elected president. He succeeds the late Henry L. Doherty.

♦

Paul T. Graff has joined Foxboro Co., Foxboro, Mass., as a sales engineer, specializing in the promotion of the company's control instrumentation.

♦

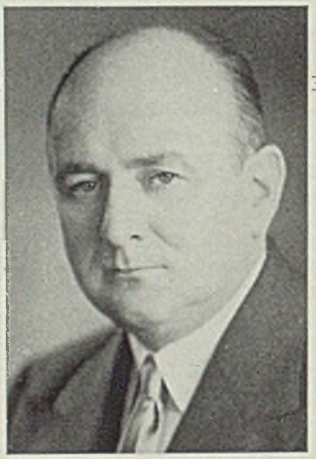
T. D. Dantzler has joined the rubber research staff of Thermoid Co., Trenton, N. J. Mr. Dantzler has had 22 years' experience in the rubber business.

♦

Edwin Fisher, associated with Cadillac Motor Car Co., 13 years, the past four years as manager of its Jefferson avenue branch in the Detroit area, has resigned to join Progressive Welder Co., Detroit, in an executive sales capacity. Mr. Fisher will assist in the development of sales of resistance welding equipment in the middle western area.

♦

Howard T. Walsh has retired after 41 years of continuous service with Sullivan Machinery Co., Michigan City, Ind. He served successively as an apprentice in the company's training course, salesman in the Denver territory, Pacific Coast manager, London manager, general sales manager, and vice president and director.



Herbert J. Watt

J. M. Bowlby

Edwin Fisher

♦

F. B. Shay, mining engineer, Foote Mineral Co., Philadelphia, is on a trip to Cuba to investigate manganese, chrome and other mineral deposits.

♦

Carleton Reynell has been appointed general manager of purchases and traffic, Worthington Pump & Machinery Corp., Harrison, N. J. **Frederic W. Thomas** has been named assistant general manager of purchases, and **Dean K. Chadbourne,** assistant general manager of traffic.

♦

John M. Manly Jr. has been appointed personnel director, Lodge & Shipley Machine Tool Co., Cincinnati. He formerly was secretary, Industrial Association of Cincinnati, Cincinnati branch of the National Metal Trades Association, and Associated Foundries of Cincinnati.

♦

Dr. Harvey C. Rentschler, director of research, lamp division, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., was recently awarded an honorary degree of doctor of science in engineering by Princeton University. A Westinghouse research scientist for 25 years, Dr. Rentschler was cited for his talents in the investigation of photoelectric cells and X-ray and electron tubes.

♦

Henry M. Hogan and **Frederic G. Donner** have been elected vice presidents, General Motors Corp., Detroit, and members of the administration committee. Mr. Hogan has been assistant general counsel of General Motors, with headquarters in Detroit, while Mr. Donner has been general assistant treasurer, with headquarters in New York.

♦

L. P. Krampf, supply agent, Missouri Pacific railroad, St. Louis, was

elected chairman, purchases and stores division, Association of American Railroads, at the division's annual meeting in Chicago, recently. **E. J. Lamneck,** purchasing agent, Pennsylvania railroad, Philadelphia, was chosen vice chairman.

♦

Delbert B. Geeseman has been appointed general superintendent, Canonsburg, Pa., works, Carnegie-Illinois Steel Corp., the tin plate manufacturing plant recently acquired by Carnegie-Illinois from Standard Tin Plate Co.

D. B. Geeseman

♦

W. A. Fletcher has been appointed district sales manager, western division, E. F. Houghton & Co., Philadelphia, with headquarters at 835 Harrison street, San Francisco. Mr. Fletcher formerly was district sales manager at Cleveland and more recently in charge of the company's government products division.

♦

C. D. Howe, minister of munitions and supply, Ottawa, Ont., announces the following changes in personnel of the purchasing branch of his department. **John Eaton,** director of the purchasing branch, has been recalled by the Canadian Pacific Railway Co., and has been promoted to assistant general purchasing agent. Mr. Eaton has been succeeded as director of purchasing branch by **L. L. Price,** heretofore general purchasing agent. **W. E. Wilford,** the department's purchasing representative at Toronto, Ont., has been promoted to general purchasing agent at Ottawa, and **R. H. Yarnell,** will now head the Toronto purchasing office.

♦

Cloud Wampler, president, Stern, Wampler & Co., Chicago, investment bankers, has been elected executive vice president, Carrier Corp., Syracuse, N. Y.

♦

F. A. Coons, formerly purchasing agent and secretary, Thomas Machine Mfg. Co., Pittsburgh, has resigned.

♦

Edward Nelson Case has joined the research staff of A. F. Holden Co., New Haven, Conn. He is a recent graduate of Union College, Schenectady, N. Y. **James Ceriani,** formerly research chemist, E. I. Du Pont De Nemours & Co., Wilmington, Del., also has joined Holden's research staff. He is a graduate of the Royal Institute of Industrial Chemistry at Bergamo, Italy.

♦

E. J. Lassen has been appointed manager of welding sales for General Electric Co. in the New York district. He will work with **E. Vom Steeg Jr.,** G-E welding specialist, and with Welding Engineering Sales Corp., G-E distributor, in serving northern New Jersey, New York state and Connecticut. Mr. Lassen formerly was engaged in welding application engineering work at Schenectady, N. Y.

T. R. Rhea has been named engineer of the chemical section, a new section in General Electric's industrial engineering department, established to carry on activities which heretofore have been a part of the work of the mining section of the industrial engineering department.

♦

Philip N. Cooke, for more than 15 years sales manager, Norton Co. of Canada Ltd., Hamilton, Ont., has been appointed resident manager, succeeding the late Robert C. Douglas. **D. M. Chisholm,** of the Canadian sales organization, succeeds Mr. Cooke as sales manager. Mr. Cooke has been associated with the Canadian plant from its inception, leaving Worcester, Mass., in June, 1920, as one of the original Canadian-Norton organization.

♦

F. V. MacArthur, after nearly 50 years of service with Link-Belt Co., Chicago, has resigned as secretary and assistant treasurer, and is retiring from business. **Harry E. Kellogg,** heretofore treasurer and assistant secretary, has been elected secretary, and will also continue as treasurer. **Melbourne P. Anderson** has become assistant treasurer, and **Henry C. Oakes,** assistant secretary. **Frank H. Brandt** has been named general auditor.

225,000 Tons Canadian, Mexican Lead Contracted

■ Metals Reserve Co. has completed arrangements to purchase up to 225,000 short tons of Canadian and Mexican lead in the second half of 1941 to meet expanding defense needs in United States. Of this 50,350 tons represents material now held in stockpiles by three smelting companies with which contracts have been made. The balance is to be delivered out of production during the remainder of 1941.

Because domestic lead production is only about 60 per cent of consumption, lead purchased by the Metals Reserve Co. will be distributed under allocation of OPM to consumers in United States at prevailing prices. Metals Reserve Co. is paying for the lead 3.75 cents per pound, exclusive of duty, at Laredo, Tex., and Trail, B. C. This price is expected to prevent further curtailment in Mexican production which has been declining due to loss of European markets.

Companies possessing the 50,350-ton stockpile: Consolidated Mining & Smelting Co. of Canada Ltd.; American Metal Co. Ltd.; and American Smelting & Refining Co.

Frank T. Sisco

Who has been appointed assistant secretary, American Institute of Mining and Metallurgical Engineers, New York, as announced in STEEL, July 7, page 28. He formerly was editor, Alloys of Iron Research of the Engineering Foundation

Louis Jordan

Who has resigned as assistant secretary, American Institute of Mining and Metallurgical Engineers, New York, to become associated with the Office of Production Management, Washington, as reported in STEEL, July 7, p. 28

Activities of Steel Users, Makers

■ PRODUCTION at Westinghouse Electric & Mfg. Co.'s new fluorescent lamp plant, Fairmount, W. Va., is expected to begin Aug. 2. Eventually 200,000 tubes will be made daily. The plant is windowless and air conditioned; equipment is being installed. The company will start work shortly on another plant on the same property to cost about $1,800,000, to supply the lamp works with glass tubes.

♦

Metal & Thermit Corp., New York, has started construction of a research laboratory at Woodbridge, N. J. One story high, it will contain 16,000 square feet of floor space. Dr. Lincoln T. Work, formerly of Columbia University, is director of research activities.

♦

"Keel laying" of the new Empire State Express was celebrated at the E. G. Budd Mfg. Co. plant in Philadelphia last week. F. E. Williamson, president, New York Central, and Edward G. Budd made the first weld in the center sill of the first of 32 streamlined cars under construction for the New York-Buffalo service.

♦

United States Radiator Corp. has reopened its foundry at West Newton, Pa., after a seven-year shutdown. Plant now employs 100, soon will add 150 more.

♦

Fox Grinders Inc., manufacturer of grinding machines for steel mills and foundries, will raze its plant at Harmony, Pa., and erect a new steel and concrete structure, 50 x 100 feet, in its place.

♦

Fedders-New York Co., 415 Lexington avenue, New York, has been organized by John C. Kjerner, to serve the metropolitan area with heating and air conditioning equipment. Eugene J. Moran, formerly of Moran & Brown, will be associated with Mr. Kjerner.

♦

Vascoloy-Ramet Corp., North Chicago, Ill., has opened a district sales engineering office at 50 Church street, New York, to be in charge of Eugene Roth, eastern district sales manager, assisted by Alan Carver, Harry J. Chase and Standish Rowe. Sales and service for the New York area had been handled previously from the Vascoloy-Ramet eastern plant in Jersey City, N. J.

♦

Donberg & Danits, 548 West Washington boulevard, Chicago, has been organized by Joseph H. Donberg and Samuel Danits, to deal in used machine tools. The company offers a comprehensive line of all types of tools and is prepared to purchase such equipment, including complete plants. The organizers have a combined experience of 35 years in the used machine tool field.

♦

Bolens Mfg. Co., Port Washington, Wis., has been sold to a new firm to be known as Bolens Products Co. The latter company is owned by Roy Johnson, president, Automatic Products Co. There will be no change in personnel.

♦

Western Foundry Co., Chicago, has re-opened its foundry at Holland, Mich. The plant will be operated by Frank J. Biener, plant manager, and William Selgrath, superintendent.

Canada To Produce 10% Of Tin Requirements

TORONTO, ONT.

■ Effective methods for tin production from complex ores, in the Sullivan Mountain area in British Columbia have been devised by Consolidated Mining & Smelting Co., Montreal, it was reported last week. The company will soon be able to provide about 10 per cent of Canada's tin requirements. Steel Co. of Canada Ltd., at Hamilton, Ont., is expected to receive entire output.

Since outbreak of war Consolidated has added to its activities the exploitation of mercury deposits at Pinchi Lake; milling of scheelite from tungsten at Roche de Boule Mountain; production of cadmium, bismuth, tin and other metals.

Construction of new power development project designed for ultimate capacity of 1,000,000 horsepower and to cost about $30,000,000, by Aluminum Co. of Canada Ltd., Montreal, has started. Additional power is required for the company's proposed $60,000,000 plant expansion program, to fill large orders for Canada, Great Britain and United States.

Department of Munitions and Supply in the week ended July 4, placed 2422 contracts with total value of $17,314,157. Orders to United States companies aggregated $3,719,139. Canadian companies' awards:

Ordnance: Dominion Engineering Works Ltd., Montreal, Que., $1,460,000; Northern Electric Co. Ltd., Montreal, $177,864; Robert Mitchell Co. Ltd., Montreal, $8986.

Munitions: Barber Die Castings Ltd., Hamilton, Ont., $29,379.

Shipbuilding: E. & S. Barbour, Newton, B. B. Newfoundland, $9693; Halifax Shipyards Ltd., Halifax, N. S., $7407; St. John Dry Dock & Shipbuilding Co. Ltd., St. John, N. B., $30,533.

Dockyard supplies: British Admiralty, England, $13,000; Dominion Chain Co. Ltd., Niagara Falls, Ont., $24,562; McKinnon Columbus Chain Ltd., St. Catharines, Ont. $24,562.

Instruments: British Admiralty, England, $7200.

Land transport: General Motors of Canada Ltd., Oshawa, Ont., $69,218; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $44,479; Ford Motor Co. of Canada Ltd., Windsor, Ont., $19,273.

Aircraft: Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $223,051; Anglo-Canadian Wire Rope Co. Ltd., Montreal, $13,152; Dominion Wire Rope & Cable Co., Montreal, $9516; Noorduyn Aviation Ltd., Montreal, $792,169; Switlik Canadian Parachute Ltd., Montreal, $9979; Canadian Wire & Cable Co. Ltd., Toronto, $11,421; DeHavilland Aircraft of Canada Ltd., Toronto, $22,882; National Steel Car Corp. Ltd., Malton, Ont., $14,849; Fleet Aircraft Ltd., Ft. Erie, Ont., $480,096.

Electrical equipment: Canadian Marconi Co., Montreal, $38,476; Canadian General Electric Co. Ltd., Ottawa, $5630; Canadian Westinghouse Co. Ltd., Ottawa, $8907; R. C. A. Victor Co. Ltd., Ottawa, $20,402; Canadian Telephones & Supplies Ltd., Toronto, $12,320; Exide Batteries of Canada Ltd., Toronto, $14,274; Ferranti Electric Ltd., Toronto, $20,280; Grimmer Wilson Engineering Co., Toronto, $7688.

Machinery and tools: Burrard Iron Works Ltd., Vancouver, B. C., $8796; Robert Mulhall, Ottawa, $10,938.

Miscellaneous: Canadian Comstock Co. Ltd., Toronto, $18,650; Horton Steel Works Ltd., Toronto, $13,925; Howard Furnace Co., Toronto, $5785; Ontario Hydro Electric Power Commission, Toronto, $87,082; T. W. Hand Fireworks Co. Ltd., Cooksville, Ont., $20,380; Kraft Containers Ltd., Hamilton, Ont., $8368; International Business Machines Co., Ottawa, $34,920; Canadian Kodak Sales Co. Ltd., Toronto, $31,602; Diamond Construction Co., Fredericton, N. B., $40,000; McNally, Patterson & Hanes, Ottawa, $15,000; Hagen & Co., Halifax, N. S., $22,000; Power Bros. Ltd., Lunenburg, N. S., $7000; George C. Abbott Ltd., Toronto, $6000.

Instruments: British Admiralty, England, $7200; John Hay & Co. Ltd., Eastview, Ont., $12,480.

War construction projects: Ralph & Arthur Parsons, Windsor, N. S., $219,000; Anglin-Norcross Maritime Ltd., Montreal, building at Halifax, N. S., $700,000; E. J. Ryan Construction Co., Vancouver, B. C., building at Prince Rupert, $75,000; Ambrose Wheeler Ltd., Moncton, N. B., $213,299; Magliore Couchon Ltd., Quebec, Que., $492,414; Frid Construction Co. Ltd., Hamilton, $212,018.

DIED:

■ Robert C. Farrington, 59, since 1919 chief mechanical engineer for the Austin Co., Cleveland, designers and builders, and a specialist on factory building and design, July 15, in Ft. Worth, Tex.

♦

William J. Vanderkloot, 62, a pioneer Chicago steel manufacturer and president, Vanderkloot Steel Works, Chicago, until it discontinued business ten years ago, at his home in Lake Bluff, Ill., July 14.

♦

William H. Campbell, 59, since 1909 president, Garrigues, Stewart & Davies Inc., New York, in Plainfield, N. J., July 12.

Machine Tools from South America Penetrate North American Market

■ UNTIL outbreak of the present European war it was a debated question whether South America would within reasonable time become a market for North American machine tools. The general conclusion was that it would be many years before it would represent a substantial market for machine tools of production type.

In view of that, it came as a surprise to many last week to learn that a substantial number of production machine tools not only are being manufactured in Argentina and in Brazil by native-owned and operated companies, but also that arrangements have been made for sale of the tools in United States.

Will Ease Shortage Here

During recent trips to South America, James F. Strnad, president, Lempco Products Co., Bedford, O., automotive shop equipment manufacturer, was impressed with the possibilities of importing Argentine and Brazilian tools as a step toward relieving the present shortage in the United States. He arranged to serve as exclusive American and British distributor for five of the leading South American machine tool builders—three in Buenos Aires and two in Sao Paulo, Brazil.

First shipment—47 machines—will arrive in Cleveland this week, including shapers, drill presses, punch presses, die filing machines and hand screw machines. Later shipments will include large turret lathes, planers, heavy-duty drill presses and milling machines. One of the milling machines is shown in the illustration below.

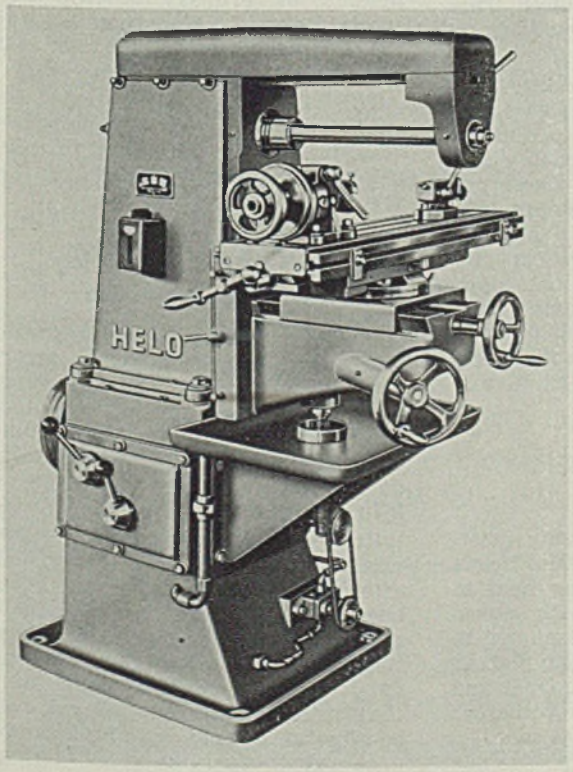
The equipment is designed and built to conform to American standards and shop practice. This also is true of accessories, such as dividing heads. South American iron and steel are used and according to Mr. Strnad, the quality of castings is high.

Commenting on workmanship, he said the marked artistic ability of Argentineans and Brazilians makes them appreciative and capable of high-grade craftmanship necessary in machine tool building.

Interchangeability of parts is maintained, and spare parts will be stocked by the Lempco Products organization.

While it is not expected South American tools will be an important factor in the North American market in normal times, it appears they will present active competition to North American and European builders in the South and Central American markets after the war.

"In the meantime these tools should further our government's 'good neighbor' policy with the South American republics," said Mr. Strnad. "Above all, we hope that these machines will help to increase America's output of war materials by easing some of the production bottlenecks."



■ Typical of production machine tools now being built by a number of companies in Argentina and Brazil is this horizontal milling machine equipped with adjustable swiveling table, gibbed overarm and dividing head

June Machine Tool Shipments $63,400,000

■ June machine tool shipments totaled $63,400 000, compared to $60,800,000 for May and $34,000,000 for June, 1940, according to the National Machine Tool Builders' Association, Cleveland.

The entire production is going to national defense and aid to Britain.

The industry has practically doubled its rate of production within the last twelve months. Ninety-five per cent of the employes in the industry are employed in companies working two or three shifts, subcontracting is steadily increasing and programs for training new employes are in full swing.

Shipments are expected to continue to mount steadily and according to present indications the industry will meet or exceed its announced goal of a total production of $750,000,000 during the year 1941.

United States To Obtain Mexico's Surplus Metals

■ Mexico will export to this country for the next 18 months all surplus strategic and critical materials under an agreement with Metals Reserve Co. and Defense Supplies Corp.

Antimony, copper, graphite, lead, mercury, tungsten, tin, zinc and henequen are covered by the pact.

The government companies will buy, at market prices at the time of purchase, any surplus of these products not sold to private industry in the western hemisphere. The Mexican government has ruled that exports of these commodities may be made only to points within the hemisphere.

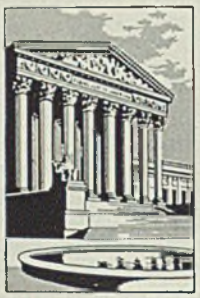
Delivers Tank No. 1000

■ Combat tank No. 1000, built by American Car & Foundry Co., New York, for the United States Army, rolled off the assembly line at the company's Berwick, Pa., plant July 10. This unit was completed 452 days from acceptance by the government of the first tank produced by this company.

Tank No. 1000 is undergoing the regular shakedown tests, and will be delivered to the Army July 26, with appropriate ceremonies.

Windows of WASHINGTON

Price control legislation scheduled to reach Congress this week. Many changes in proposed bill expected. Report wages, farm prices labled "do not touch" by administration . . . OPM consultant studies expanding steel capacity. Say 6,000,000-ton increase may be sufficient . . . Stettinius places cutting tools on preference rating basis . . . Name companies to operate new aluminum plants



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ PRICE control legislation, discussed for many weeks and desired by the administration's OPACS, is scheduled to reach Congress this week. Bills designed to control the cost of the defense program and to prevent a general inflationary spiral probably will be introduced in both houses.

Congressional leaders privately admit that these bills will not attempt to place a ceiling over wages or farm products. These have been labeled "do not touch" by the administration.

While the proposed legislation has been studied from many angles, it is expected many changes will be made after it reaches Congress.

OPACS officials want three things in the law:

Definite legal declaration that prices should be controlled. Since OPACS first began to establish price ceilings on certain commodities the question of legality of the division's actions has been raised repeatedly.

Enforcement powers. Just what OPACS could do if any industry refused to comply with established price ceilings is a moot question. The new bill probably will provide for fines or jail sentences and the use of injunctions.

Public support. To date, price-fixing authorities believe, the public has not been pinched enough by rising prices to wax enthusiastic over controls. If such powers are incorporated in law, they believe, the policy will be more readily accepted.

One group of the bill's proponents believes that prices should be frozen at levels prevailing on a certain date before inflation started, plus additions necessitated by rising costs, and another group favors fixing prices as of a certain base period.

Metals Firms Included in President's Export Blacklist

When President Roosevelt slapped an American export blacklist on 1800 pro-axis persons and firms doing business below the Rio Grande, he included a number dealing in metals and metal products. Among the more prominent of these were:

Argentina Technical Co., Buenos Aires; Krupp Sociedad Metalurgica Argentina, Buenos Aires; Alnora Soc Machinas Ltd., Rio de Janeiro; Fonecedorma de Machinas Ltd. Soc, Rio de Janeiro; Explotadorada de Manganeso Soc Ltd., Santiago; Machinery & Chemical Supply Co., Havana; General Machinery Co., Montevideo.

6,000,000 Tons New Steel Capacity Now Mentioned

W. A. Hauck, OPM steel consultant, is making a survey of expanding steel capacity.

His desk is piled high with reports from small and large steel mills with suggestions as to how they can and will expand their capacity if the additional tonnage is required. This information is being tabulated by Mr. Hauck.

Mr. Hauck does not believe that his report will be completed for about a month. It will go to William S. Knudsen who will probably forward it to the President. There has been talk recently that the administration has decided that a 6,000,000 ton increase in productive capacity is all that is necessary instead of the 10,000,000 tons originally suggested. If this is so, officials of OPM who have most to do with the situation have not been advised of any change.

Priority Problems Clarified For Steel Executives

Knotty problems involving priorities were clarified by OPM officials at an educational meeting held in Washington last week with executives of steel companies assigned to priorities duties. Other meetings at which representatives of copper and other nonferrous metals companies will be present will be held soon.

Workings of the steel preference rating plan were explained by Stanley B. Adams of the priorities staff. L. H. Whitney presented OPM's position on the alloy steel preference order and W. A. Nelson discussed alloy priorities control.

The meeting was sponsored by compliance unit of the priorities division. Officials pointed out the unit has "crackdown" powers against violators of priority orders but intends to clarify the regulations before taking action against offenders.

366,000 Subcontractors Producing Defense Items

Defense material is being produced by 366,000 subcontractors and sub-subcontractors for the 18,000 holders of primary defense contracts, Robert L. Mehornay, head of the Defense Contract Service, said last week.

The OPM will not be satisfied, he said, until subcontracting reaches "the full extent necessary to complete the defense program with the greatest possible speed."

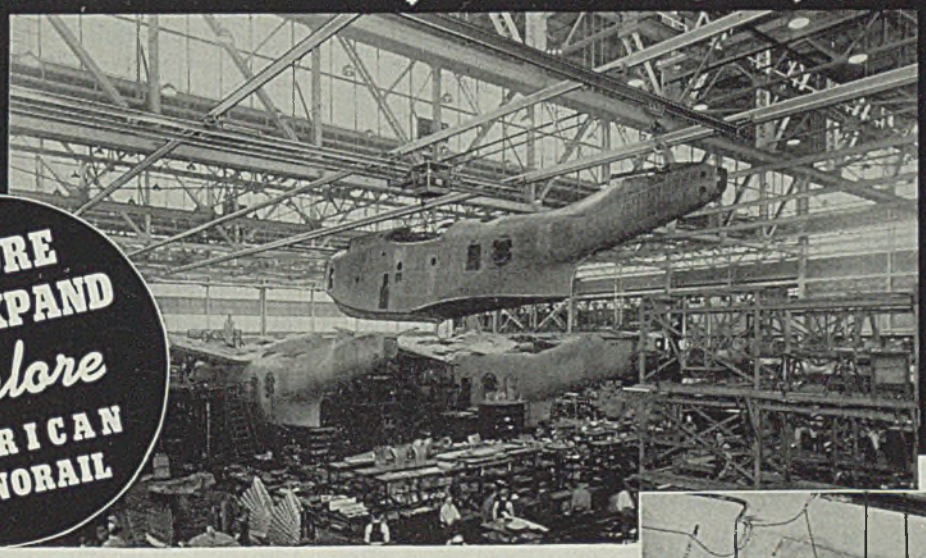
Preference Order for Cutting Tools Issued by Stettinius

Preference order for cutting tools was issued last week by the Priorities Division to meet "an increasing shortage." Henceforth manufacturers and distributors will be unable to fill orders for tools which do not have a preference rating of A-10 or higher.

Ruling provides, however, that nondefense orders may be filled after all defense needs on hand have been met. Priorities Director Stettinius declared manufacturers may continue working on orders in production July 17 for six weeks after that date. This exemption will not be affected, he said, by other preference rated orders received during

AMERICAN MONORAIL

Increases Plant Capacity



Handling service furnished by American MonoRail interrelated cranes over the nation's largest aircraft assembly floor —plant of The Glenn L. Martin Company.

BEFORE YOU EXPAND *Explore* **AMERICAN MONORAIL**

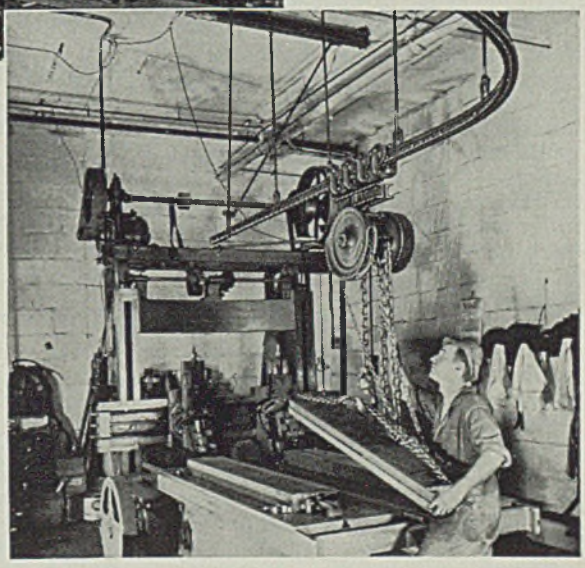
EVERY day more plants are adding capacity by putting their floor space to better use—by putting carrying jobs **overhead** with American MonoRail.

They find that materials and products are thus kept on scheduled routes—no congestion, no damage in transit.

The men, too, relieved from lifting and carrying, give full time and skill to production and accomplish more.

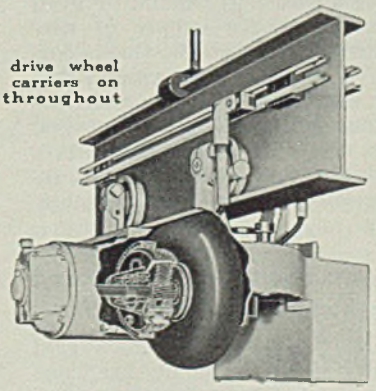
Since standard parts are assembled into complete systems to meet the special requirements of the particular job, the cost of American MonoRail is surprisingly moderate. Operation and maintenance are a minimum. Supplied for manual, electric or automatic operation.

Let us arrange for an American MonoRail engineer to survey your requirements at no obligation.



Easy placing of heavy die blocks in planer with no damage to dies or machinery.

Rubber drive wheel propels carriers on cranes throughout system.



Write for copy of "Blue Book" showing hundreds of installations.

THE AMERICAN MONORAIL CO.

13102 ATHENS AVENUE CLEVELAND, OHIO

the six weeks' period, except those with an AA emergency rating.

Manufacturers who find compliance would interfere with actual production are given a 10-day period in which the order may be deferred. "No manufacturer or distributor may discriminate against defense orders," declared Mr. Stettinius. "He must accept such defense contracts in preference to other contracts offered under substantially similar terms and conditions."

Priorities Critical List Revised; Metals Unchanged

Revised priorities critical list was issued last week by the OPM Priorities Division. Included for the first time are fire prevention and fire fighting equipment, laboratory equipment, neatsfoot oil, oxygen manufacturing units and rubber.

The metals list was unchanged. Included, however, are all but a few precious metals.

Repair Maintenance Parts for Consumers Goods Gain Preference

To assure adequate supplies of repair and maintenance parts for such privately-owned consumers goods as automobiles, trucks, trailers and household equipment, the Civilian Supply Allocation Division of OPACS promulgated an allocation program giving such materials and equipment a preference over other civilian needs.

Program, which is to be administered by the OPM, is expected to reduce to a minimum the inconvenience to the public caused by diversion of raw materials to defense needs with resultant curtailment of consumer durable goods production. By maintaining supplies of repair and maintenance parts such goods now in existence can be kept in operation.

The program points out that increasing requirements of the defense program will in the near future make it difficult to expand or even keep constant the supply of new consumer durable goods. Goods covered by the program include: Passenger automobiles, trucks and tractors, household refrigerators, stoves, ranges, and water heaters, sanitary plumbing fixtures, and furnaces, including oil burners and automatic stokers.

Eight Commodity Branches Placed Under Stettinius' Supervision

Priority Director Stettinius said last week eight commodity branches covering products in which importing or allocating problems are uppermost will come under his supervision as a result of the OPM reorganization. Branch chiefs and commodities they will direct are:

Branch 1, Dr. Harry S. Rogers, rubber, synthetic rubber, cork. Branch 2, Davis A. Uebelacker, nickel. Branch 3, Harry K. Masters, tungsten, molybdenum, vanadium, cobalt, antimony, beryllium. Branch 4, John A. Church, copper, other copper alloys, zinc, brass, cadmium. Branch 5, Andrew Leith, manganese, chrome, ferrosilicon, zirconium, titanium, rutile, columbium, tantalum and alloys of these products.

Branch 6, Erwin Vogelsang, tin, lead, illmenite (pigment). Branch 7, Howard Sykes, mica, fluorspar, cryolite, graphite, magnesite, gypsum. Branch 8, Richard J. Lund, asbestos, mercury, industrial diamonds, quartz crystal, platinum metals, radium, uranium, kyanite, abrasives, diamond dies, jewel bearings.

The branches as set up today will handle one or more commodities, but if allocation problems involving a particular metal expand greatly, a separate branch will be created. The commodity branch organization under Mr. Stettinius includes: Philip D. Reed, deputy director; C. H. Matthiessen Jr., assistant deputy director; Dr. C. K. Leith, technical consultant; Dr. W. Y. Elliott, consultant on import shipping allocations; Marshall J. Dodge Jr., administrative assistant. A consultant on stock piling will be named shortly.

Name Companies To Operate Seven New Aluminum Plants

Five companies to operate seven new government-owned aluminum plants to produce an additional 600,000,000 pounds of the metal annually were recommended to the War Department by OPM last week.

Construction of a plant, likewise to be owned by the government, and operated during the emergency by the Aluminum Co. of America for the production of 400,000,000 pounds of alumina annually also has been recommended to the War Department by OPM. Production of alumina from bauxite is a preliminary step in the manufacture of aluminum. This will be the first alumina plant ever designed for the combined treatment of both high-grade and low-grade bauxite ores.

Construction of the plants to produce an additional 600,000,000 pounds will raise the aluminum capacity of the United States to 1,400,000,000 pounds annually. Imports from Canada will raise the total supply available to 1,600,000,000 pounds.

Names of the companies recommended, the capacity of the plants proposed for their operation, and the locations recommended to date follow:

Aluminum Co. of America, 100,000,000 pounds, Arkansas; Aluminum Co. of America, 90,000,000 pounds, Bonneville-Grand Coulee area; Union Carbide & Carbon Co., 60,000,000 pounds, Spokane, Wash.; Reynolds Metals Co., 100,000,000 pounds, Listerhill, Ala.; Bohn Aluminum & Brass Co., 70,000,000 pounds, Los Angeles; Olin Corp., 30,000,000 pounds, Tacoma, Wash.; Aluminum Co. of America, 150,000,000 pounds, Massena, N. Y.

An arrangement has been worked out with Alcoa under which that company will design and supervise the construction, on a nonprofit basis, of the plants to be operated by the Union Carbide & Carbon and Olin Corp. This will eliminate the necessity of these companies from engaging in preliminary investigations of plant design, and therefore will speed construction. Reynolds and Bohn will design and construct the plants they will operate.

Sandmaier Named to Defense Advisory Committee Bureau

Philip J. Sandmaier, Republic Steel Corp., Cleveland, has been named assistant to Sidney J. Weinberg, chief of the OPM Bureau of Clearance of Defense Industry Advisory Committees.

Mr. Weinberg also appointed to his staff R. H. Webb-Peploe, Lever Bros. Co., Cambridge, Mass.; Richard Wells, Freeport Sulphur Co., New York; Tom Lilley, Burlington Mills Corp., Greensboro, N. C.; and Charles R. Crosby, Dean Langmuir Inc., New York.

Eric Nicol, who has been serving as executive assistant to Sidney Hillman, was appointed associate chief of the Labor Division's new Labor Supply Branch last week. Mr. Nicol will devote his entire time to development of the new labor supply program in the field, and will work directly with the 12 regional Labor Supply Committees established to meet defense industries' needs.

Paul Linz, nonferrous metal expert, has been appointed commodity specialist for lead in OPACS price division.

Blanket Preferences Granted 20 Yards Building Ship Ways

Twenty shipyards building ship ways under contract with the Maritime Commission or at government direction were issued blanket preference ratings last week. Ratings cover all material going into the way and certain types of equipment.

For ways which will produce completed ships this year, an A-1-a rating was assigned. An A-1-b rating applies to ways which will complete ships in 1942 and 1943.

Machine tools are not obtainable under the blanket rating but must be obtained through the usual individual preference certificates.

Simplification Plan To Conserve Metals Outlined to Hardware Men

■ A BROAD program to simplify the lines and varieties of consumers goods was outlined by Donald M. Nelson, OPM Purchases Director, before the annual convention of the National Retail Hardware Association in New Orleans, last week. The simplification program, Mr. Nelson said, is necessitated by severe shortages of essential metals from aluminum to steel.

The plan, which will be launched immediately, will not be done by issuing arbitrary orders or by telling industry what must and what must not be done, Mr. Nelson stated. He outlined the program as follows:

"Each industry affected will be represented by a committee . . . composed of representatives of manufacturers, distributors and consumers. It will be selected by the government from nominations made by industry; it will convene in Washington, where the whole program of simplification will be discussed with experts from the Bureau of Standards and defense officials. The industry representatives will be asked to suggest ways and means of simplification. Decisions will be made by the government, of course, but only after full discussion with industry's duly selected representatives.

"Your own representatives—representatives of the retail field—undoubtedly will sit on the committee. Their presence on the committee will offer to you a fine opportunity to be of service. As retailers, you know the lines which lie on your shelves or in your stock rooms, month after month, taking up space, tying up capital and material and representing a drain on your resources rather than a live commercial asset. You will be able to suggest innumerable items on which savings can be made.

"When a program has finally been agreed upon and adopted, you will feel the benefits. You will have an increased turnover of your stocks. You will be dealing more largely in staple lines, easy to buy and easy to sell. You will be able to concentrate your sales effort on fewer lines. You will have less capital invested in new stocks and repair parts, and you will be able to get along with less storage space and decreased overhead."

By drastically reducing the sizes, styles and shapes of various items it should in many cases be possible to avoid a reduction in the overall quantity which is offered the public, Mr. Nelson said.

"Simplification offers a method of meeting shortages without getting a corresponding reduction in available goods."

The pinch in metals is the most severe of any class of raw materials, according to the OPM official.

"The civilian demand for such aluminum as is left over after all defense needs have been met is in the ratio of 15 to one—which means that for every pound of aluminum available to meet civilian needs there are at least 15 manufacturers each one of whom needs that pound. Civilian demand for the available supply of copper is in a ratio of five to two; civilian demand for such nickel as will be available is in a ratio of two to one. The situation in steel is not quite so bad; the ratio of civilian demand to available supply stands at about ten to nine, although the situation is considerably worse in respect to some of the alloy steels. Practically all of the metals in general industrial use stand somewhere between aluminum and steel."

Henderson Sees Shortage of Metals for Consumers Goods

Defense consumption of steel, copper, aluminum, nickel, zinc, chromite, manganese and several other raw materials will be so great "we won't have enough left over for consumers durable goods," OPACS Administrator Henderson told the New York Housewares Manufacturers Association meeting in Atlantic City, N. J., last week.

"Rationing at the raw material line will be necessary with civilian goods' factories thrown into enforced idleness and men made unemployed for lack of machines."

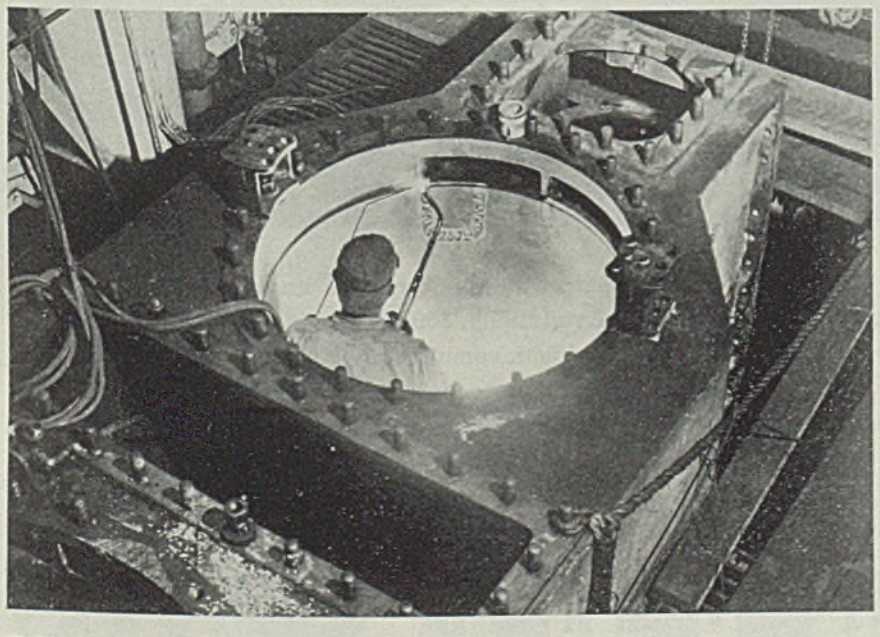
Referring to his activities to expand steel and other industries, Henderson said "efforts for expansion have been too small. Some steel not needed for military purposes can still be used to build additional capacity, but chances are it will mean little net gain for civilian uses.

"By the time we get the additional capacity the needs of the defense program will have expanded to the point where most of it will be needed for armaments."

Henderson warned that the government will stiffen control over prices, no matter how "ornery and belligerent" the protests against it.

He predicted the defense program will convince the nation that demand for goods produces prosperity. "After the war," he said, "the people will support continued heavy government expenditures for public works. Thus the foundation will be laid for a continuing demand for steel, aluminum, copper, tin, zinc and rubber that we have been too reluctant to expand in the last year."

Welders Repair Sabotaged Axis Vessels



■ Despite severe damage to engines and other vital parts of the German and Italian cargo vessels taken over by the United States government last April, repair work is being speeded to the point where some of them will be placed in service by midsummer. Here a bronze welder is repairing the main engine in a sabotaged Italian vessel; it was unnecessary to remove engine from the ship. Photo courtesy Linde Air Products Co., New York

A hand tool manufacturer makes both his striking and socket wrenches from Chrome-Molybdenum (SAE 4140) steel. He gets the toughness needed for striking wrenches even at the relatively high hardness of 35-38 Rockwell "C". His socket wrenches resist deformation because of a Rockwell "C" hardness of 46-48.

Availability, economy, and quality are nicely combined with versatility in this one steel.

Our free technical book, "Molybdenum in Steel" will be sent to those interested.

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

Climax Mo-ly-b-den-um Company
500 Fifth Avenue · New York City

MOLY

Mirrors of MOTORDOM

Transition from consumer goods to defense manufacturing creating unemployment and possibility is seen of 60,000 idle in Michigan as a result of auto curtailment . . . Important metal savings accrue from lower car production—1,619,000 tons of steel in six months . . . Several producers now closed for model changes . . . No more aluminum powder for car finishes

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ PROSPECTS of large-scale unemployment in automobile and parts industries resulting from curtailment of car production are looming ever larger and, as might be expected, are stirring up labor leaders and politicians to a state of at least mild worry. It is an anomalous situation in the face of the current defense boom and seems to give the lie to earlier public proclamations about the dire shortage of labor the country was facing.

Consider a few statistics, prepared by C. C. Carlton, vice president of the Motor Wheel Corp., Lansing, Mich., and chairman of the Michigan Council for Defense, submitted in a recent report to Governor Van Wagoner, Michigan. He points out that curtailment of auto production by 20 per cent from the level prevailing in the first six months of the 1941 model year is actually a 38 per cent curtailment from the pace of the last six months of the model year, or the six months ending in July. And further this curtailment, already agreed to by the motor industry in conferences with the OPM at Washington, will mean loss of jobs by 96,100 in Michigan and 155,000 in the entire country. Automobile and parts industries in the country now hire 525,000 persons, of whom 325,000 are employed in Michigan.

Would Leave 60,000 Jobless

Defense plants nearing the production stage in Michigan will be able to employ an additional 36,210 by October, according to the Carlton report, which would leave some 60,000 working people still without jobs.

If a 50 per cent reduction in auto output should be made mandatory, as some of the more inflammatory orators at Washington would like, then 173,600 would lose their jobs in Michigan plants, and 280,000 throughout the country.

Granting that these estimates may be on the pessimistic side, still it is apparent a serious dislocation in employment is on the way as the transition from peacetime to defense production speeds up. Some of this unemployment may be temporary, it is true, but there may be thousands twiddling their thumbs this fall because of stoppage of jobs not alone in the automotive industries but in many other consumer industries as well. Already there are instances of smaller plants forced to shut down completely because of the lack of vital materials.

This appears to be a part of the price which must be paid for a gargantuan defense effort. Even in Great Britain, where all types of manufacturing are dwarfed alongside this country's productive plant, the same trouble has been experienced.

Already the complaints are starting to be heard. The UAW-CIO has issued a report urging greater attention to an orderly transition from nondefense to defense manufacturing. State governors and Washington representatives are being besieged with pleas from their constituents.

The motor industry saw the difficulty coming. Early last spring officials were calling attention to the serious effects on employment which would result from curtailment of consumer production.

Nonetheless curtailment of nondefense manufacturing is here and there is not much legislators can do about it except to attempt to ease the strain. So far it has come from defense priorities on materials over which few people are inclined to quibble. The auto industry, for example, has led the way in trying to make adjustments in its car manufacturing techniques to facilitate the flow of material to defense.

Some actual figures will show savings in vital metals which the industry will achieve in the six months starting Aug. 1, compared with the six months immediately preceding. These, of course, are based on the accepted 20 per cent curtailment, or as previously explained, the 38 per cent curtailment from the current rate. A saving of 87.4 per cent in primary aluminum and 33.8 per cent in secondary aluminum, or 17,000,000 pounds in all, enough for 1700 average-size military airplanes; a saving of 76.1 per cent in nickel steel, or 185,000,000 pounds in all; a saving of 70.1 per cent in zinc; a saving of 71.7 per cent in tungsten; and a saving of 37.1 per cent in steel, or 1,619,000 tons in all.

Translating the saving in steel to a year's basis, it amounts to one-third of the entire 10,000,000-ton new capacity figure being urged upon the industry by Washington expansionists.

High Production a Help To Defense Program

There are those who look on the production of 5,300,000 cars and trucks of 1941 vintage as virtual treason to the defense program. They proclaim wildly that this output should have been shut off long ago and the plants turned over to making guns, planes, tanks and whatnot. Such hysterics are simply foolish. Defense is the motor industry's No. 1 job and even if car production had been stopped cold months ago, there would not be a single extra gun, a single extra tank or a single extra machine gun available now. It takes time to engineer and tool up for military items, and in every case where the automobile industry is moving into defense manufacturing it is either on or ahead of schedule.

As a matter of fact, the motor industry has really made a valuable

contribution to national defense by turning out 5,300,000 cars and trucks in the closing model year. Two reasons: First, this heavy production has taken an estimated 100,000 men off relief rolls and public payrolls and trained many of them to do important manufacturing jobs; and second it has demonstrated to suppliers of now-critical materials — aluminum, zinc, copper, nickel, etc.—the dire need for stepping up production of these items immediately, far in advance of the time when an expanding defense program might have demonstrated oncoming shortages. Thus, by showing up material shortages earlier and persuading suppliers to take steps to expand their output, automobile plants have at least helped to make these critical materials available at the time they are most needed.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,321
5 mos.	1,731,495	2,176,874	2,602,408
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†
June 28	127,926	87,550
July 5	96,457	51,975
July 12	114,318	62,176
July 19	109,912	53,020

†Comparable week.

OPACS Disregards Auto Industry Advisory Group

Spreading rift between the OPM and the OPACS was attested last week by action of the Henderson organization in disregarding the automotive industry's defense advisory committee organized the week before by OPM, and in sending invitations to all the various motor companies to attend a meeting in Washington to discuss further curtailment of auto manufacturing. No reason was given for ignoring the carefully planned industry committee which is already functioning and includes representatives from car and truck manufacturers, nine others on a motor truck subcommittee and eight parts manufacturers. The committee is purely advisory in character and has no authority to issue any orders or to enforce any regulations.

Scheduling for 1942 Models

Breakdown of the first material authorization orders from Ford for 1942 models shows a total of 250,000 Ford and Mercury models, comprising 9000 Ford specials, 52,000 deluxe, 105,000 superdeluxe, 23,000 Mercury, 21,000 commercial and 40,000 truck chassis. Engines classify into 1400 of the 4-cylinder, 45,000 of the 6-cylinder, 154,800 of the 90-horsepower V-8 (formerly the 85), and 43,800 of the 100-horsepower V-8 (formerly the 95).

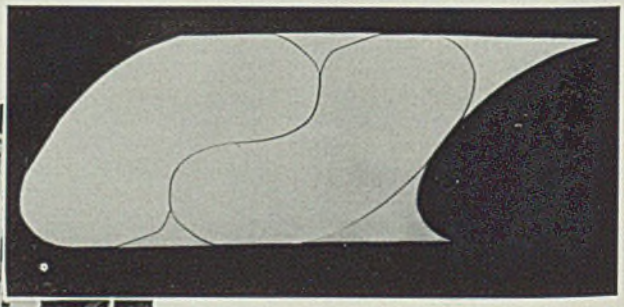
Lincoln material authorizations cover 7000 in all, the bulk of them Zephyr models. Production will begin at a rate of 75 a day, presumably this week.

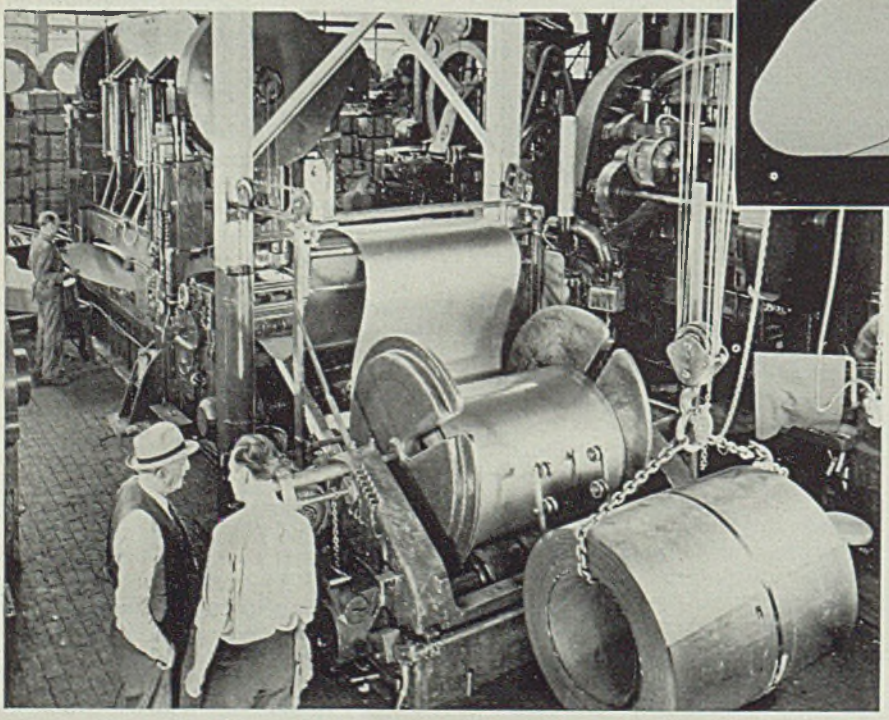
Hudson apparently will be the first of the passenger car producers to show its 1942 line semiofficially, a Detroit area preview being scheduled for next week. The Hudson plant has been closed for changeovers for the past three weeks.

Nash likewise has been closed for three weeks for model change and last week Plymouth was making an effort to wind up 1941 production. The Plymouth closing was delayed as a result of a strike in a local plant supplying upholstery items to Chrysler divisions. Although this labor trouble was adjusted last week, it had progressed to the point where shutdowns were forced at Plymouth, De Soto and Chrysler for several days. Hence Plymouth was required to continue beyond original closing dates to fill out its schedule. An early changeover to 1942 models is being planned, although it is doubtful if assemblies can be rolling much before the middle of August, since Briggs Mfg. Co., body supplier, will be down for

(*Please turn to Page* 95)

Stamping Chevrolet Rear Fender Blanks



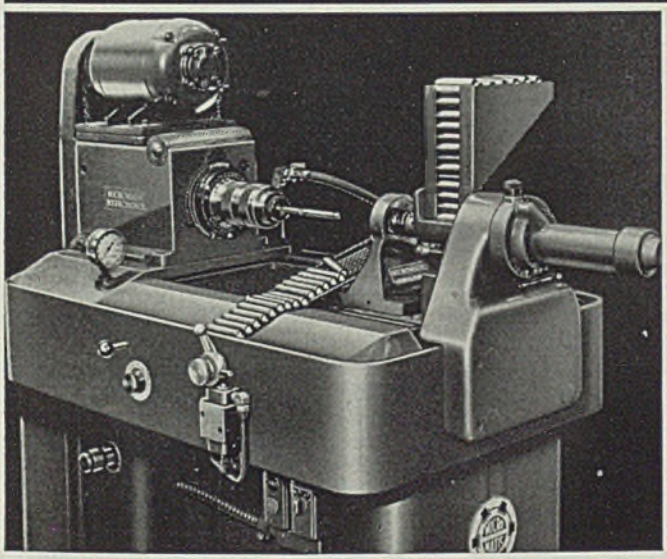


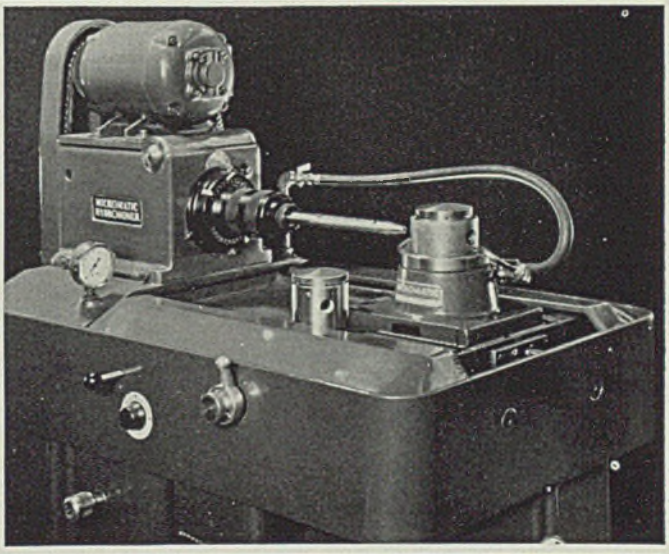
■ Like newsprint these giant coils of cold-rolled strip steel are threaded through a roller leveler and into a press in the background where Chevrolet rear fender blanks are punched out in a steady stream. Maximum utilization of the steel is realized by ingenious interlocking of the curved blanks, as illustrated in the diagram, and also shown at the left in the photograph. Even the triangular shaped waste pieces can be used partially as stock for smaller stampings, so actual scrap loss from the strip is extremely low

Now—

COMPLETELY AUTOMATIC HONING *with* AUTOMATIC MICR-O-SIZE CONTROL

One completely automatic Microfinish operation removes from .0015" to .0025" stock from reamed **VALVE STEM GUIDES** at the rate of approximately 200 pieces per hour. Uniform size is generated within .0005" and bore accuracy within .0001" to .0002" limits.





THE HYDROHONER

MICRO MATIC

Microfinish for Combined Accomplishment in One Process

The Automatic Micr-O-Size Control Unit generates accurate sizing, in high production, uniformly within limits from .0002" to .0005", reducing the tolerance range and number of selective fits. It offers increased production through simplified practice. It is provided with an unique feature: visual dials for set-up, adjustment, and complete operating control. Additional features comprise:

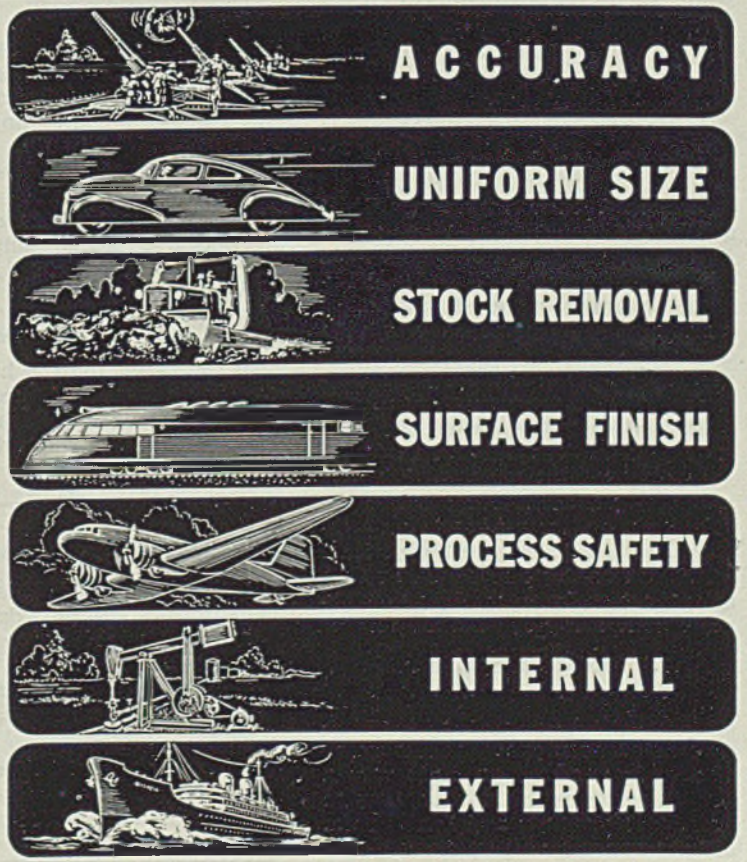
- Instantaneous abrasive expansion only to average rough bore size—by hydraulic pressure control—and thereafter positively restrained against any backlash; followed by—
- A controlled, uniform rate of abrasive expansion feed-out to uniform size and finish—under variable pressure, hydraulically actuated control, synchronized with an adjustable time cycle, and,
- Expansion collapse of the abrasive members always to the same starting diameter—under mechanical control—and automatic compensation for average stone wear.

This equipment, for the first time in honing makes completely automatic operation successful, in high production as shown above left.

★

MICROMATIC HONE CORPORATION

1345 East Milwaukee Ave.
DETROIT, MICHIGAN, U.S.A.



"Keep Up Production in Nondefense Industries," Foreman's Group Advises

By HERBERT RADDATZ

■ EVERYONE is agreed that production must be maintained in defense industries, but is it equally vital that production be maintained in the nondefense industries?

Without pretending to pose as economic experts, a group of foremen employed by the A. Geo. Schulz Co., Milwaukee, after prolonged discussion, concluded that the maintenance of production at high levels is a constructive force of the highest order.

Having decided in prior meetings that one of the major duties of a supervisor is to maintain production at a high level, a conference was scheduled to discuss ways and means to accomplish this.

Before becoming involved in the "how" of maintaining production, one conferee asked "Why is it important to keep up production?"

The discussion which followed developed some answers of such great significance that it was felt desirable to present the viewpoint of the group to the public for comparison, against some views of private industry which have had such widespread discussion recently.

In our opinion it is important to keep up production in our plant for these five reasons:

1. To keep our jobs.
2. To meet competition.
3. To make profits.
4. To continue in business.
5. To do something useful for society.

The first four represent direct self-interest and probably are merely an exposition of nature's laws of self-preservation. The fifth, however, expresses the fundamental purpose of private enterprise, and is a practical example of democracy at work. It is the soundest foundation upon which a business may be built, and should represent the spirit actuating every employe involved.

Analyzing the useful function our company performs for society, we selected nine items of major importance. These nine are listed here in order of their discussion, and no attempt has been made to determine their order of importance.

1. Provide Employment

By providing employment opportunities—the existence and operation of our company enables some citizens in our community to earn a livelihood; to rear their families in peace and security; and through the distribution of wages, to improve the standards of living, not only of the employe and his family but also of employes engaged in housing; clothing; food; transportation; entertainment and other industries. The opportunity of private employment is a bright objective to young people on the threshold of life.

2. To Promote Sanitation

Proper packaging not only makes for lower packing and handling costs of consumer goods, but protects them against unsanitary exposure. Our business directly contributes to the maintenance of sanitary standards in commerce and the home.

3. To Safeguard Health

Foods, druggists' sundries, babies' toys and countless other things important in our daily life are protected against contamination through dust, dirt, handling and other sources by proper packaging. Individual containers lessen the likelihood of pollution ever present when commodities are handled in bulk. In this we do our part by providing the right kind of containers.

4. To Reduce Consumer Costs

Properly designed containers, packages, boxes and cartons facilitate packing, handling, shipping and selling, and by eliminating much lost time and waste motion, effect general economies in the cost of distributing goods. Lower spoilage, decreased accidental losses and greater economy of space in trucks, trains and stores help to lower the cost of goods purchased by the family buyer.

5. To Pay Taxes

It is right that a business pay for the privilege of existence and one of the forms of such payment is that of taxes. Fire and police protection, city, state and national governments, and the social systems to assist the needy and dependent are financed almost wholly by taxes paid by business and its employes. Since increased production means lower costs, the savings our business affords to society increase our ability to pay taxes, which in dollars and cents exceed the so-called profits of the business.

6. To Improve Living Standards

When a business distributes wages to employes, it stimulates employment in other lines. The industries which furnish our supplies and transport supplies and products, in turn, provide more employment and wages when we maintain high production. Reducing the consumers' costs enables the family to divert the money thus saved to other purposes, thus stimulating still other businesses.

7. To Promote Community Welfare

Employment and earning power mean better homes; better schools; better clothing; better health; and better recreation. The construction of a new home adds wealth to the community, and in turn, provides further work and wages to those employed in supplying living facilities.

8. Makes Better Citizens

An individual with a job is not as likely to enter into a life of crime as one who is without a means of earning a living. Unemployment adds to the family burden and causes a drain on relatives, friends and organized charity. By providing employment a business minimizes the evils of idleness and emphasizes broader opportunities for education and social intercourse.

9. To Improve the Art of Management

Successful business operation makes possible further research and development. Worth while things developed in our business spread to the other businesses and they too realize the resulting savings and other advantages.

These conclusions of my fellow foremen cause me to wonder if it would not be worth while for other groups to consider the same thought in their own work, and whether it would not be a good idea to keep reminding the world of the importance of these three words and their meaning to life—keep up production!

About the Author

■ Herbert Raddatz is foreman of the set-up box department, handwork and stripper department, A. Geo. Schulz Co., manufacturer of set-up and folding boxes, fiber and corrugated containers, Milwaukee.

He is one of 14 foremen who meet regularly to discuss their problems as supervisors.

■ Number of patents granted for inventions throughout the world totaled 147,396 during 1939, latest year for which figures are available, according to the International Bureau for the Protection of Industrial Property, Berne, Switzerland. Leading all countries in patents granted was the United States with 43,442.

War Department's Defense Fund Obligations in June $4,986,300,310

■ NATIONAL defense funds obligated by the War Department in June aggregated $4,986,300,310, a monthly total never before approached in American military expenditure, it was reported last week by Under Secretary of War Patterson. This averaged $199,452,012 for every business day in the month.

Air Corps obligations, $2,297,476,278, constituted the largest single group. Ordnance was next, with $1,500,231,225.

Characterizing the figures as "eloquent proof of the War Department's determination to expedite the letting of contracts to the limit," Mr. Patterson added that "the bulk of this money did not become available until the passage of the Fifth Supplemental Appropriation Act on April 5, totaling $4,091,264,354."

Army appropriation for the fiscal year 1924, Mr. Patterson pointed out, was $251,250,231, lowest since the World war. Thereafter appropriations rose gradually until 1931, when total was $339,906,459. In 1939, appropriation was $459,401,254.

War Department last week reported awards totaling $826,128,952. Aircraft and aircraft parts contracts constituted a large portion of the amount. The contracts:

American Construction Co., Houston, Tex., $888,690 for motor repair facilities including 36 miscellaneous buildings and utilities at Normoyle quartermaster depot, motor transport, San Antonio, Tex.

Artley Co. and Espy Paving & Construction Co., both of Savannah, Ga., $4,820,500 for advanced twin engine flying school at Valdosta, Ga., including cantonment-type buildings with necessary utilities, other appurtenances requisite for a flying school. Architectural and engineering contract was awarded to Reynolds, Stockman & Hills, Jacksonville, Fla.

Central Contracting Co., Atlanta, Ga., and Beckham & Brooks, Perry, Ga., fourth echelon motor repair base section of Atlanta quartermaster depot, including warehouses, sheds and necessary utilities, $2,529,778. Robert & Co. Inc., Atlanta, awarded architectural and engineering services contract.

Cleary Bros. Construction Co., West Palm Beach, Fla., $3,627,640 for air corps basic flying school at Sebring, Fla. Undertaken immediately will be $2,014,879 of this amount, remainder to be accomplished when sufficient funds are made available. Frank W. Ball & Associates, Ft. Myers, Fla., awarded architectural-engineering contract.

Dixon, L. E., Co., Los Angeles, $2,617,883 supplemental agreement to fixed fee contract covering construction of a water supply system to carry water from mountains to Camp San Luis Obispo, California, including concrete dam, tunnels, pipe line, pumping plant and other appurtenances. Approximately 200 miscellaneous structures are included. Leeds, Hill, Barnyard & Jewett, Los Angeles, furnishing architectural-engineering services.

Doyle, Russell & Wise, Richmond, Va., $2,557,348 for quartermaster corps school for 900 officers and men and additional structures in replacement center area at Camp Robert E. Lee, Virginia. Wiley & Wilson, Lynchburg, Va., have award for architectural and engineering services.

Dunn Construction Co., Birmingham, Ala., and John S. Hodgson & Co., Montgomery, Ala., $2,109,640 supplement to previous contracts for Anniston Ordnance Depot, Talladega, Ala., including magazines, aprons, shelters, guard house fencing, railroads, roads and other facilities. Present total estimated cost of the project is $10,635,579. J. B. Converse & Co., Mobile, Ala., and A. C. Polk, Birmingham, are architects and engineers.

Du Pont, E. I., de Nemours & Co., Wilmington, Del., supplemental contract for $15,848,000 in connection with establishment of anhydrous ammonia plant at Morgantown Ordnance Works, Morgantown, W. Va., to increase productive capacity. Total estimated cost of the plant is now $31,448,000, with $20,700,000 for equipment.

Gillson-Taylor Inc., Lexington, Ky., general hospital at Danville, Ky., to contain 250 beds and be located adjacent to newly constructed hospital facilities being leased from the Commonwealth of Kentucky. Estimated Cost, $330,943. Associated Architects & Engineers, Lexington, have been awarded architectural-engineering contract.

Grimshaw, W. R., Co., Tulsa, Okla., motor transport facilities at Ft. Sill, Okla., including maintenance shops, warehouses and necessary utilities for housing third echelon motor repair equipment, $1,076,650.

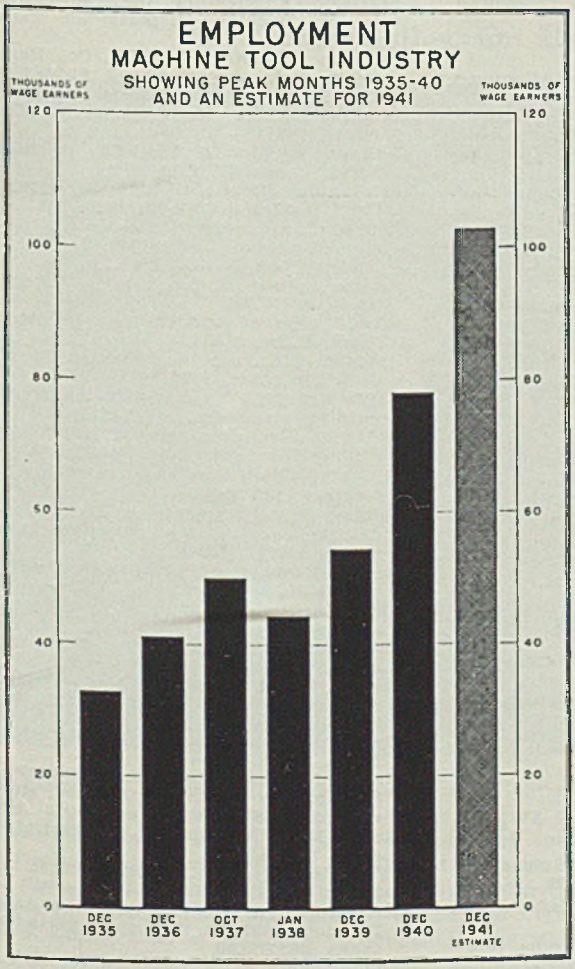
Mason, Silas, Co., New York, shell loading plant at Minden, La., estimated to cost $19,356,908. Contractor to provide architectural-engineering services, construct, equip and operate the plant, train key personnel. Approximately $3,158,200 will be for acquisition of machinery and equipment for installation in the plant, which will load shells, bombs, fuzes and boosters. Plant will be operated on a fixed fee basis, government to furnish all explosives and metal parts for loading ammunition.

McKenzie Construction Co., San Antonio, Tex., $1,857,559 for additions to existing San Antonio general depot, including warehouses, sheds, magazines, fencing and other appurtenances. Work is to start immediately on a portion of the project estimated to cost $972,184, balance to be undertaken when funds are available.

McShain, John, Inc., Philadelphia, storage warehouse, Arlington, Va., $1,640,000. Proposed building is to have floor area of 518,000 square feet.

Poirier & McClane Corp., and John W. Harris & Associates Inc., both of New York, $6,658,454 for ammunition storage depot at Seneca Ordnance Depot, Kendaia, N. Y., including magazines, transfer platforms, shelters, railroads, roads, miscellaneous structures and necessary utilities. William S. Lozier, Rochester, N. Y., has architectural-engineering contract.

Price Bros. and C. & G. Construction Co., both of Dayton, O., and Hinton & Smalley, Celina, O., $1,692,055 for field



✦

Needed: 22,600 More Workers

■ About 22,600 workers must be added to the payrolls of the machine tool industry by the end of the year, the Bureau of Labor Statistics reported recently after a survey of the industry's requirements. This will bring total employment of wage earners to 103,000, not including workers engaged in manufacturing tools by subcontracting companies, which have become of increasing importance.

In addition to shop workers, the industry will require during this year 2600 more salaried employes, including 300 engineers and 500 draftsmen.

Accompanying chart shows how machine tool employment has increased since 1935. Chart by the Bureau of Labor Statistics

construction work at Wright field, Dayton.

Sound Construction Co., Seattle, 50 miscellaneous buildings, $827,100.

Stone & Webster Engineering Corp., New York, $868,967 supplemental agreement for construction and architectural-engineering services for an additional line for production of lead azide at Kankakee Ordnance Works, Joliet, Ill. Plant, to be operated by E. I. du Pont de Nemours & Co., Wilmington, Del., has reached total estimated cost of $32,079,967.

Teufel, George F., & Paul N. Carlson, Seattle, $1,033,221 for motor repair shops at Ft. Lewis, Washington, including maintenance shop, warehouse shop, warehouses and utilities for housing third echelon motor repair facilities.

Wheatley & Mobley, Augusta, Ga., additional construction at infantry replacement center, Camp Wheeler, Georgia, including class rooms, sports arena and 24 miscellaneous buildings with utilities, $487,197.

Ordnance Department Awards

Accurate Tool Co., Newark, N. J., tools, $4403.55.

Aelco Brass Foundry, Milwaukee, aluminum castings, $3078.56.

Albert & Davidson Pipe Corp., Brooklyn, N. Y., black steel pipes, $4698.04.

Allis-Chalmers Mfg. Co., Milwaukee, tractor parts, $2645.33.

Aluminum Co. of America, Pittsburgh, aluminum ingots, $1767.

Aluminum Seal Co., New Kensington, Pa., detonator parts, $81,220.

American Cutter & Engineering Co., Detroit, punches and dies, $21,900.

American Locomotive Co., New York, gun carriages, tanks, $28,863,000.

American Rolling Mill Co., Middletown, O., steel, $10,647.54.

American Spring & Mfg. Corp., Holly, Mich., steel springs, $2429.41.

Ames Baldwin Wyoming Co., Parkersburg, W. Va., shovels, $2128.10.

Apex Tool & Cutter Co. Inc., Shelton, Conn., blades for milling cutters, $4132.86.

Armstrong & Son Co., New York, mortar accessories, $1270.80.

Associated Spring Corp., Barnes-Gibson-Raymond Division, Detroit, helical springs, $3780.

Automatic Screw Products Co., Indianapolis, fuzes, $233,612.40.

Bausch & Lomb Optical Co., Rochester, N. Y., metallurgical microscopes, $1059.25.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., starter assemblies, $85,560; direct electric starters, $13,800; Bendix Marine Division, Brooklyn, N. Y., transmitters and differentials, $908,976.10; Scintilla Magneto Division, Sidney, N. Y., spare parts for tank, $3721.14.

Bernz, Otto, Co. Inc., Rochester, N. Y., gasoline blowtorches, $1300.

Bethlehem Steel Co., Bethlehem, Pa., forged bomb bodies, $72,687.50.

Bliss, E. W., Co., Brooklyn, N. Y., punch presses, $3570.

Boesch Mfg. Co., Danbury, Conn., punches, $10,640.

Borg-Warner Corp., Mechanics Universal Joint Division, Rockford, Ill., fuzes, $1,586,000.

Bowen Products Corp., Ecorse, Mich., cartridge cases, $1,075,000.

Breeze Corps. Inc., Newark, N. J., spare parts for tank, $39,504.27.

Bristol Co., Waterbury, Conn., dilatometer, $1551.50.

Brown & Sharpe Mfg. Co., Providence, R. I., screw machines, $13,554.

Budd, Edward G., Mfg. Co., Philadelphia, shells, $870,000.

Burroughs Adding Machine Co., Washington, accounting and posting machine, $1630.80.

Carboloy Co. Inc., Detroit, tools, $21,350.

Carnegie-Illinois Steel Corp., Chicago, steel, $1062.30.

Carpenter Steel Co., Reading, Pa., drill rods, $7989.55.

C. & G. Tool Co., East Orange, N. J., tools, trays and gages, $2852.

Chicago Flexible Shaft Co., Chicago, fuzes, $901,529.

Cincinnati Milling Machine Co. Inc., Cincinnati, milling machines, $9827.

Clapp, E. D., Mfg. Co., Auburn, N. Y., drop forgings, $1896.

Clark Equipment Co., Clark-Tructractor Division, Battle Creek, Mich., industrial truck, $2338.35.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., guns, parts, Browning machine guns and parts, $6,947,239.08.

Columbia Steel Tool Co., Chicago Heights, Ill., steel, $1023.22.

Comtor Co., Waltham, Mass., gages, $1431.04.

Continental Motors Corp., Muskegon, Mich., pins, valve tappet rollers, flywheel assemblies, $11,562.14.

Continental Tool Works, Detroit, cutters and pilots, $3666.68.

Crucible Steel Co. of America, New York, steel, shot, molybdenum steel, $3,152,735.62.

Defiance Pressed Steel Co., Marion, O., cartridge cases, $1,291,408.

Detroit Broach Co. Inc., Detroit, broach section details, $1416.80.

Detroit Seamless Steel Tubes Co., Dearborn, Mich., steel, $5805.60.

DeVilbiss Co., Toledo, O., nozzle type wash booth, complete with splash proof pump motor, $1003.50.

Elwell, H. F., Iron Works, Springfield, Mass., structural steel, $1288.

Ever-Tite Mfg. Co., Davenport, Iowa, plates and gussets, $5523.30.

Farquhar, A. B., Co. Ltd., York, Pa., hydraulic presses, $2980.

Felton, S. A., & Son Co., Manchester, N. H., bore brushes, $8322.95.

Firth-Sterling Steel Co., McKeesport, Pa., tools, $16,790.

Ford Motor Co., Dearborn, Mich., motor carriages, $15,000.

Ft. Pitt Bedding Co., Pittsburgh, metallic belt links, $720,000.

Ft. Pitt Malleable Iron Co., Pittsburgh, grooved castings, $4257.50.

Fulton-Sylphon Co., Knoxville, Tenn., metal fuze parts, $64,911.

General Electric Supply Corp., Allentown, Pa., cable and wire, $1309.21.

General Fireproofing Co., Youngstown, O., office equipment, $2280.23.

General Motors Corp., Delco Appliance Division, Rochester, N. Y., gun directors, $524,000; Delco Products Division, Dayton, O., fuzes, $82,248.09; Detroit Division, guns, $27,823,008.25.

Graybar Electric Co., New York, linestarters, switches and electric counters, $1955.

Great Lakes Steel Corp., Ecorse, Mich., steel sheets and plates, $13,537.98.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $6232.98.

Hadley Special Tool Co. Inc., Boston, parts for machine guns, $7770.

Hansaloy Mfg. Co., Davenport, Iowa, parts for tanks, $3464.94.

Hardware & Supply Corp., Kansas City, Mo., axes, $2986.80.

Hartford Electric Steel Corp., Roxbury, Mass., steel castings, $1025.81.

Hershey Mfg. Co., South Boston, Mass., primers, $51,246.

Hesse Machine & Mfg. Co. Inc., Boston, gages, $1750.

High Standard Mfg. Co., New Haven, Conn., guns, $4,724,841.12.

Holden, John S., Attleboro, Mass., primers, $95,600.

Hydraulic Controls Inc., Chicago, pumps, $4650.

International Register Co., Chicago, shells, $1,593,700.

Karp Metal Products Co. Inc., Brooklyn, N. Y., steel chests, $2628.67.

Lamson Co. Inc., Syracuse, N. Y., tripod mounts, $1,243,152.20.

Leeds & Northrup Co., Philadelphia, multiple point recorders, $4512.95.

Leland-Gifford Co., Worcester, Mass., drilling machines, $1220.

Lincoln Engineering Co., St. Louis, lubricating fittings and guns, $1309.81.

Lindberg Engineering Co., Chicago, electric furnace, $3122.50.

Ludlow Valve Mfg. Co., Troy, N. Y., hydrants, $1196.48.

Machinery & Welder Corp., Moline, Ill., welding electrodes, $1449.25.

Marys Mfg. Co., St. Marys, O., tracks, $4357.76.

McKenna Metals Co., Latrobe, Pa., tools, $2430.

Mesta Machine Co., West Homestead, Pa., guns, $1,863,140.

Metal Products Corp., Miami, Fla., fuzes, $140,600.

Molded Insulation Co., Philadelphia, battery switches, $4448.

Montgomery Elevator Co., Moline, Ill., modernize freight elevator, $2066.

Munning & Munning Inc., Newark, N. J., laboratory equipment, $1055.50.

National Acme Co., Cleveland, equipment required to complete automatic screw machine, $3319.40.

National Cylinder Gas Co., Chicago, welding rods, $4250.56.

National Machinery Co., Tiffin, O., double stroke header, $19,263.

Nelson, Herman, Corp., Moline, Ill., starter shields, $1856.25.

Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., lathes, gage blocks, $13,089.35.

Noble, K. B., Co., Hartford, Conn., generator set, $6528.25.

Northwest Metal Products Co. Inc., Seattle, cartridge clips, $777,450.

Ocean City Mfg. Co., Philadelphia, primers, $26,460.

Ohio Steel Foundry, Lima, O., breech ring castings, $1689.

Otis Elevator Co., Buffalo, steel castings, $2198.54.

Peterson Bros. Tool Co., Milford, Mass., inspection gages, $2290.

Pittsburgh Water Heater Corp., Pittsburgh, metal percussion primer parts, $77,954.50.

Pope Trading Corp., New York, tin, $10,568.

Precision Fabricators Inc., Rochester, N. Y., packing supports for cans, $1468.97.

Pullman Standard Car Mfg. Co., Hammond, Ind., gun carriages, $1,548,000; Butler, Pa., Division, shells, $4,650,000.

Quality Tool & Die Co., Indianapolis, gages, $6211.

Rahaim Machine & Tool Co., Gardner, Mass., gages, $7716.50.

Remington Arms Co. Inc., Bridgeport, Conn., cartridges, $2,460,000.

Republic Steel Corp., Union Drawn Division, Cleveland, steel, $1547.45; Chicago Division, steel, $2598.95.

Revere Copper & Brass Inc., Chicago, brass, $2475.08.

Rivet Lathe & Grinder Inc., Brighton, Mass., lathe, $1531.

Ryerson & Haynes Inc., Jackson, Mich., cartridge cases, $716,000.

Ryerson, Joseph T., & Son Inc., Chicago, welding electrodes, steel, $10,443.47.

St. Louis Steel Products Co., St. Louis, arming wire assemblies, $20,836.83.

St. Pierre Chain Corp., Worcester, Mass., forgings, $38,744.06.

Shipley, W. E., Machinery Co., Philadelphia, case turning coulter machine, boring machine, $60,220.

Sieg Co., Davenport, Iowa, motor starters, $1080.

Signode Steel Strapping Co., Chicago, steel, $1140.

Smith and Wesson Inc., Springfield, Mass., revolvers, $1,170,444.71.

Springfield Municipal Water Works, Springfield, Mass., hersey detector meter, $1560.

Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $9764.46.

Standard Pressed Steel Co., Jenkintown, Pa., nuts for machine gun tripod, steel nuts, $4252.65.

Stoner Mfg. Co., Aurora, Ill., cartridge cases, $1,233,750.

Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $7287.40.

Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., spare parts for tanks, $65,660.50.

Titeflex Metal Hose Co., Newark, N. J.,

assembly tubes, $16,844.30.
Tobe Deutschmann Corp., Canton, Mass., filter generators, $1810.40.
Tri-Metal Products Corp., Conshohocken, Pa., castings, $2547.19.
Triumph Explosives Inc., Elkton, Md., photo-flash bombs, $1,375,810.38.
Union Gear & Machine Co., Boston, gears, $6213.
Union Twist Drill Co., Athol, Mass., cutting tools, reamers, $4068.65.
United Carr Fastener Corp., Cambridge, Mass., fasteners, $1396.81.
United Engineering & Foundry Co., Pittsburgh, guns, $1,220,199.40.
United Shoe Machinery Corp., Boston, extra parts for guns, $128,514.88.
United States Rubber Co., Detroit, tracks for half track vehicle, $10,929.84.
Uranium Lighting Corp., New York, fixtures, $2112.91.
U.S.L. Battery Corp., Metal Mfg. Division, Long Island City, N. Y., practice projectiles, $550,000.
Vascoloy-Ramet Corp., North Chicago, Ill., tools, $7070.
Veit & Young, Philadelphia, punches, $9160.
Vinco Corp., Detroit, gages, $3790.
Wallace Supplies Mfg. Co., Chicago, exhaust manifolds, $30,380.
Watson-Stillman Co., Roselle, N. J., forged steel valves, $1029.50.
Weinstein, S., Supply Co., New York, tools, $3961.07.
Weldon Tool Co., Cleveland, end milling cutters, $1032.
Western Cartridge Co., East Alton, Ill., cartridges, $10,015,200.
Western Electric Co. Inc., Kearny, N. J., recorder, $9000.
Westinghouse Electric & Mfg. Co., Springfield, Mass., fuze parts, $43,000.
Wilson Brown Co., New York, equipment for modernization of Barnes hydraulic honing machine, $4285.
Wright Aeronautical Corp., Paterson, N. J., flywheel hubs, tools, $6641.20.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $5237.60.

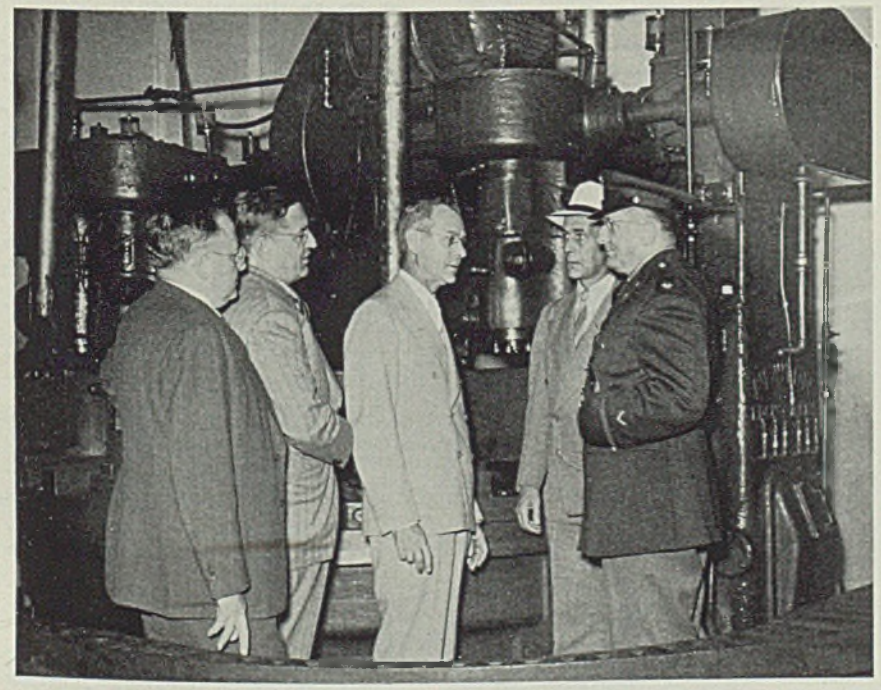
Signal Corps Awards

Acorn Insulated Wire Co. Inc., Brooklyn, N. Y., wire, $7800.
American Automatic Electric Sales Co., Chicago, telephone assemblies and equipment, battery telephones, $111,207.
American Fork & Hoe Co., Cleveland, axes, $1617.97
Bell & Howell Co., Chicago, motion picture projector and equipment, $6157.14.
Collins Radio Co., Cedar Rapids, Iowa, radio telegraph, telephone equipment, $32,427.
Cornelius, H. M., Co., New York, ground rod, $542.40.
Depue, Oscar B., Chicago, reduction printer, $3690.
Empire Cooler Service Inc., Chicago, interphone equipment, $1938.93.
Ferris Instrument Corp., Boonton, N. J., signal generators, $2860.50.
Follett Time Recording Co., Newark, N. J., stamps, $27,020.
General Dry Batteries Inc., Cleveland, batteries, $17,897.78.
General Electric Co., Schenectady, N. Y., crystal units, mountings, $8849.
General Electric Supply Corp., New York, radio receivers, $4370.
Graybar Electric Co. Inc., New York, telephone switchboards, wire, desk telephones, clamps, augers, heat coils, reels, $92,961.04.
Hackensack Cable Corp., Hackensack, N. J., wire, $1460.80.
Insuline Corp. of America, Long Island City, N. Y., alignment tool, $826.
Joslyn Co., New York, wire, $14,883.31.
Kellogg Switchboard & Supply Co., Chicago, telephone batteries, wire, $19,299.72.
Kennicott Wire & Cable Co., Phillipsdale, R. I., cable, $28,210.
Leich Sales Corp., Chicago, switches, $850.
McElroy, T. R., Boston, automatic keying unit and equipment, recorders and tubes, $38,292.
National Carbon Co., New York, batteries, $47,524.09.
O'Leary, Arthur J., & Son Co., Chicago, anchor rods, $1957.
Pan American Mfg. & Supply Corp., Miami, Fla., wind speed assembly, $636.30.
Power Equipment Co., Detroit, printer test sets, $560.56.
Radio Receptor Co., New York, radio transmitting equipment, $134,681.
Rauland Corp., Webster-Chicago Sound Division, Chicago, interphone equipment, $3936.07.
R.C.A. Mfg. Co. Inc., Camden, N. J., public address systems, $19,874.
Roebling's, J. A., Sons, New York, wire, switchboard cable, $16,158.31.
Simplex Wire & Cable Co., Cambridge, Mass., wire, $7072.50.
Simpson Electric Co., Chicago, test set, $6699.67.
Stromberg-Carlson Telephone Mfg. Co., Chicago, transmitter head, switchboard positions, $29,770.50.
Teletype Corp., Chicago, teletype sets and equipment, $72,285.66.
Templeton Kenly Co., Chicago, pole pulling jack, $6261.25.
United States Electric Mfg. Corp., New York, flashlights, $65,949.66.
United Transformer Corp., New York, coils, $226,342.08.
Westinghouse Electric Supply Co., Chicago, anchors and screws, $1010.28.
Weston Electrical Instrument Corp., New York, Weston analyzer, $1653.75.
White, David, Co., Milwaukee, tripods, $510.
Widin Metal Goods Co., Garwood, N. J., legs, $986.40.
Wilson, W. S., Co., New York, thimbles and washers, $653.65.

Air Corps Awards

Adams, S. G., Co., St. Louis, photographic darkroom equipment, $77,393.
Apple Mfg. Co., Dayton, O., target assemblies, $106,848.
Aro Equipment Corp., Bryan, O., oil servo units, $150,750.
Baker-Lockwood Mfg. Co. Inc., Kansas City, Mo., target assemblies, $80,574.90.
Bell Aircraft Corp., Buffalo, armor plate, wings, bullet-proof glass, $273,707.40.
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind., wheel assemblies, $29,725.59; Pioneer Instrument Division, Bendix, N. J., compasses and inverters, parts for oxygen regulators, $978,428.94; Eclipse Aviation Division, Bendix, N. J., maintenance parts, $105,247.80.
Biederman Motors Corp., Cincinnati, trucks, tractors, $377,597.44.
Boeing Aircraft Co., Seattle, tank assemblies, $498,830.
Crescent Tool Co., Jamestown, N. Y., pliers, $82,950.38.
General Cable Corp., Cincinnati, O., iron, steel, brass and copper wire, $82,583.87.
General Electric Co., Schenectady, N. Y., generator voltage regulators, and relay switches, $520,000.
General Motors Corp., Allison Division, Indianapolis, engine parts, aeronautical engines, $2,904,116.60.
Hussmann-Ligonier Co., St. Louis, electric refrigerators, $24,080.
Independent Engineering Co., O'Fallon, Ill., oxygen generating plant, $57,000.
Jaeger Watch Co. Inc., New York, tachometer assemblies, $63,839.93.
Jewett Refrigerator Co. Inc., Buffalo, electric refrigerators, $692.
Keller, William H., Inc., Grand Haven, Mich., pneumatic tools, $61,890.
Kidde, Walter, & Co. Inc., New York, oxygen cylinders, $115,102.
Koch Butcher's Supply Co., North Kansas City, Mo., electric refrigerators, $73,958.40.
Martin, Glenn L., Co., Baltimore, air-

Off Automobiles, On Defense



■ Earmarked for defense production on bomber parts and antiaircraft gun parts, this large rotary milling machine is one of a score or more of machines in the Plymouth plant in Detroit shortly to be taken off automotive production. Plant officials conferred with military experts last week on the program. Here are, left to right, A. H. Paterson, Plymouth production chief; H. L. Weckler, Chrysler vice president and general manager; D. S. Eddins, Plymouth president; Lieut. Col. R. Z. Crane, chief of ordnance production for the war department in the Detroit area, and Lieut. Col. H. W. Rehm, commanding officer, Chrysler tank arsenal

plane parts, $658,751.77.
Pease, C. F., Co., Chicago, photographic assembly lamps, $61,000.
Roth Office Equipment Co., Dayton, O., steel cabinets, $193,235.30.
Trailer Co. of America, Cincinnati, trailers, $287,548.80.
Wright Aeronautical Corp., Paterson, N. J., crankshaft assemblies, $159,480.

Quartermaster Corps Awards

American Safety Razor Corp., New York, safety razors, $29,375.
Aqua Systems Inc., New York, gasoline fueling system, Kellog airport, Michigan, $30,612.
Atkins, E. C., & Co., Indianapolis, butcher saws, $4091.88.
Auf der Heide Aragona Inc., West New York, N. Y., fire station, Ft. Dix, New Jersey, $9800.
Autocar Co., Ardmore, Pa., tractor-trucks, $5,056,283.
Blair, A. Farnell, Decatur, Ga., warehouses at Augusta arsenal, Georgia, $589,937.
Bowen, John, Co., Boston, theatres, service club, officers' recreation building and guest house, Ft. Devens, Massachusetts, $175,956.
Branford Construction Co., Hartford, Conn., ten temporary buildings, Ft. H. G. Wright, New York, $76,000.
Buford Bracy Co., Little Rock, Ark., additional facilities at reception center, Camp Joseph T. Robinson, Arkansas, $12,700.
Burkes Bros., New Orleans, 22 chapel buildings, Camp Shelby, Mississippi, $340,790.
Chell & Anderson Inc., Chicago, radio shelter building, Ft. Sheridan, Illinois, $8650.
Chicago Bridge & Iron Co., Chicago, elevated water tank, Ft. Sheridan, Illinois, $38,150.
Cumina Building & Construction Co., New Brunswick, N. J., garage building, Raritan arsenal, Metuchen, N. J., $67,645.
Devine, Maurice M., Inc., Boston, chapel, Ft. Andrews, Massachusetts, $21,766.
Equitable Equipment Co., New Orleans, sea-going tug, steel harbor tug, coastwise tug, $732,000.
Fargo Motor Corp., Detroit, ½-ton trucks, $11,236,975.
Fleisher Engineering & Construction Co., Buffalo, storage buildings, test buildings, loading platform, utilities and roads, Lexington signal corps depot, Kentucky, $445,731.
Flint-Jordan Construction Co. Inc., Jackson, Miss., additional facilities, reception center, Camp Shelby, Mississippi, $35,980.
Ford & Loryea, Portland, Oreg., gasoline storage, distribution and dispensing system, concrete paving, sanitary sewerage system, water supply system, electric service facilities and railroad spur track, Ft. Lewis, Washington, $148,943.
Gillette Safety Razor Co., Boston, safety razors, $38,472.50.
Gray, George W., Lubbock, Tex., motion picture theater, Camp Barkley, Texas, $10,668.
Great Eastern Construction Co., New York, four regimental chapels, Ft. Monmouth, New Jersey, $83,110.
Green, Mont J., Manhattan, Kans., five regimental chapels, Ft. Riley, Kansas, $91,475.
Hackett, Henry H., Rapid City, S. Dak., post ordnance magazine, Ft. Meade, South Dakota, $5472.
Harper, J. A., Crowville, La., standard ordnance repair shop, Camp Beauregard, Louisiana, $64,307.
Indian Motorcycle Co., Springfield, Mass., motorcycles, $2,059,805.
Ivey, Henry A., Decatur, Ga., 12 regimental chapels, Camp Forrest, Tennessee, $192,000.
J.A.J. Construction Co. Inc., Brooklyn, N. Y., five barracks, Ft. Dix, New Jersey, $55,519.
Kitchens, Rex D., Construction Co., Austin, Tex., six regimental chapels, Ft. Sam Houston, Texas, $88,055.
Mion Construction Co., Atlanta, Ga., 500-man addition to recruit reception center, Ft. McPherson, Ga., $196,714.
O'Driscoll & Grove Inc., New York, storehouse, Ft. Dix, New Jersey, $5400.
Owen, Ames Kimball Co., Grand Rapids, Mich., motor repair shops, grease and inspection racks, oil houses, wash racks, and administration buildings, Ft. Custer, Michigan, $374,400.
Rabalais, C. E., Bunkie, La., five standard ordnance warehouses, Camp Beauregard, Alexandria, La., $16,850.
Simonds, John H., Co., Portland, Me., regimental chapel, Ft. Preble, Maine, $21,760.
Southeastern Construction Co., Charlotte, N. C., theatre and service club, Camp Croft, South Carolina, $25,963.
Twaits, Ford J., Co. & Morrison-Knudsen Co. Inc., Los Angeles, temporary housing, Ft. Ord, California, nurses' and officers' quarters, barracks-medical detachment, standard wards, storehouse, at Camp Roberts, California, $1,406,435.
Vizzini, Philip, Baltimore, five barracks at Ft. George G. Meade, Maryland, $58,482.
Wheatley & Mobley, Augusta, Ga., small arms repair and optical shop building, guard house and 40-car garage including utilities and paving, Augusta arsenal, Augusta, Ga., $298,978.
White Motor Co., Cleveland, prime mover trucks, $1,957,800.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., 2½-ton trucks, van trucks, $1,530,197.16.
Young Construction Co., Salt Lake City, Utah, two barracks and one induction building at reception center, Ft. Douglas, Utah, $30,166.

Corps of Engineers Awards

American Instrument Co., Silver Spring, Md., signal lamps and devices, $12,378.20.
American Laundry Machinery Co., New York, laundry equipment, $19,461.
Aqua Systems Inc., New York, air corps gasoline fueling system, Jackson airport, Mississippi, $100,599.
Atlantic Bitulithic Co., Washington, runways and apron, New Myrtle beach municipal airport, South Carolina, $203,353.
Bauerle, H. O., Los Angeles, airport lighting system, Las Vegas airport, Nevada, $33,200; Los Angeles, airport lighting system, Santa Barbara municipal airport, California, $33,600.
Buffalo-Springfield Roller Co., Springfield, O., rollers, $28,472.30.
Camillus Cutlery Co., Camillus, N. Y., pocket knives, $46,200.
Chicago, Rock Island & Pacific Railway Co., Lecompte, La., steel rail, angle bars and tie plates, $187,113.36.
Clanchette, J. R., Pittsfield, Me., apron, taxiways and gasoline distribution system, Bangor airport, Maine, $495,076.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, Ft. Crook aircraft assembly plant, Omaha, Nebr., $242,314.
Clow, James B., & Sons, National Cast Iron Pipe Division, Kansas City, Mo., cast iron water pipe, Jefferson barracks, Missouri, $40,197.90.
Colorado Fuel & Iron Corp., Denver, pipe and fittings, Lowry field, Colorado, $5442.48.
Consolidated Steel Corp. of Texas, Orange, Tex., fabricated structural metal and hangar doors, Las Vegas airport, Nevada, $38,697.
Dahlgren & Brooks, Oklahoma City, Okla., airport, including paving, drainage and lighting, Oklahoma City municipal airport No. 2, Oklahoma, $145,146.62.
Diamond, Arnold M., Brooklyn, N. Y., steel towers and power line, Wax lake outlet, south of Bayou Teche, St. Mary Parish, Louisiana, $30,350.34.
Dow, Richard H., Los Angeles, temporary building, March field, California, $202,080.
Euclid Construction Co. Inc., New York, test structure, Edgewood arsenal, Maryland, $138,779.50.
Fisk Electric Co., Houston, Tex., basic lighting, Corpus Christi municipal airport, Nueces county, Texas, $14,980.
Flotation Systems Inc., New York, air corps gasoline fueling system, municipal airport, Tucson, Ariz., $132,060.
Foley, Howard P., Co. Inc., Philadelphia, electric distribution system, Middletown air depot, Pennsylvania, $134,700.
Gaw Construction Co., Philadelphia, equipment repair building, Middletown air depot, Middletown, Pa., $238,000.
General Motors Corp., Pontiac Division, Detroit, station wagon, $889.64; Chevrolet Division, Detroit, trucks, pick-up and canopy express trucks, $7181.94.
Goedhart, George, Pasadena, Calif., armament and instrument inspection and adjustment building, March field, California, $83,259.
Grinnell Co. of the Pacific, San Francisco, manhole frames and covers, $2153.25; Seattle, plumbing supplies, Ladd field, Alaska, $3115.80.
Hamilton, Arthur, Jr., West Palm Beach, Fla., basic lighting system, Pinellas county airport, St. Petersburg, Fla., $14,233.
Hillman, C. Kirk, Co., Seattle, churn drills, cast steel drilling cable and sand cable, Annette island landing field, Alaska, $21,743.70.
Imperial Electrical Supply Co., Brooklyn, N. Y., steel tape parkway cable, Lowry field, Colorado, $3042.60.
International Harvester Co., New Orleans, pick-up and canopy express trucks, $1714.16.
Kesl, Joseph, Rental Equipment Co., St. Louis, portable air compressors, Jefferson barracks, Missouri, $8640.
Kuhlman Electric Co., Bay City, Mich., transformers, Jefferson barracks, Missouri, $18,042.40.
Lake Erie Engineering Corp., Buffalo, hydraulic forming press, Ft. Crook aircraft assembly plant, Omaha, Nebr., $98,745.
Lawrence Construction Co., Sacramento, Calif., air corps repair hangar, McClellan field, Sacramento, Calif., $97,841.
Lord & Burnham Co., Irvington, N. Y., footbridges, $301,941.
McWane Cast Iron Pipe Co., Birmingham, Ala., cast iron fittings, Jefferson barracks, Missouri, $3012.50.
Moor, Lee, Contracting Co., El Paso, Tex., runways and taxiways, airport lighting, drainage port, and paving parking apron, Amarillo airport, Texas, $233,901.20.
Nebraska Power Co., Omaha, Nebr., power transmission lines and substation facilities, aircraft assembly plant, Ft. Crook, Nebraska, $71,120.
Northern Commercial Co., Seattle, tractors and bulldozers, Elmendorf field, Anchorage, Alaska, $29,063.44.
Northwest Engineering Co., Seattle, parts for diesel engine, Yakutat landing field, Alaska, $2871.95.
Pacific States Cast Iron Co., Provo, Utah, cast iron pipe, $6866.49.
Reed, L. P., Meridian, Tex., landing strips, incidental taxiways, and paving one runway, Waco municipal airport, Texas, $184,745.75.
Seerie, Peter, Denver, temporary school building and storehouse, Lowry field, Colorado, $36,415.
Van Range, John, Co., Cincinnati, photographic sinks, Elmendorf field, Alaska, $6500.
Wattson, R. A., Co., Los Angeles, pumping plant, March field, California, $12,503.
Webster & Hedgcock Tractor & Equipment Co., St. Louis, crawler type tractors with bulldozers, Jefferson barracks, Missouri, $7270.
Westinghouse Electric & Mfg. Co., St. Louis, oil circuit breakers, Jefferson barracks, Missouri, $7024.
Wold, Peter, Seattle, motorship FERN, Annette Island, Alaska, $40,000.
Wolff Construction Co., St. Louis, booster pump station, Scott field, Illinois, $20,700.
Ziebarth, Fritz, Long Beach, Calif., pumping plant, Phoenix military airport, Litchfield park, Arizona, $9940; sewage treatment plant, March field, California, $174,800.

Rapid Defense Plant Construction Characterizes Rearmament Program

■ SPEED has been the chief attribute of America's defense program. This country is attempting to do in two years what required six or seven in Germany. First call for speed was for erecting new plants and additions for large-scale production of ordnance. Structural steel fabricators therefore were among the first to get into motion.

Cartoons have shown men working at machines, hastily set-up, while builders were racing to get roofs over their heads—yet lagging behind. The cartoonists did not exaggerate much. On yesterday's bean field tanks are being built today. A railroad locomotive from a switching yard was tracked into an unfinished plant in dead of winter to keep machinists' hands, as well as newly-laid cement, from freezing.

This article is no attempt to award blue ribbons to the fastest fabricators or to list, one, two, three, the speediest jobs. Seldom is there a common denominator among jobs, unlike a horse race where competitors are of the same age, condition of training, with same running conditions of track and temperature.

Rapid fabrication depends a great deal on type of building, weather, nearness of fabricator to site of job, whether a building is single or multi-storied, whether specifications are complete at the start and not revised during progress, satisfactory labor conditions, sufficiency of riveters and welders, requiring not too much overtime.

Especially fortunate as to location was the airplane engine plant, Buick Motor Division, General Motors Corp., Melrose Park, Chicago, with Mississippi Valley Structural Steel Co., Decatur, Ill., as fabricator. Latter was located only about a mile from the job, with the Indiana Harbor Belt railroad as the connecting link. The railroad supplied a drop-center car on which was placed special rigging to support the trusses during shipment. This rigging, usually set-up individually for each truss as shipped, was in this instance permanent, the car being shuttled back and forth between fabricator and new plant. The job required 8800 tons of steel, bids taken Feb. 11 and awarded Feb. 14.

Improved Equipment Helps

Employment of speed in steel fabrication is not new. Many now at drawing boards and in the field served during World war days when it was necessary to get materials as well as men onto the European battlefields. In peace time also there is occasional demand for utmost speed, such as when a railroad bridge on a main line is wrecked or washed out.

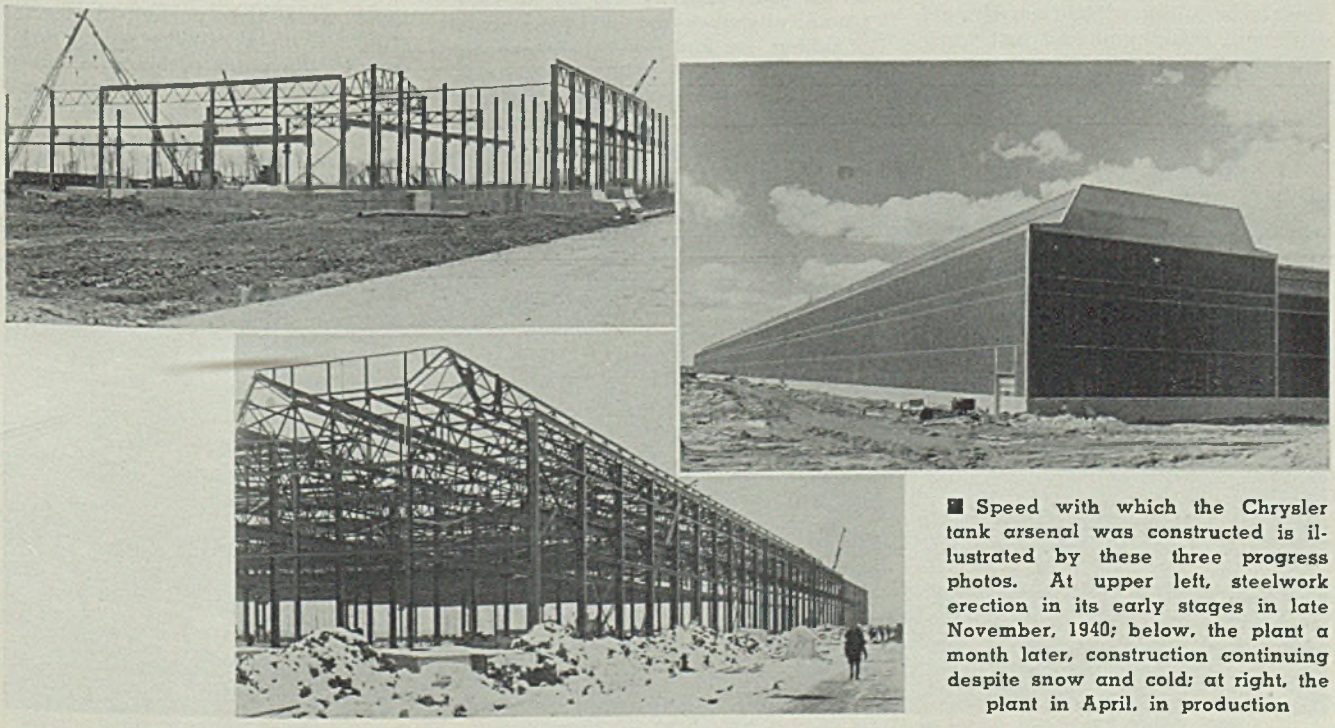
Many fabricators have been able to make speed records alongside volume. Thus Bethlehem Steel Co. has brought to completion within the past four months 60,000 tons of steel erection on key defense jobs.

Improved erecting and fabricating equipment since the first World war has aided in today's effort. Thus caterpillar cranes now are capable of lifts up to 50 tons. Some have booms up to 120 feet in length.

Plant design for the defense industries has undergone a change since the last war. Certain defense industries now are housed in conventional-type mill buildings. But the present demand for airplanes and tanks has called for many buildings with considerable variation. Some of the new blackout plants are of radical design. Bethlehem's construction has ranged from conventional construction to airplane assembly plants that incorporate 500-foot continuous spans. There has been far more variety in erection and fabricating problems than was characteristic during the first World war.

Fast erection invariably means letter-perfect scheduling and delivery of fabricated steel on the job as schedules demand. In 25 years much progress has been made in efficient detailing, both in fabricating and erecting, an element of which is today's improved equipment for copying blueprints and plans.

In the old days structural erection was seasonal, falling off sharply during the winter. Not so today. For example, the Chrysler tank plant is located on low ground and persistent rain converted large portions of the site into mud. Steel was unloaded with caterpillar



■ Speed with which the Chrysler tank arsenal was constructed is illustrated by these three progress photos. At upper left, steelwork erection in its early stages in late November, 1940; below, the plant a month later, construction continuing despite snow and cold; at right, the plant in April, in production

cranes which had to be supported on timber pads. Erection was started Nov. 18, the established contract starting date, and completed Jan. 10, or 12 days ahead of schedule.

The tank arsenal took 6514 tons of steel, and averaged 145 men on the job, varying from day to day with weather conditions. Building is 500 x 1382 feet, covering 16.4 acres. Two locomotive cranes were spotted on temporary tracks along the center of the structure, everything else having been handled by crawler cranes. All was riveted construction. The heaviest pieces were columns weighing about 6 tons.

According to a spokesman for Albert Kahn Associated Architects & Engineers, Detroit, who engineered the Chrysler job, contracts on the cost-plus basis are much preferred to lump-sum contracts because of the many unforeseen contingencies which arise.

It is conceded by fabricators that it is no special trick to make speed records when materials and equipment have right-of-way for the particular job. It is suggested that the pyramids of Egypt had the right of way in Pharoah's time. In fact many a fabricator is inclined to soft pedal a speedy job, claiming that other customers are likely to ask: "Why couldn't you use such speed on our job?" Speed records mean all-out priorities on men and materials.

In some instances jobs which started much later than scheduled, finished up sooner than date in the contract. Thus for an aeronautical manufacturing building for Otis Elevator Co., Harrison, N. J. field work started eight weeks late, but building was completed two weeks ahead of schedule. Factors: Efficient scheduling of fabricated steel, sufficient equipment and fast working erection crews. Erection was carried on at three points, with material unloaded from cars at two points, three tractor cranes erecting and one unloading.

Erection crews have worked overtime on most defense jobs, states Bethlehem, usually on the basis of a nine-hour day and six-day week. While this schedule has been pushed to a ten-hour day on some jobs, overtime schedules in excess of six nine-hour days have been avoided as much as possible, because of diminishing returns resulting from overfatigue.

Albert Kahn company mentions among difficulties labor shortage, mainly riveters; supply is scarce and truculent and sometimes inefficient.

Uses Proved Methods

Bethlehem notes that it has been found advisable to adhere to well tried erection methods for speed.

A Kahn official does not believe that erection work for emergencies is being done much faster than in 1918. He recalls no developments which has made any speed-up in steel erecting possible, although cranes, motors, other equipment and accessories have been improved.

A handicap against one speed job was the exceptionally low limit as to height of loaded cars which required special routing, drawn by a special Long Island railroad steam engine. This was a new plant for the Grumman Aircraft Corp., Bethpage, Long Island, fabricated by Lehigh Structural Steel Co., and requiring 2400 tons of steel. The Austin Co., Cleveland, awarded the contract Sept. 20, fabrication started Oct. 21, first shipment, Oct. 31; completed Jan. 20. Plant is 500 x 700 feet, one-story, with two-story office section. Structure consists of 140- and 80-foot trusses, with steel purlins and bracing. At intersection of the 140-foot bays, trusses are supported by a 140-foot jack truss weighing 80 tons.

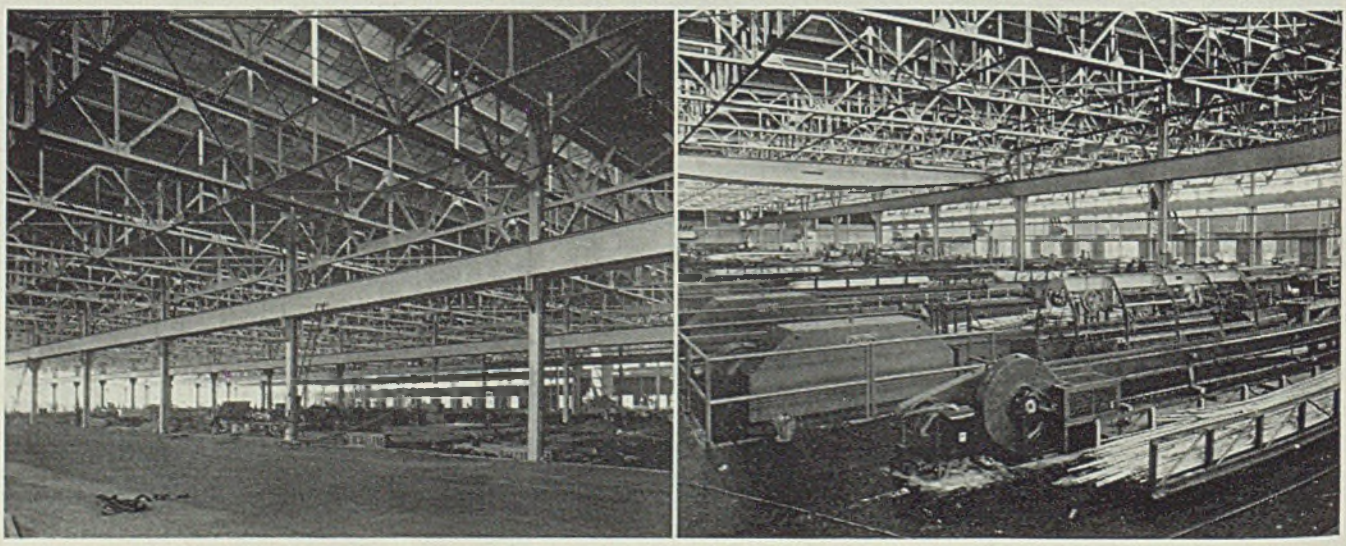
In the Buick plant, Melrose Park, Ill. cranes were put on tracks along top longitudinals for erecting steelwork between them. This was done because of deep foundations which had to be dug, making it difficult to work cranes on the ground.

An opposite situation was where speed was aided by necessity for little excavation and virtually no leveling in the plant for North American Aviation Co., near Dallas, Texas. Prefabricated cellular steel construction, supplied by H. H. Robertson Co., Pittsburgh, promoted speed.

Work on the Westinghouse Electric & Mfg. Co.'s naval gun plant at Canton, O. started March 6, two days late, was completed May 15, 12 days ahead of schedule. The job: Four duplicate buildings, each with crane runways and three aisles in width. Steel was erected from a completed first floor supported on basement columns on 20-foot centers. A safe operating area for the caterpillar crane was devised by construction of 25 x 25-foot operating mats of I-beams and concrete floor slabs.

In another job at no time after shipment were the truss span sections set down on their sides. While most were transported in special trucks from a railway siding adjacent to the point of erection, those that were unloaded on the job ahead of erection schedules were also

■ **Aluminum Co. of America's huge plant at Lafayette, Ind., has been expanded five-fold since the start of the war in September, 1939. At that time the plant had monthly capacity for 695,000 pounds of extruded shapes and 122,000 pounds of tubing. By the end of this year, capacity will be 4,256,000 pounds of shapes and 1,034,000 pounds of tubing, six and nine-fold increases, respectively. Photo at left shows steelwork being erected for one of the additions; at right, the plant in production soon afterward**



stored in upright position, which not only protected the bars but saved a certain amount of erection time. This was an assembly building for the Republic Aviation Corp., Farmingdale, N. Y. A feature was the erection in 100-foot sections of thirty-nine 500-foot continuous trusses, 12 feet deep. Special precautions had to be taken to prevent bending these unwieldy members.

Erection of a submarine runway for the Electric Boat Co., New London, Conn., involved handling heavy trusses ranging from 12 to 15 tons, erected to a height of 97 feet. Rather than employ a built-up traveler on which a light derrick could be mounted, which would have been a feasible method, tractor cranes with exceptionally long booms, supplemented with jibs, were used. A limited working area, as some of the steel had to be erected over water, necessitated the use of a 50-ton tractor crane with 125-foot boom and 20-foot jib. Three other tractor cranes with 100-foot booms and 20-foot jibs and one with an 80-foot boom and 20-foot jib also were employed. Use of these, rather than employing travelers that would have required the erection of a temporary structure to support them, accounted mainly for the fast time—started Jan. 27, completed April 19; 2834 tons of steel.

Aircraft Plants Speedily Built

Pace at which steel can be erected in terms of space to be enclosed is impressive in connection with new airplane plants. Erection for a group of buildings for the Douglas Aircraft Co., Long Beach, Calif., started Jan. 29 and was completed May 27, by which time enough steel had been erected to support structures covering 1,260,000 square feet. Two weeks later this had expanded to 1,356,000 square feet; total steel, 11,108 tons.

Other fast jobs, in brief, were:

Midvale Steel Co., Philadelphia, armor plate machine shop, 1900 tons, one-story. Erection started March 31, completed May 20, ahead of schedule, without labor overtime.

Hudson naval arsenal, Detroit, comprising 14 buildings, 11 steel, 6500 tons total. Largest, gun shop, 1340 tons, erection started April 21, finished May 12; next largest, assembly shop, 820 tons, May 6 to June 14. Bethlehem, fabricator. Area, over 1,000,000 square feet of floor space, over 135 acres. Maximum 150 workmen, no overtime.

General Electric Co., Schenectady, N. Y., 1900 tons. Contracts Dec. 20, steel shipments Feb. 12, work completed April 11. One story, with small 2-story office.

Studebaker Corp., Chicago, airplane engine parts, 2600 tons. Giffels & Vallet Inc., Detroit, engineers. Steel from Joseph T. Ryerson & Son Inc. Award Feb. 1, erection completed May 1.

Kingsbury ordnance plant, Laporte, Ind. Steel for 25 buildings, 1750 tons. Bates & Rogers Construction Co., Laporte, contractor. Bethlehem, fabricator. Awarded late January. Erection started in 8 weeks, completed 2½ buildings per week.

Westinghouse Electric & Mfg. Co. at Fairmount, W. Va., 200 x 884 feet. Erected in 76½ working hours.

Fourteen warehouses, quartermaster depot, Jeffersonville, Ind., 2300 tons. Gage Structural Steel Co., Chicago, fabricator. George H. Rommel Co., Louisville, Ky., contractor. Warehouse unit completed every two weeks, each unit 605 feet 8 inches x 79 feet 6 inches.

Ford Motor Co., Dearborn, Mich., 8700 tons. American Bridge Co., fabricator, 360 x 1007 feet. Erected in 53 calendar days.

Keynes Denies Britain Exports Lease-Lend Steel

■ CATEGORICAL denial that Great Britain is re-exporting steel and other goods obtained from the United States under the lease-lend bill was issued by John Maynard Keynes, economic advisor to the British Treasury, in an interview in Washington last week.

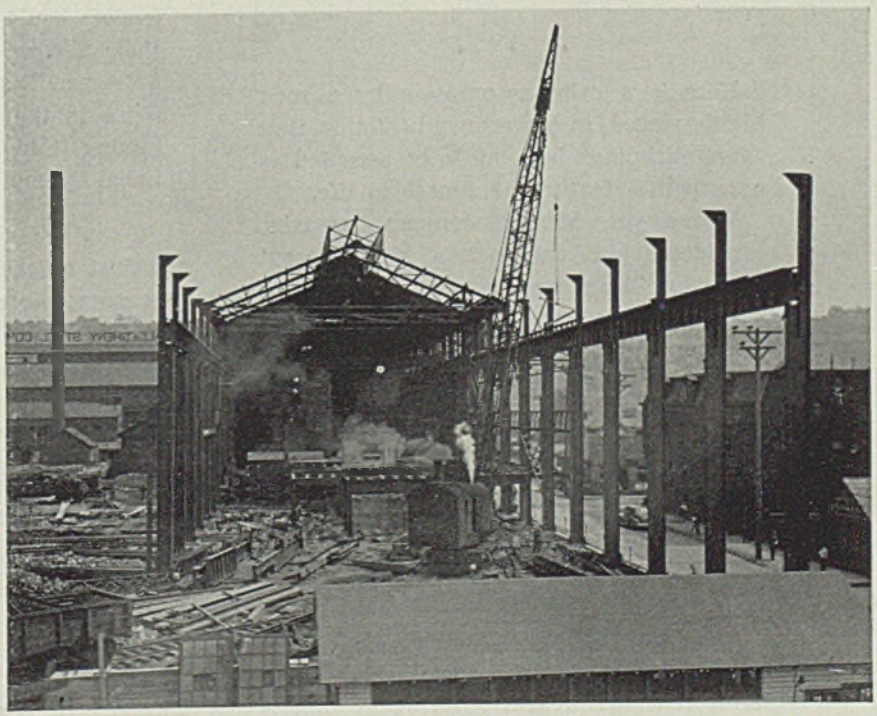
The denial followed widespread reports that goods shipped to England for prosecution of the war were being sold in South America in competition with United States goods.

Although England is committed to supplying 7500 tons of steel for a pipe line in Argentina on a contract now in force, the economist said, sharp restrictions have been applied to steel products in general and exports are forbidden except where they are needed overseas to complement goods essential for the war effort. Two substantial contracts, one for supplying equipment for the electrification of the Central Brazilian railway and another for the Rio Negro hydroelectric project in Brazil, have been abandoned.

Mr. Keynes explained that British export business has undergone four phases since the war began. First was "business as usual" and lasted until the capitulation of France. After France fell and her financial help was lost, Britain entered a second phase of intensified export activity to aid in financing the war effort. Emphasis on export trade began to fall off in the third phase which started when President Roosevelt expounded his lease-lend plan. The fourth phase was entered when the act was finally signed, and has resulted in curtailment of exports.

Recent restrictions could not be brought into immediate operation, Mr. Keynes explained, because there were many instances where orders were only partially completed and which required materials which could not be diverted to the war effort.

Future British export activity will be centered in textiles, the economist said, because they require little cargo space, are manufactured mainly with female labor and with machinery that is of little use in producing war materials.



■ **ALL-OUT PRODUCTION: One hundred days after Allegheny-Ludlum Steel Corp. broke ground for this plant addition at Brackenridge, Pa., it was pouring alloy steel from a new 35-ton Swindell-Dressler electric furnace, although the building itself had not been completed. A second furnace will be installed. Capacity for producing special steels is being increased 50,000 tons**

Expanding for What? Defense, Or More Planned Economy?

■ LAST week OPACS Administrator Leon Henderson told members of the New York Housewares Manufacturers Association that "efforts for expansion have been too small."

"By the time we get the additional capacity," he added, "the needs of the defense program will have expanded to the point where most of it will be needed for armaments."

He then expressed the opinion that the experience of the defense program will convince the American public that "demand for goods produces prosperity."

"After the war," he predicted, "the people will support continued heavy government expenditures for public works. Thus the foundation will be laid for a continuing demand for steel, aluminum, copper, tin, zinc and rubber that we have been too reluctant to expand in the last year."

♦ ♦ ♦

Here is a calm assumption by a man highly-placed in government affairs that "pump-priming" is going to be accepted as a perpetual feature of American life.

Worse yet, Mr. Henderson's remarks, considered in conjunction with recent statements by numerous other government spokesmen, indicate not only that pump priming and other artificial attributes of a planned economy are to be continued after the present emergency has ended, but also that many of the new controls exercised by the President under powers granted him for the duration of the emergency are expected to be made permanent.

♦ ♦ ♦

These expectations or assumptions should be of grave concern to every citizen. They imply that the present government administration believes that the public has given it a mandate to continue and to expand its visionary experiment in planned economy.

No such mandate has been given nor will it be given when the people understand what is involved in the ultimate destiny of the experiment.

♦ ♦ ♦

The entire history of "New Deal" philosophy of planning an "abundant life" is marked by red flags of caution. The original objective was to promote recovery. The original method, embodied in NRA, failed partly because it was overloaded with too drastic social and economic reforms.

The second method, namely spending-lending, failed largely for the same reason notwithstanding the fact the spend-lenders complained that they had not spent enough to make the plan effective.

Now that the need of defense has created artificially a demand which spend-lenders could not develop on the basis of their theory, they are trying to justify a tremendous expansion of plant for defense in the hope that the need of sustaining it in peacetime will call for additional "pump priming."

♦ ♦ ♦

Just as each forward step in a planned economy since 1933 has necessitated additional controls, so will every advance henceforth call for more regulation and regimentation.

This program cannot be sustained by a nation half regulated and half free. Regulation and regimentation must be increased and expanded until, as in Russia, Germany and Italy, the state controls everything.

It is time that we realize the horrible destiny of our present policy.

E. L. Shaner

EDITOR-IN-CHIEF

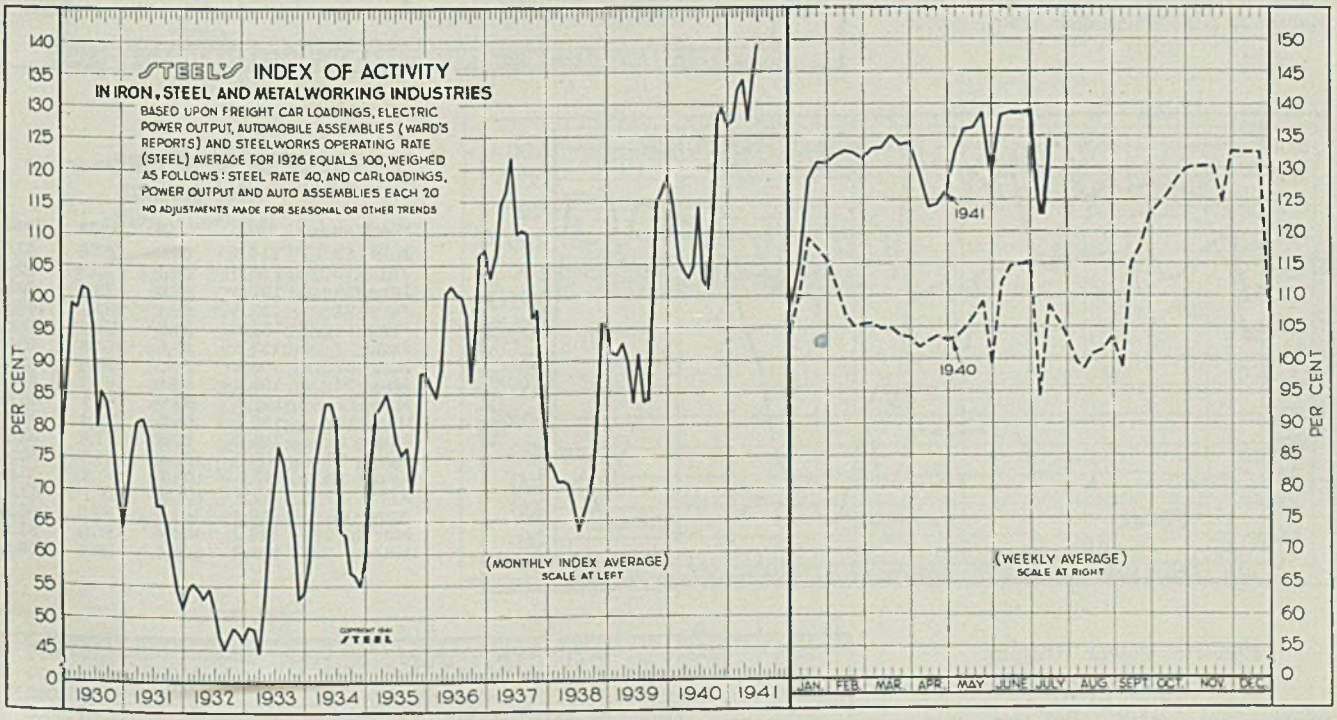
The *BUSINESS TREND*

Activity Index Back Near Pre-Holiday Peak Level

■ INDUSTRIAL activity has recovered sharply from the moderate interruption recorded during the July 4 week, but some industrial indicators have not yet reached the pre-holiday levels.

STEEL's index of activity in the iron, steel and metalworking industry gained 11.6 points to 134.5 during the week ended July 12. In the period immediately preceding the holiday week it was at the peak level of 138.8. The index advanced 14.3 points to 108.5 in the week following the July 4 holiday last year, while in the comparable periods of 1937 and 1929 it gained 11.9 and 9 points respectively.

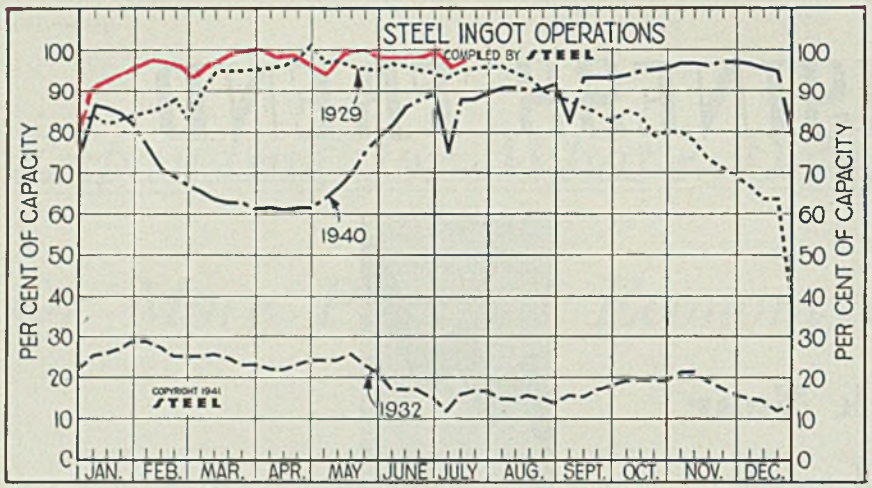
Each of the industry indicators composing the index advanced during the latest period. Steelmaking operations rose 1 point to 97½ per cent, but compared unfavorably with the 99.5 per cent recorded in the week ended June 28. Automobile production recovered some of the ground lost in the holiday week to 114,318 units, against 96,457 recorded during the preceding week and 127,926 in the week of June 28. The decline from the prevailing 130,000 units a week level recorded during June is significant of the gradual tapering in production as the model year draws to a close.



STEEL'S index of activity gained 11.6 *points to* 134.5 *in the week ended July* 12:

Week Ended	1941	1940
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
June 28	138.8	115.3
July 5	122.9	94.2
July 12	134.5	108.5

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	138.7	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

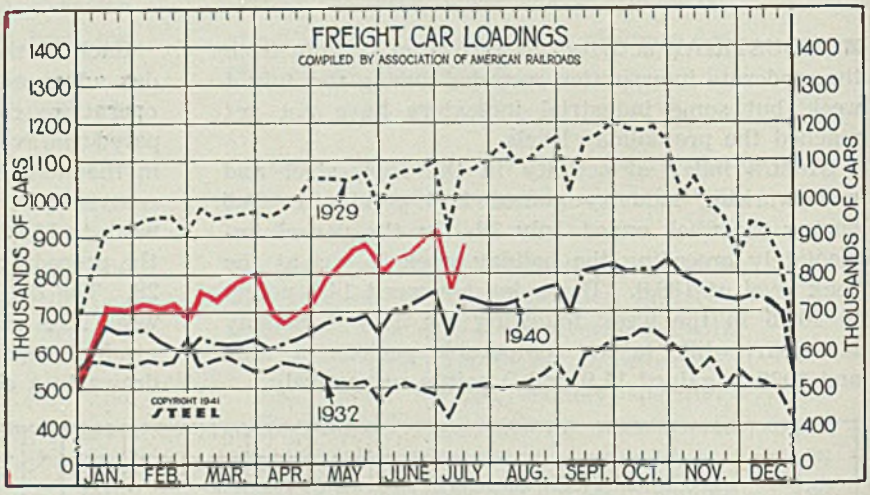
(Per Cent)

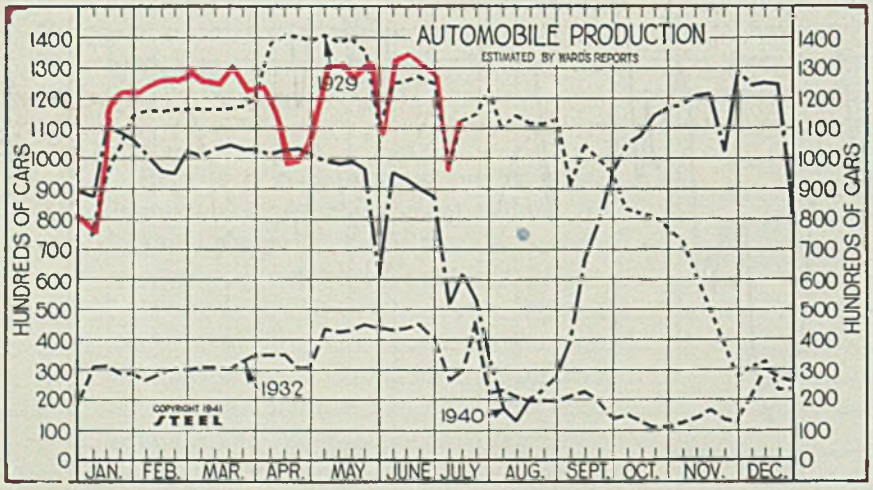
Week ended	1941	1940	1939	1938
July 12....	97.5	88.0	50.5	32.0
July 5....	96.5	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	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

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
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





Auto Production

(1000 Units)

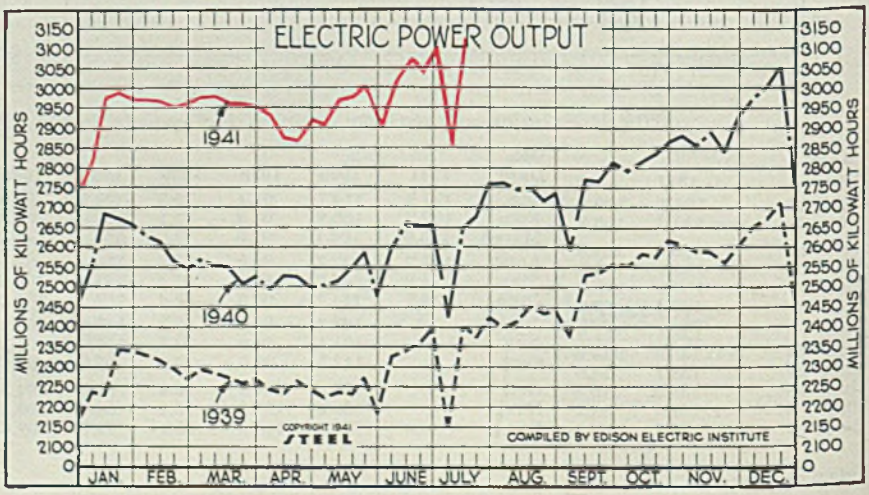
Week ended	1941	1940	1939	1938
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	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

Electric Power Output †

(Million KWH)

Week ended	1941	1940	1939	1938
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,396	2,074
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

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

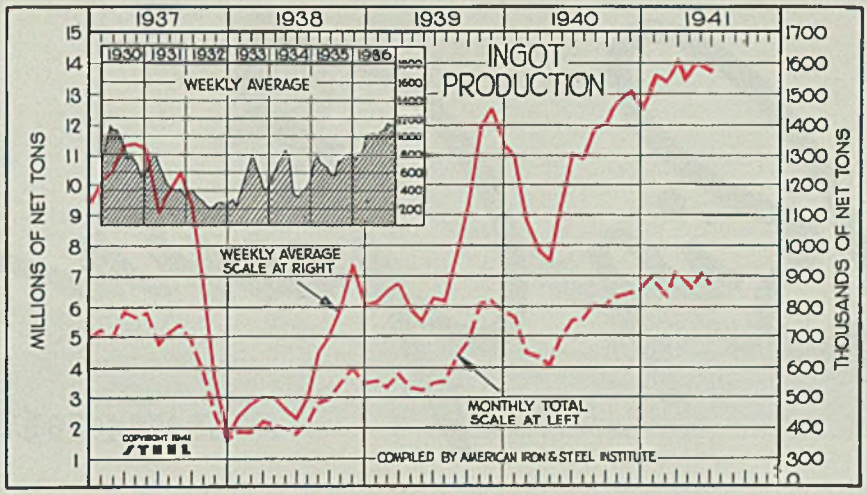


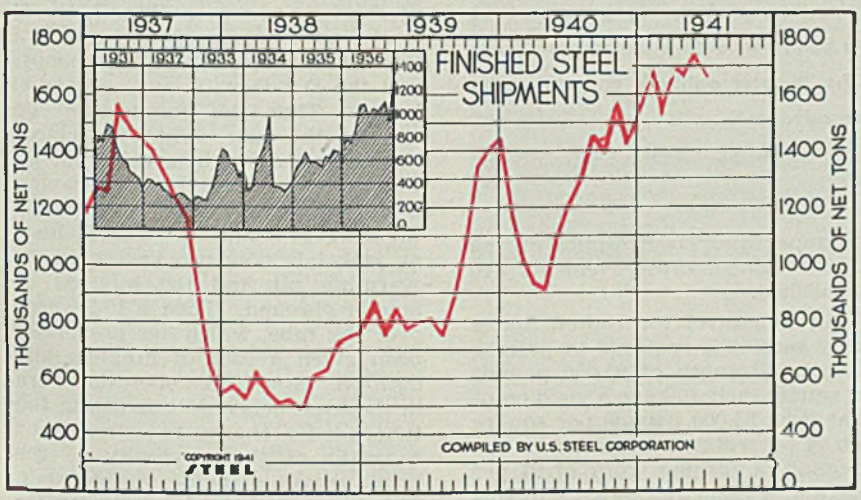
Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total 1941	1939	Weekly Average 1941	1940
Jan.	6,928.8	5,764.7	1,564.1	1,301.3
Feb.	6,237.9	4,525.8	1,559.5	1,093.2
Mar.	7,131.6	4,389.2	1,609.9	990.8
Apr.	6,757.7	4,100.5	1,575.2	955.8
May	7,101.8	4,967.8	1,603.1	1,121.4
June	6,800.7	5,657.4	1,585.3	1,318.8
July	.....	5,724.6	.....	1,295.2
Aug.	.....	6,186.4	.....	1,396.5
Sept.	.....	6,056.2	.....	1,415.0
Oct.	.....	6,644.5	.....	1,499.9
Nov.	.....	6,469.1	.....	1,507.9
Dec.	.....	6,495.4	.....	1,469.5
Total	.....	66,981.7	.....	1,281.2†

†Weekly average.





Finished Steel Shipments

U. S. Steel Corp.

(Unit 1000 Net Tons)

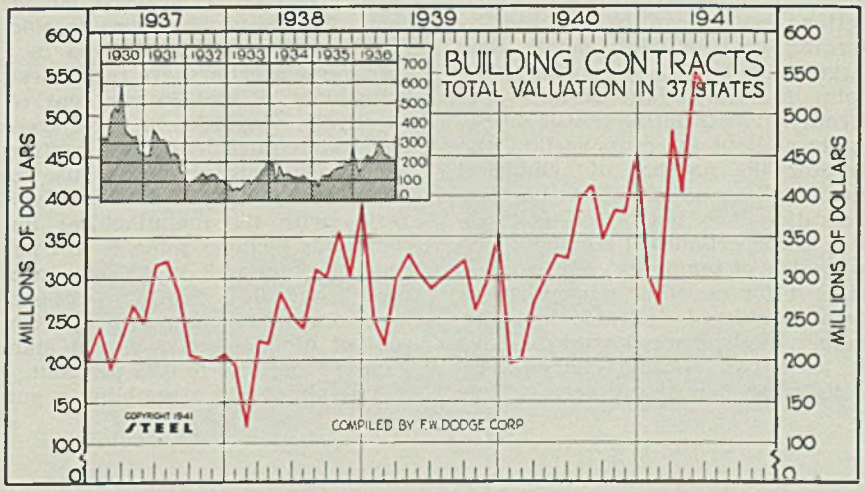
	1941	1940	1939	1938	1937
Jan....	1682.5	1145.6	870.9	570.3	1268.4
Feb....	1548.5	1009.3	747.4	522.4	1252.8
Mar...	1720.4	931.9	845.1	627.0	1563.1
Apr....	1687.7	907.9	771.8	550.5	1485.2
May ..	1745.3	1084.1	795.7	509.8	1443.5
June ..	1668.6	1209.7	807.6	525.0	1405.1
July...	.....	1296.9	745.4	484.6	1315.3
Aug. ..	.....	1455.6	885.6	615.5	1225.9
Sept..	.....	1392.8	1086.7	635.6	1161.1
Oct....	.....	1572.4	1345.9	730.3	876.0
Nov. ..	.....	1425.4	1406.2	749.3	648.7
Dec....	.....	1544.6	1444.0	765.9	539.5
Tot.†	.....	14976.1	11707.3	7315.5	14097.7

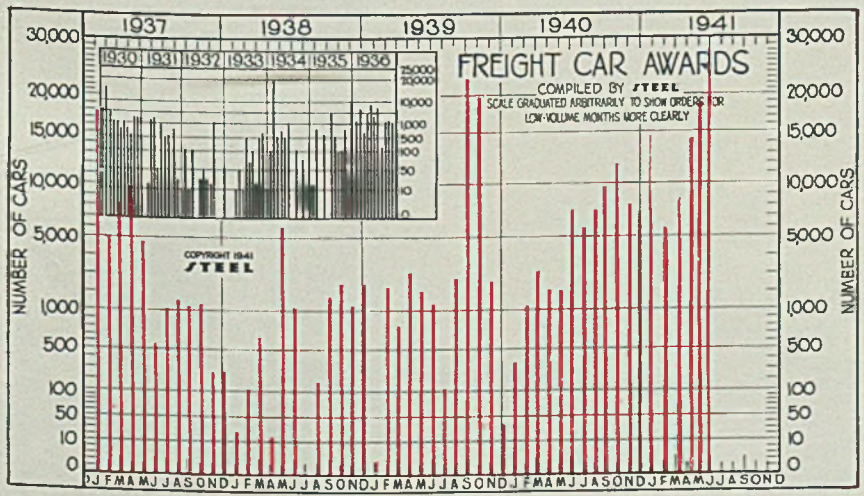
†After year-end adjustments.

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1941	1940	1939	1938	1937
Jan....	$305.2	$196.2	$251.7	$192.2	$242.7
Feb....	270.4	200.6	220.2	118.9	188.3
Mar...	479.9	272.2	300.7	226.6	231.2
April..	406.7	300.5	330.0	222.0	269.5
May...	548.7	328.9	308.5	283.2	243.7
June ..	539.1	324.7	288.3	251.0	317.7
July...	.....	398.7	299.9	239.8	321.6
Aug. ..	.....	414.9	312.3	313.1	281.2
Sept. ..	.....	347.7	323.2	300.9	207.1
Oct....	.....	383.1	261.8	357.7	202.1
Nov. ..	.....	380.3	299.8	301.7	198.4
Dec....	.....	456.2	354.1	389.4	209.5
Ave. ..	.....	$333.7	$295.9	$266.4	$242.8





Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March ...	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	18,630	2,010	2,051	6,014
June	32,749	7,475	1,324	1,178
6 mos. ...	94,775	16,173	9,532	8,121
July	.....	5,846	110	0
Aug.	.....	7,525	2,814	182
Sept.	.....	9,735	23,000	1,750
Oct.	.....	12,195	19,634	2,537
Nov	.....	8,234	2,650	1,232
Dec.	.....	7,181	35	2,581
Total ...	.....	66,889	57,775	16,303

Big Guns—Ancient and Modern

Here is data on characteristics of gun tube steel for modern big guns; method of assembly of built-up gun; insertion of liner; theory of auto frettage; significant changes in artillery since 1914-18; the new 37-millimeter antitank and automatic anti-aircraft guns and other advanced units

This Is Number 23 in a Series on Ordnance and Its Production, Prepared for STEEL *by Professor Macconochie.*

(Concluded from Last Week)

■ THE MANNER of constructing a built-up gun is shown clearly in Fig. 7. Note the liner, the tube, the jacket, the hoops and the locking rings. This complexity arises from several causes. There is the necessity, for example, of greater strength near the breech than near the muzzle because of the greater instantaneous pressures. Then from a practical manufacturing standpoint, better results can be secured by forging and drawing small than large, thick parts. From the standpoint of securing the greatest uniformity in distributing tensile stresses throughout the cross section, the greater the number of cylindrical elements the better. But this consideration does not oblige us to divide these cylindrical elements into a number of segments. For safety's sake, if for no other reason, it has been considered desirable in large-caliber, high-powered guns to have at least two reliable elements resisting the bursting forces. Thus the upper and lower limits of the number of cylindrical elements are established.

Gun tube steel for United States Army service is required to possess a tensile strength of 95,000 pounds per square inch, to have a yield point of at least 65,000 pounds per square inch, a percentage elongation in the direction of forging work of 21 per cent and a reduction of area in this same specimen of at least 40 per cent. The requirements as to elongation and reduction of area in a transverse specimen are rather less, being only 18 and 30 per cent respectively. In order to meet these physical requirements, the contractor is obviously obliged to use an alloy steel. The actual analysis varies with the manufacturer but commonly includes some ¾ to 1 per cent chromium, 2 to 2½ per cent nickel and 0.30 to 0.40 per cent molybdenum, together with a carbon content of 0.35 per cent and manganese from 0.40 to 0.75 per cent.

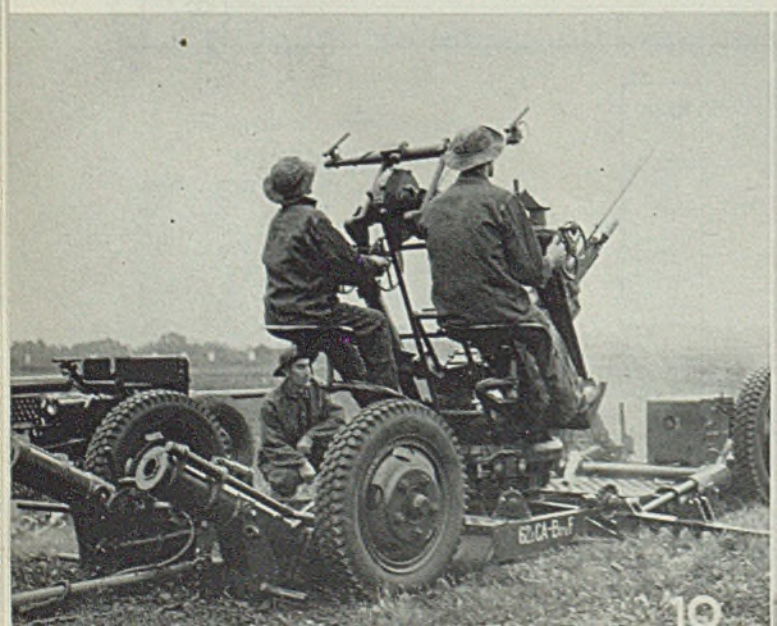
Assembling: In assembling a gun of the type shown in Fig. 7, the B hoops are shrunk on the tube A_1; then the C hoops on the B hoops; and the D hoops (if any) on the C hoops. Thus the gun is built up around the tube, which is placed breech end down in a cold gun pit with its end resting in a pot having a short mandrel extending up into the bore to steady it. The B, hoop or jacket is now removed from its warming pit and the internal diameter checked. Then it is lowered over the tube, which has previously been given a coat of graphite and light oil. Now if this operation were in the least delayed, thus giving the tube itself a chance to warm up as a result of the proximity of the hoop, uneven gripping might result. This is avoided by circulating water through the tube.

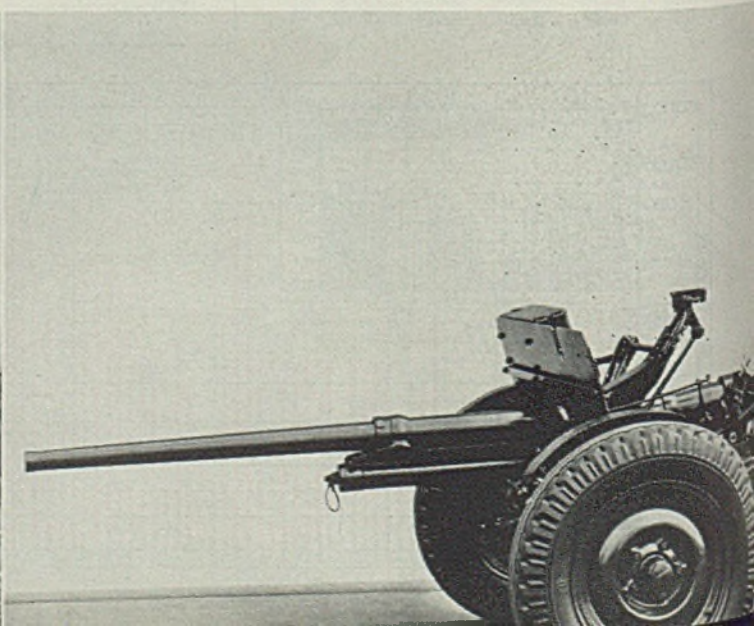
After the hoop is in position on the tube, it is cooled off by a water spray which plays on the breech end first and gradually ascends at a predetermined rate, lowering the

Fig. 8—The modernized 75-millimeter gun of the United States Army

Fig. 9—This is the new and highly mobile 37-millimeter antitank gun of the United States Army

Fig. 10—This is the Army's new 37-millimeter anti-aircraft gun. It automatically fires 120 rounds a minute



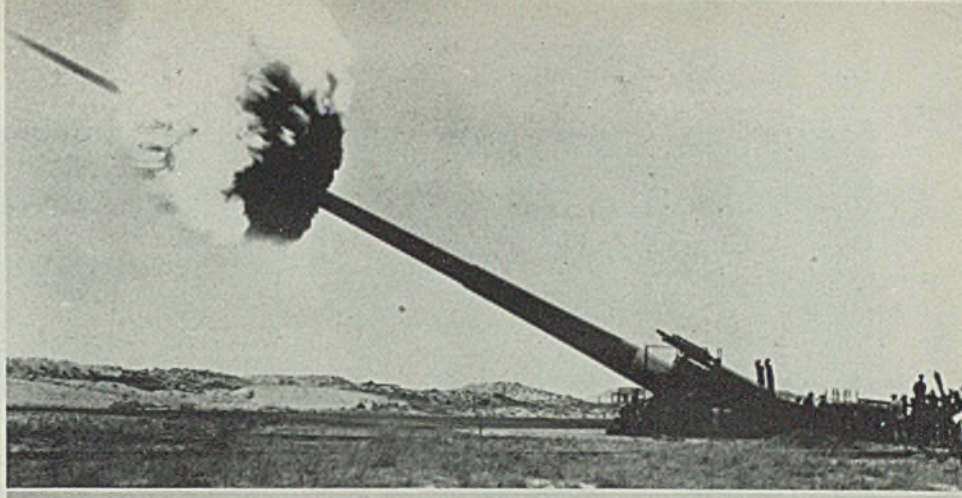


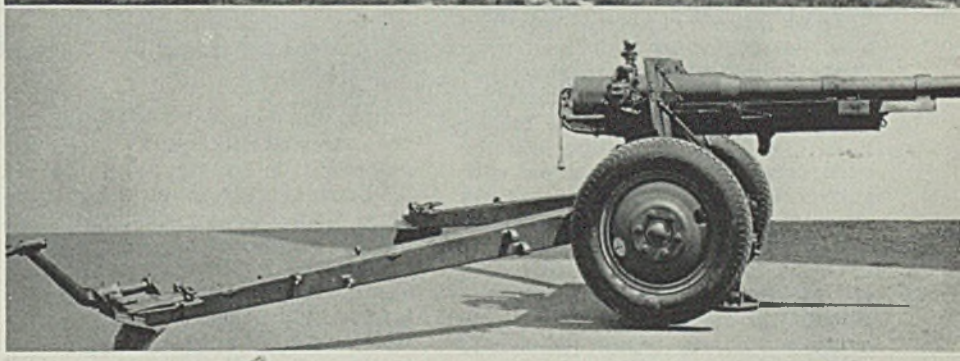
By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

temperature progressively toward the muzzle. The other hoops are assembled in similar fashion. The gun is then mounted in a lathe and threaded at the junctions of the outside hoops so the locking rings may be screwed on.

The method of inserting the liner is of interest. After assembly of the various parts of the gun proper in the shrinkage pit, the tube is bored to a small taper with the aid of a series of tapered boring bits of the familiar packed type. The gun is then placed in a pit furnace muzzle down, heated to some 600 or 800 degrees Fahr. by electric heating elements and the liner, filled with cold circulating water, is slowly lowered into position. After seating, a holding-down yoke is applied, and valves set in the central standpipe of the liner cooling system are opened progressively to permit the liner to warm up at the breech end first where, consequently, gripping begins and spreads downward toward the muzzle. The gun is now ready for machining and finishing.

Monoblock Guns: The auto-frettage process to which reference has already been made, see STEEL, last week, is now applied to monoblock guns (not built-up guns described above), with or without liners, of





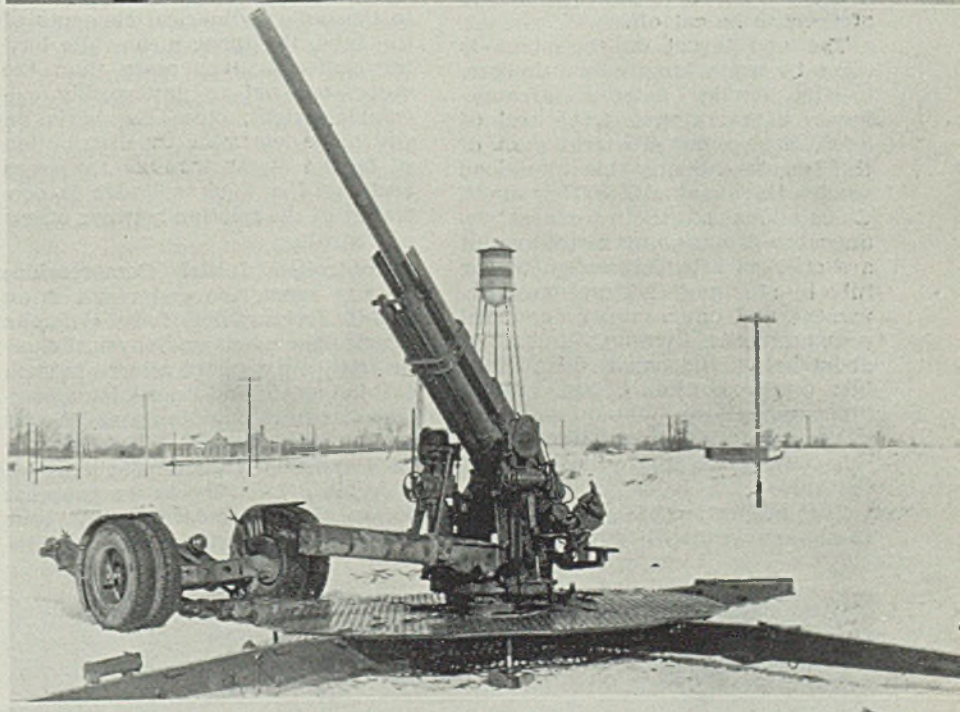
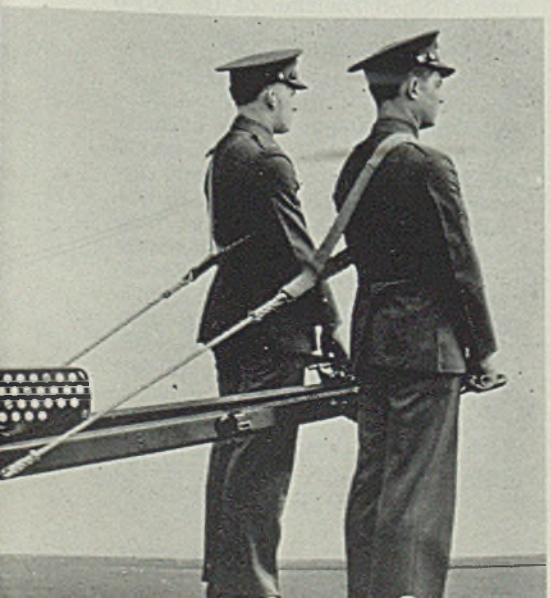
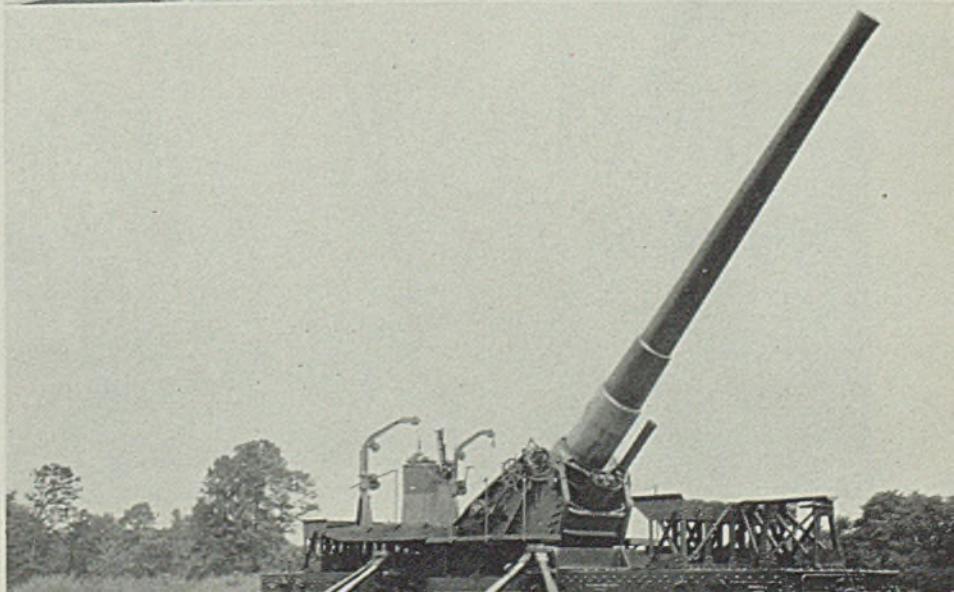


Fig. 11—The 90-millimeter anti-aircraft gun shown here fires a shell over 6 miles up. This is the new standard anti-aircraft gun for air defense. Note it is a mobile unit

Fig. 14—The 8-inch railroad gun has a range nearly 15 miles, weighs 86 tons

Fig. 15—Mammoth 16-inch coast defense guns like this throw a 2340-pound armor-piercer 28-miles—a match for the most heavily armored battleship





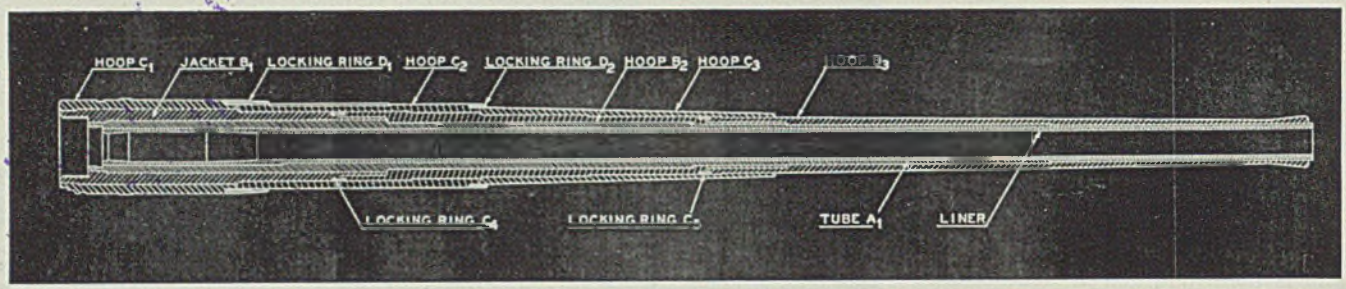


Fig. 7—Method of assembling main tube, jacket, liner five hoops and four locking rings to form gun. Hoops and locking rings are carefully shrunk on tube in succession to set up high initial "squeeze" on material underneath, thus helping to afford uniform stress throughout entire cross section when gun is fired. Illustration from paper by G. A. Spohn, General Machinery Corp., Detroit

from 75 to 240-millimeter caliber. In practice the gun is mounted within inner tapered sleeves of hardened steel, supported in their turn by a heavy outer tube into which they are carefully fitted by grinding. Hydraulic pressure is applied to the gun tube by fitting plugs into the ends, these plugs being packed with rubber, leather and copper washers (in that order) to prevent leakage of the water under extremely high pressure. Ballooning of the tube does not, of course, take place beyond the plugs, but the original length is great enough to permit these end sections to be cut off.

The end thrust on the plugs is taken by heavy longitudinal tie bars, capable, under existing arrangements of carrying a total load of 3,000,000 pounds. To treat guns of the largest calibers, this total load would be about 8,000,000 pounds. Calculations of the pressures required to produce any desired result are checked after expansion of the tube by star gage internal measurements and micrometer external measurements, within limits of about half a thousandth of an inch in a total expansion of perhaps 190 thousandths—the amount attained in the case of the 75-millimeter gun tube. This amounts to 6 per cent of the bore.

The properties of gun steel, as these are revealed in the tensile testing machine by the plotting of the stress-strain curve, are employed to determine (with the aid of Lame's theorem of thick cylinders) that pressure which will just induce permanent set in the innermost cylindrical element of the tube. Thereafter the pressure in the bore is increased step by step until permanent set has spread progressively to the outer cylindrical elements of the tube, the inner meanwhile having suffered much more than the outer, but not to any readily calculable extent, since the basis on which we determine the distribution of tensile stress through the cross section of a thick cylinder is constancy of the relation between stress and strain.

Controlled Initial Compression: In any event, the end result is an infinite series of cylindrical elements whose dimensions and physical characteristics have been altered in such fashion as to induce initial compressive stresses of declining magnitude toward the neutral surface of the tube and thereafter tensile stress of increasing intensity as we progress toward the outermost layer. We thus have a gun constructed by this method which, as in the case of the built-up type, is in a situation to distribute the stresses resulting from discharge of the piece in a much more uniform manner than if no permanent expansion had taken place. Furthermore, the result in this case is superior to that secured by building up from tube and hoops since the best we can hope for in this latter plan is a step-by-step approach to the ideal solution of the problem.

It should not be inferred from this that where monoblock construction might be undesirable from a manufacturing standpoint, the process of auto-frettage cannot be successfully applied to the built-up gun. As a matter of fact, this is how 8-inch naval guns are now constructed. One great advantage of the auto-fretting process is that the barrel of the gun is subjected, in the course of manufacture, to internal loads far in excess of any it will be called upon to bear in practice. Thus failure in action, with its grave consequences, is well-nigh impossible.

The Paris Gun: Among the many and varied types of modern guns, perhaps none has made such a vivid impression on the imagination of the general public as the German guns which fired on Paris in the latter stages of the war of 1914-18. Fragments of the shell fired from these guns were sent over to the Experimental Shell Division of the Royal Ordnance Factories, Woolwich Arsenal, in 1918 so a copy might be made and the design investigated. From these and other evidences, the following particulars were adduced, but no direct evidence appears to be forthcoming since every care seems to have been taken to prevent the precise details of construction from becoming generally known. Those who wish to pursue this subject may refer to "The Paris Gun" by H. Miller, originally published by Harrap and made available in this country by a publisher

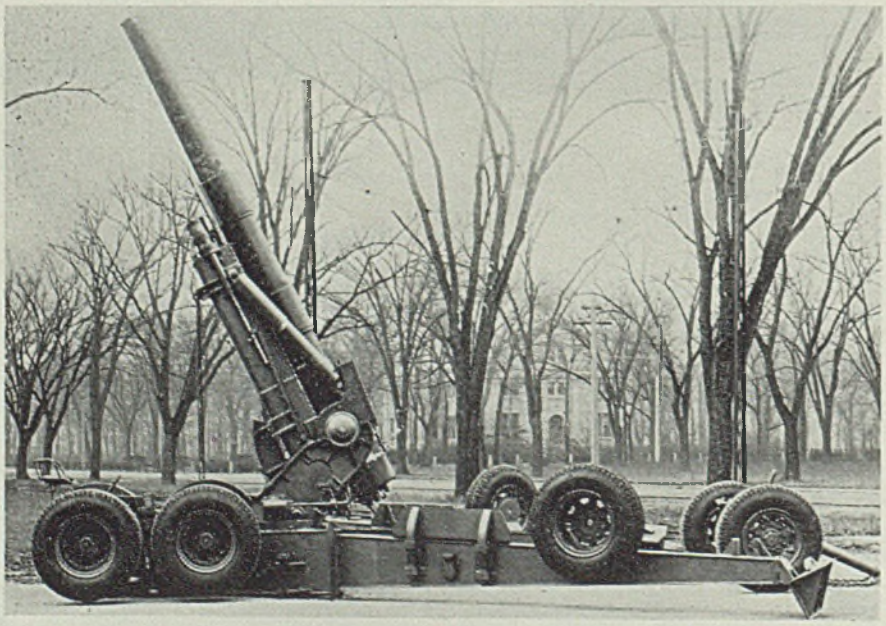


Fig. 13—The 8-inch howitzer can throw a 200-pound shell a distance of 10.5 miles

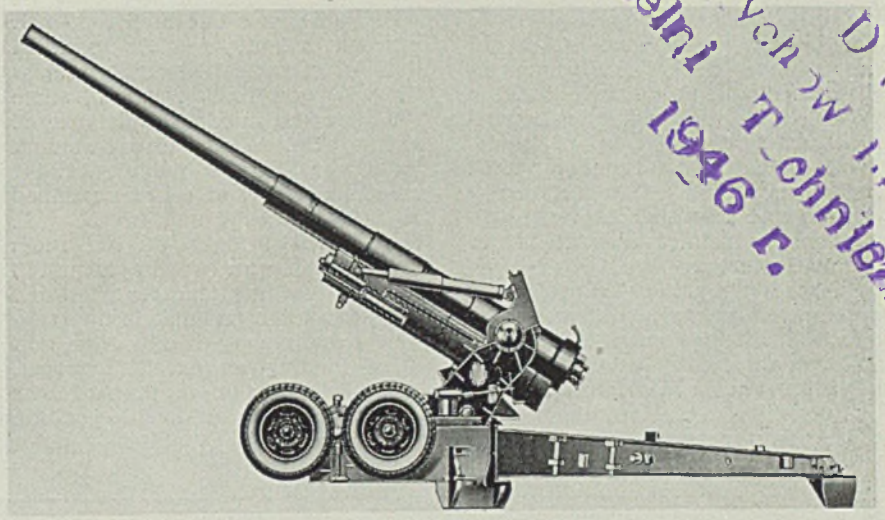


Fig. 12—The longest range of any field artillery weapon is had by this 155-millimeter gun that fires a shell 26,000 yards, roughly some 14 miles

now out of business. Hence consult your reference librarian.

THE PARIS GUN

Range	76 miles
Maximum ordinate of trajectory	24 miles (estimated variously)
Time of flight	177 seconds
Muzzle velocity	5100 feet per second
Angle of elevation	50 degrees
Velocity at vertex	2287 feet per second
Ballistic coefficient	10
Angle of fall	54 deg. 40 minutes
Weight of projectile	330 pounds
Caliber of gun in inches	8.3
Weight of propellant required	400 pounds
Length of gun (variously estimated)	150 calibers (100 feet)
Maximum pressure	47,000 pounds per square inch
Volume of powder chamber	22,000 cubic inches
Volume of bore	70,700 cubic inches

From these figures, certain interesting facts emerge. The high ballistic coefficient was secured by excellent streamlined design of the shell, which consisted of a relatively short body, holding a small amount of explosive and a long cap. The shell, as I recall its principal features, was perfectly balanced and did not depend on the copper band to provide the rotational acceleration, grooves milled in a ring integral with the body and ahead of the band, being provided for the purpose. Considerable trouble was experienced with this gun in service as a result of severe erosion of the barrel just beyond the limits of the powder chamber by the extremely high pressure gases employed. This involved centering the shell further and further up the barrel after each round, corresponding adjustments being made in the weight of the powder charge in order to maintain muzzle velocities. Guns of this type have little military value; the accuracy of shooting must necessarily be low; and there has been little or no disposition on the part of other countries to endeavor to copy them.

Many Changes: The significant changes which have come over the scene since 1914-18, at least so far as artillery is concerned, include much greater mobility; the development of antitank and anti-aircraft weapons; and the passing of the famous 75's. After the battle of France, where it became apparent that they were outclassed by the German 105 millimeter, we were obliged to adopt the 105 as our principal light artillery piece. Although the 105 is more than a ton in excess of the weight of the 75, it can be moved just about as easily. Further, it can be employed as both gun and howitzer, firing its 33-pound shell in a relatively flat trajectory or lobbing it over obstructions at shorter ranges than its maximum of seven miles. This gun can be set up in less than a minute; has a traverse of 45 degrees and a maximum elevation of 65 degrees; and can fire four shells a minute. It is primarily intended to offer infantry rather close support by shelling enemy troops, machine gun nests and minor fortifications, and through the disruption of enemy communications. The 105-millimeter guns cost $25 000 apiece.

The modernized 75-millimeter gun with its new light carriage, pneumatic tires, increased range and elevation and wider traverse is shown in Fig. 8. Before our change in policy concerning the 75, we had modernized 141 of these guns at a cost of $8000 each. Their principal application in all probability will be for tank attack unless we are called upon to fight within the near future, in which event we should still be largely dependent on this famous weapon.

Speaking of tank attack, the gun in which our new armies probably take most delight is the new 37-millimeter antitank gun shown in Fig. 9. Tired like an automobile, it can attain a speed of 50 miles per hour on the highway and is so light (850 pounds) that it can be maneuvered on reasonably flat country by hand as shown in the illustration, Fig. 9. This excellent little weapon fires a 2-pound shell capable of piercing 1½ inches of armor plate at 1000 yards—the shell at present favored being a solid type on the theory that it will do its job inside the enemy tank without any explosion, although an explosive shell also is available.

Fast Firing: The counterpart of the 37-millimeter antitank gun is the 37-millimeter anti-aircraft gun shown in Fig. 10. For anti-aircraft work several different types of guns are necessary depending on whether the enemy planes are flying at considerable elevation, in which case 90 or 105-millimeter high-explosive shell fitted with mechanical time fuzes are called for; or whether the enemy planes are dive-bombing or "hedge-hopping." As a defense against dive-bombing the 37-millimeter quick-firing (120 rounds a minute) gun projecting a 1½-pound shell fitted with the type of sensitive fuze described in a recent article in STEEL is unequalled. These fuzes, it may be recalled, function on contact with the airplane wing and act instantaneously. The maximum effective range of this weapon is 3000 yards. Like other modern artillery pieces it is highly mobile, can be hauled around by a truck and set up ready for action (including installation of the director and fire-control apparatus) in about five minutes. This particular item weighs 2½ tons as against the less than half-ton antitank weapon and costs the taxpayer $20,000. When firing at the rate of 120 rounds a minute, the two-gun battery disposes of 240 pounds costing $1320. Yes, that's $1320 a minute.

The new 90-millimeter anti-aircraft gun (shown in Fig. 11), firing a 21-pound high-explosive shell 33,000 feet up, spreads a burst that is a serious menace to any plane within 50 yards. It is the standard United States anti-aircraft gun at the present moment and supersedes the 3-inch gun on account of its greater ability to keep a given space in the atmosphere filled with flying fragments of high-explosive shell. In service it would not be moved around (although it is, of course, mobile) but would be situated in strategic locations in the neighborhoods of harbors, industrial plants, cities and the like which might invite the attention of enemy bombers.

The 155-millimeter gun shown in Fig. 12 fires a 95-pound shell a distance of 26,000 yards—the longest range of any field artillery weapon. This gun weighs over 15 tons and

requires bridges of perhaps twice this capacity when the weight of the truck is added. It belongs in the category of the "heavies" and is regarded by the Ordnance Department as a critical item of equipment. In action its function would be to concentrate on distant supply centers and munition dumps, to attack enemy fortifications and silence enemy batteries.

Classed with the 155-millimeter among the heavy artillery is the 8-inch howitzer shown in Fig. 13. This weapon fires a shell weighing 200 pounds a maximum distance of 10.5 miles. It also weighs close to fifteen tons and is designed to be towed around as a unit.

Fig. 14 shows our modern 8-inch railroad mount—another "critical item of equipment." This weapon throws a projectile weighing some 260 pounds a maximum distance of 27,000 yards. While railroad mounts have considerable mobility, their movements are, of course, confined to solid roadbeds and to the well constructed bridges of the main lines. This gun weighs about 86 tons. Thus their transfer from one point to another is liable to interruption from enemy bombs—the gun itself making an excellent target. Its chief function in time of war would be to take up its position rapidly at some threatened point along the coast.

Finally we come to the mammoth 16-inch coast defense guns shown in Fig. 15. This weapon throws an armor-piercing shell weighing 2340 pounds a distance of 50,000 yards—or more than 28 miles—one every minute if necessary. This weapon is not listed as a critical item, the War Department apparently being well satisfied as to the ability of the Navy to defend these shores. The 16-inch gun is probably the best example of modern high powered coast defense artillery. It is close to 70 feet long, requires a powder charge of 850 pounds and is capable of attacking and destroying the most heavily armored battleship.

New Film Helps Make Templets Direct from Drawings

■ The new photo-loft-templet process developed by Glenn L. Martin Co. and Lockheed Aircraft Corp. not only shortens the time between engineering and test flights in the aircraft industry from two to four months, but aircraft production cost is cut approximately $20,000 per model. See STEEL, July 1, 1940, p. 44, for description of this process.

A most important portion of this development is the matte transfer film developed by Eastman Kodak Co., Rochester, N. Y., as it permits engineering drawings to be printed either by contact or by projection on photosensitized metal sheets which then form templets or patterns for further processing.

This shortcuts the costly and time-consuming step of laying out the contours by hand from the blueprints and also the necessity of duplicating inspection.

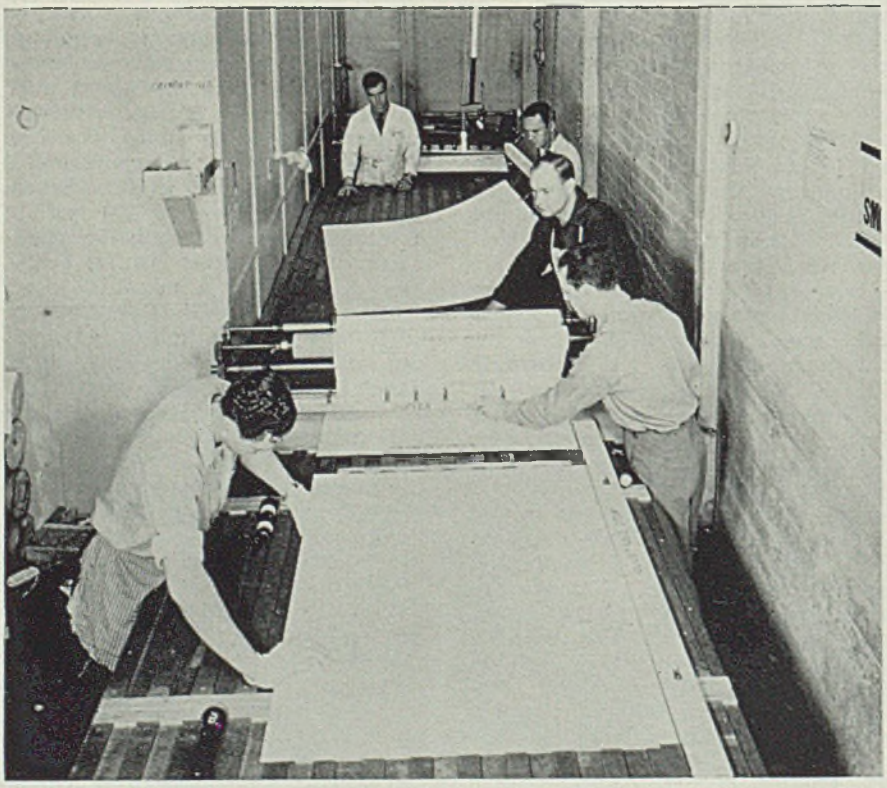
In the contact method of making prints on photosensitized metal, the engineering drawings are made on metal plates which have been given a coating of material which will fluoresce in the presence of X-rays. Then if positive prints on the metal are desired, a photosensitive glass plate is placed in contact with the treated surface of the plate bearing the mechanical drawing and exposure is made by means of X-rays through the back of the metal plate. A processed glass negative then is printed onto a sheet of photosensitized metal in the usual manner.

Also as described in STEEL, April 28, 1941, p. 87, Lockheed Aircraft Corp. makes satisfactory use of enlargements of mechanical drawings on photosensitized metal plates. In this process the mechanical drawings are made directly upon lacquered metal sheets. These drawings then are photographed on glass plates in a special camera designed for this purpose, and the glass negatives then enlarged onto the photosensitized metal sheets in sizes as large as 4 x 12 feet. It is reported that templets so made are accurate within 0.001-inch per foot.

A most simple and effective method of producing photosensitized metal sheets consists of laminating matte transfer film to lacquered metal sheet. The film itself consists of a sensitive emulsion coated on a thin film support, the film then being backed by a paper base. When used, the sensitized strip is transferred or stripped from the supporting paper base to the lacquered metal plate.

The accompanying illustration shows setup for doing this on a production basis. Here the supply roll of paper backed film is unreeled down to rolls at table-top height. These rolls apply the sensitized film and the paper backing to the lacquered metal sheet, which is passed underneath the applying roll.

At the same time, the backing paper is stripped off the film and rewound on another roll alongside the supply roll to leave the sensitive emulsion and thin film on the lacquered metal sheet, thus in effect sensitizing the metal sheet.



Here is production setup for placing sensitive emulsion on metal sheets to sensitize them for use in printing directly on the metal. The film consists of an emulsion applied to a thin film support on a paper backing which is stripped off as the film is applied to the metal surface. Photo courtesy Lockheed Aircraft Corp.

EUGENE (JACK) PHILLIPS, 1117 Cleckler South, Fort Worth, Texas, winner of first prize of $5,000 in the Revere Award for the idea doing most to help speed America's industrial defense program. Tall and lanky, Phillips is 33 years old and employed as senior radio electrician with the C. A. A. central depot at Fort Worth. When a close friend, Captain Jerry Marshall, crashed in Arkansas in landing an airplane, Phillips immediately set to work on his prize winning idea—an improved method of blind landing. He studied nights, gave up car, vacations and other pleasures for necessary equipment. His wife predicts most of the prize money will be spent for new equipment. He has three children, Patricia, 7; Kenneth, 4; James, 8 months.

The men and management of Revere Copper and Brass Incorporated are proud that the first Award of $5,000 goes to a man like Phillips. We also wish to thank the thousands of other American workmen for their splendid loyalty and cooperation in this effort to speed up industrial defense. Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

Here Mr. Wills presents a study of the factors that must receive proper consideration if your ultra-finish grinding is to be successful. As he points out, there are many things that influence the operation. For details of what constitutes an ultra finish and how it is produced, *see first section of this series, STEEL, June 30, 1941, p. 52*

Factors That Influence Grinding Rolls For Ultra-Finish Work

By H. J. WILLS
Engineer
The Carborundum Co.
Niagara Falls, N. Y.

■ ULTRA FINISH can be secured on hardened steel rolls or chilled iron rolls and is essential on foil and jewelers' rolls and on Steckel mill rolls whether made of high speed tool steel or tungsten carbide. Due to the exceptional hardness of tungsten carbide, rolls of this material appear to offer great possibilities in transferring an ultra finish to the work.

It is never necessary to use the burnishing action of a dulled wheel to get a mirror finish. It is, in fact, most undesirable, for burnishing merely covers over surface faults temporarily.

Since there must be no pattern on the roll which can be transferred to the product, grit marks on the roll must be very shallow. Therefore the surface must be built up gradually, using a series of grinding wheels of decreasing grain penetration and grain size.

The finest practicable grain size down to 600 grit should be used for ultra finishes. Not only do they leave finer surfaces but they also present a larger number of cutting points to the work and so increase speed of cut, create less heat and reduce subsequent operations.

While wheels with larger grains will sometimes remove stock more rapidly, the longer and larger number of subsequent operations needed to remove the coarse grain marks may increase total grinding time instead of reducing it.

Every wheel should be used both as a roughing wheel and as a finishing wheel for best results and economy; that is, it should be carefully "sparked out" even when it is to be followed by one or more finer grit wheels.

Surface perfection is largely dependent upon the amount of material removed per wheel. The less the material removed per wheel, the better the surface. There are no short-cuts. An ultra finish takes time.

Coolants must be clean and free from grit or particles will roll between the work and wheel to cause scratches and other blemishes. In the cutting cycle, use plain filtered water, with a slight amount of soluble oil to prevent rust, if desired. In the finish cycle, with the same wheel, apply a grease bag to the roll, held by a string to the coolant nozzle, and reduce the water supply. Should the wheel face become so filled with grease that it marks the roll in spots, increase the water supply. The grease bag may be any loosely woven cloth bag filled with a soluble paste grinding compound.

Strong soda solutions should never be used with shellac or resinoid bonded wheels since there is danger that the bonds will disintegrate.

Remove Loose Grit: In changing to finer grit wheels for subsequent operations, the wheel guards should be washed thoroughly to remove any of the coarser grit which might adhere to them and get between the wheel and work.

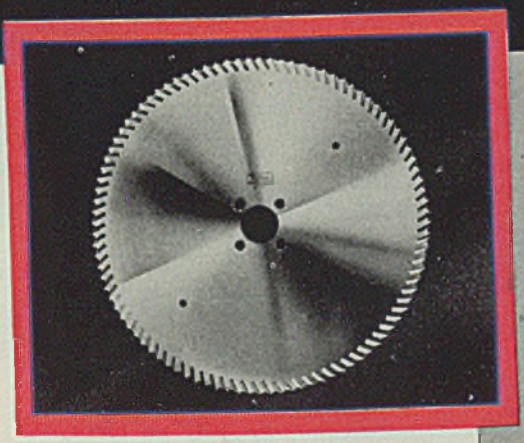
Coolant pressure should be sufficient to penetrate to the point of contact between wheel and work. Use lots of coolant. The supply should never be shut off while grinding to allow the operator to watch the point of contact. If he cannot see it while the coolant is flowing, a clearer coolant should be substituted. Any interruption to the coolant flow is fatal.

Wheel selection involves determining the abrasive, the grit, the bond and the grade. The abrasive to use depends upon the roll material and finish desired. For chilled iron rolls, silicon carbide wheels are used to give a high luster; aluminum oxide for a satin finish. Hardened steel or high speed tool steel rolls for Steckel mills usually are ground with aluminum oxide wheels. A new bond also makes it possible to use silicon carbide for finishes with improved "color." To obtain a luster, use silicon carbide or aluminum oxide wheels of special characteristics for the final grinding. Tungsten carbide Steckel mill rolls are best ground with resinoid bonded diamond wheels.

Operating Factors Important: To select wheels of the right grit and grade, and to obtain an ultra finish with them requires a thorough understanding of what happens when a wheel is in contact with the work.

A grinding wheel must operate so the stresses set up by wheel rotation and work pressures on the grinding face are close to the ultimate resistance of both bond and abrasive crystals. A slight increase in stresses beyond this point will

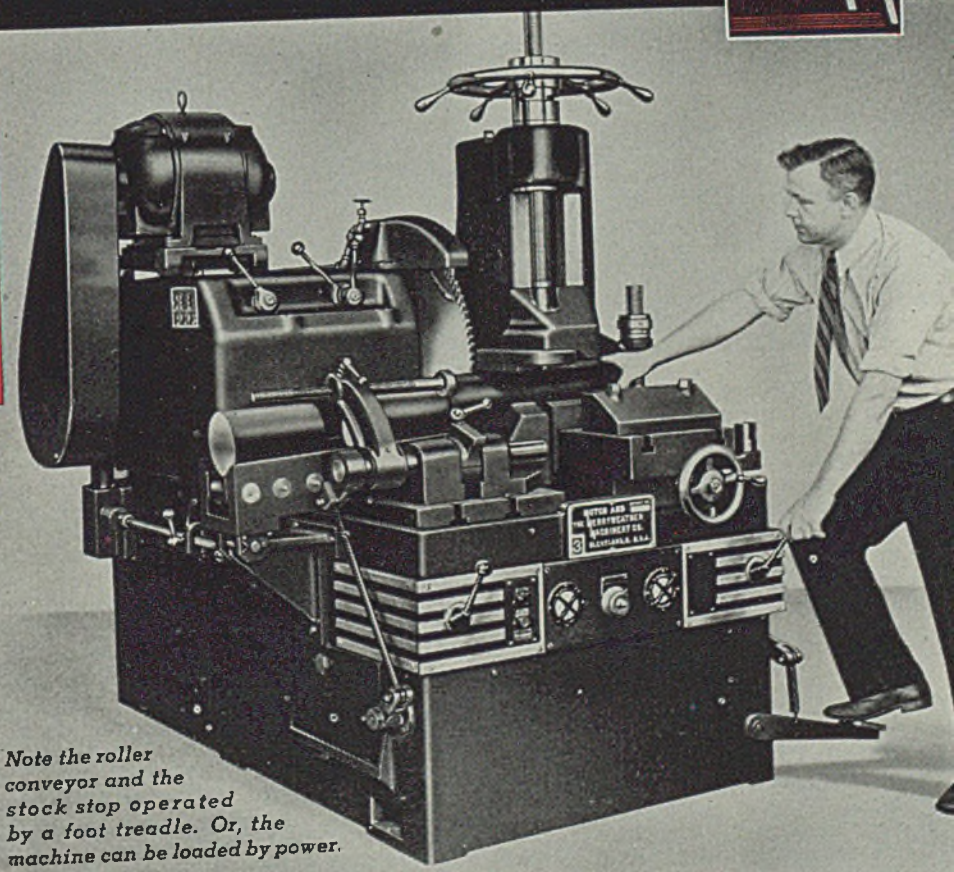
ONE MAN OPERATING 3 MOTCH & MERRYWEATHER COLD SAWING MACHINES ON 4½" ROUND SHELL STEEL AVERAGES 4320 SLUGS PER 24-HOUR DAY WITHOUT SCRAP SLUGS, WITHOUT BURRS, AT AN EXCEEDINGLY LOW COST



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.

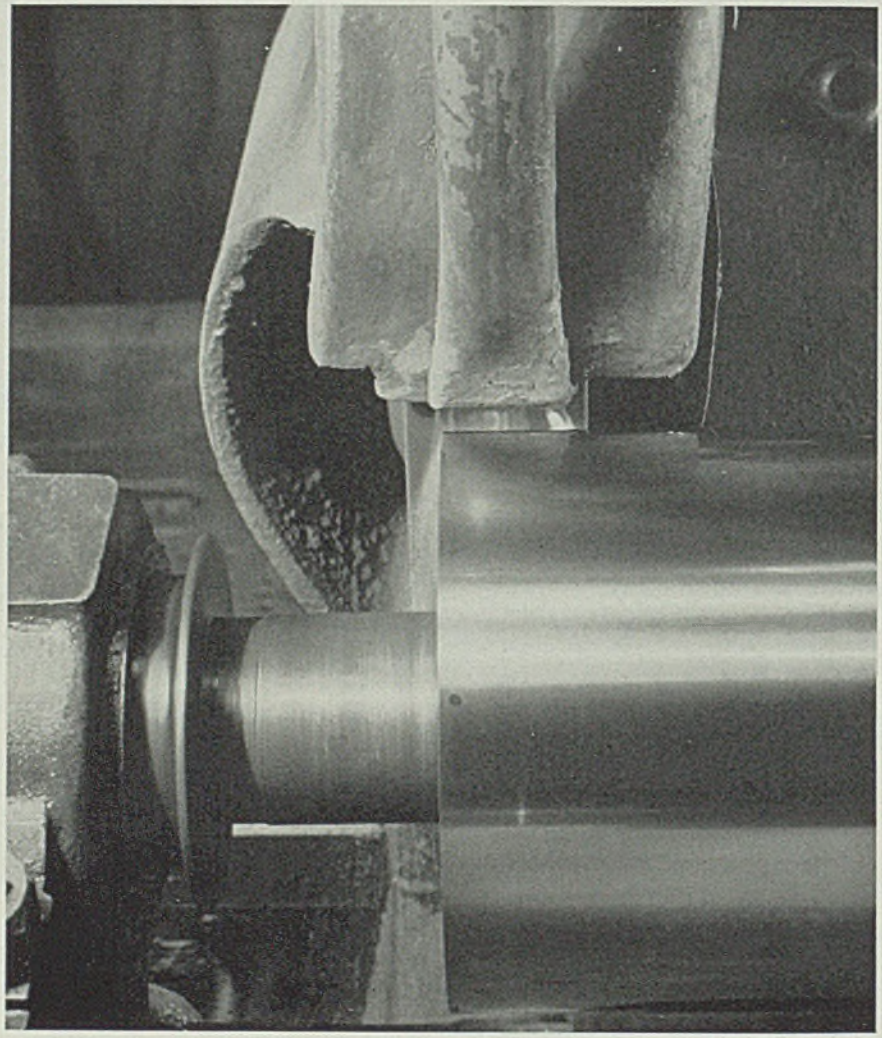
"Easy on the man." Just set the machine and feed the stock—that's al your operator has to do—and from one position at that—thanks to th features shown above. Speed? Plenty of it, *with accuracy and certainty*—n back-tracking, no lost motion, no slugs to throw away. A cut every minut —clean, sheer, and burrless. Get all the facts about this amazing performe especially on shell slugs and like exacting work.

THE MOTCH & MERRYWEATHER MACHINERY C
PENTON BUILDING :-: CLEVELAND, OHI

MOTCH AND THE MERRYWEATHER MACHINERY Co
CLEVELAND CINCINNATI DETROIT PITTSBURGH

Ask for our illustrated story of

Built by **MOTCH & MERRYWEATH**



One of the important things to watch in grinding rolls for ultra-finish work is to see that the wheel does not traverse off the roll more than one-fourth the wheel width. Otherwise, excessive radial pressure will taper the roll

break or dislodge the grains, while less pressure will cause the crystals to dull and glaze. In other words, any reduction in working stresses will cause the wheel to set harder and any increase will make it act softer. Varying the stresses will entail loss of either cutting action or abrasive material.

Wheel-to-Work Speed Relation Critical: The relation of wheel speed to work speed determines the shearing force. As wheel speed is increased relative to work speed, the stresses are decreased and the wheel is not broken down so rapidly—and vice versa. Proper ratio of wheel speed to work speed thus is essential for economical grinding. For best surface quality, the faster the work speed in relation to wheel speed, the longer will be the unavoidable grain marks on the roll, and the less visible will they be.

Therefore for ultra finish grinding the work speed should be as rapid as possible, short of causing vibration. To prevent vibration while still getting the necessary high ratio of work to wheel speed, it is customary to reduce the wheel speeds progressively as the finish is built up.

Work speeds must be kept as high as possible for two other reasons. For all finishing-out passes, the traverse per revolution of the work must be lowest obtainable. Many roll grinding machines are not designed for low mechanical traverse speeds so the work speed must be high to reduce the ratio of traverse. Since rate of traverse influences both shearing and compressive forces, a slow traverse permits softer wheel gradings and vice versa.

Recommended Traverse Speeds: Ultra finishes, however, demand a low ratio of traverse to work speeds. For roughing cuts, best practice is to traverse from one-half to two-thirds the width of the wheel per revolution of the work. For finishing cuts, traverse no more than 0.25-inch per revolution. Final finishing cuts call for slowest traverse attainable—not more than 2 inches per minute.

Never allow the wheel to travel off the work more than one-fourth the wheel width, otherwise the increased unit pressures may taper the roll ends. Slack in the traverse should be taken up to avoid long dwelling of the wheel at the ends of the passes as this causes the roll ends to be ground under size and the wheel to glaze.

The physical properties of the roll material influence the shearing forces. Thus, a hard, tough roll calls for a comparatively soft wheel. The area of contact between work and wheel face affects the compressive force. Hence wide, large diameter wheels are usually of soft grade.

Influence of Wear: Because wheel diameter constantly diminishes from wear, the ratio of work speed to wheel speed increases, the arc of contact decreases and the unit pressure increases, causing the wheel to act softer. Wheel and work speeds should be adjusted frequently.

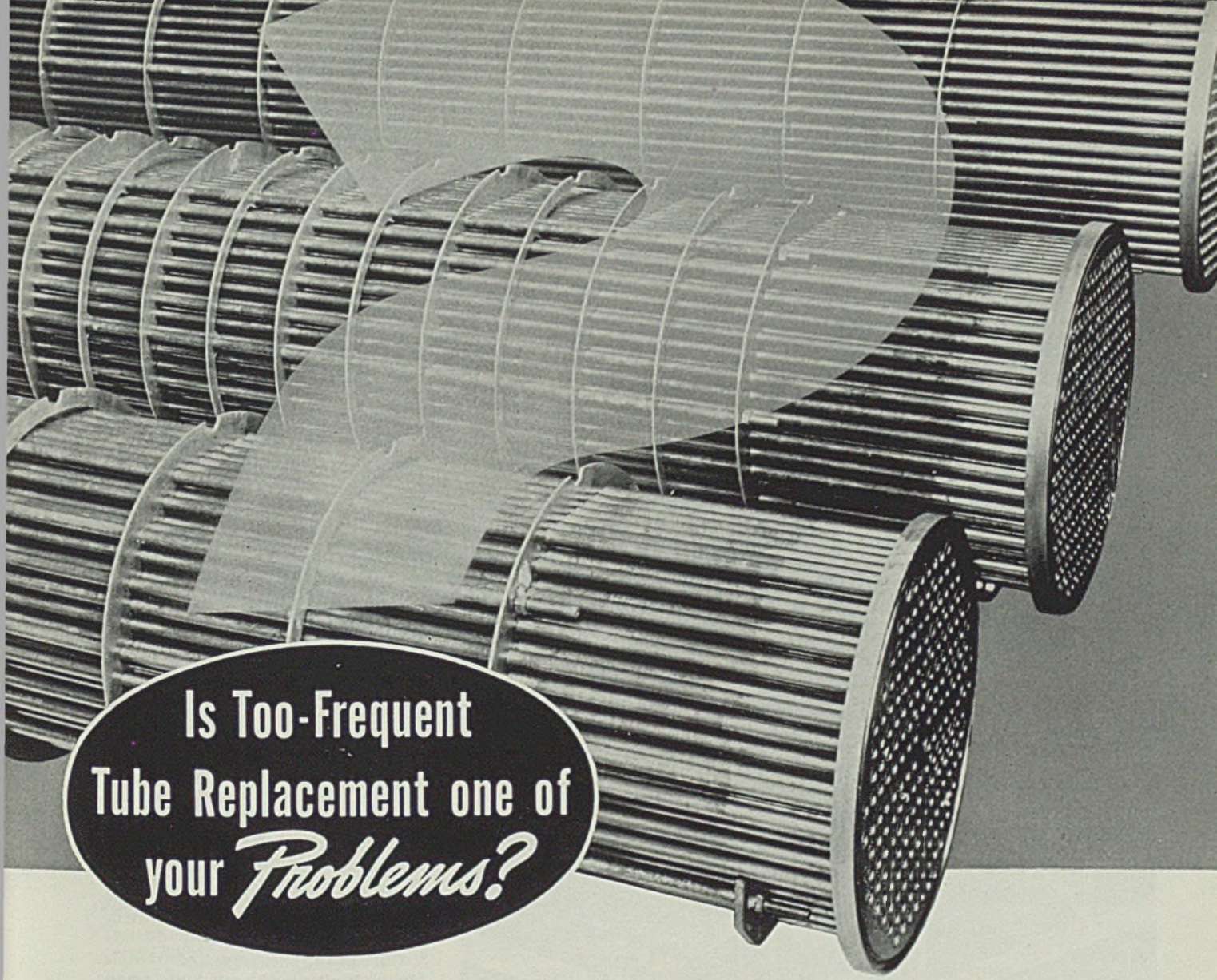
To prevent burnishing when making light finishing cuts, the cutting action can be maintained by increasing unit pressures between wheel and work, using wheels of small diameter and narrow faces. To avoid changing the wheels, it is satisfactory to underdress the wheel face to the desired width for the final passes.

Soft Bonds: Due to the wheel actions described, large diameter rolls, having greater contact area, can be ground with comparatively soft bonds. Likewise, wide wheels, especially those 4 inches or more can use softer bonds.

How To Compensate for Different Roll Diameters: Obviously no one wheel will be ideal for rolls of different diameters. Fortunately, however, operating conditions can be varied to compensate for the different arcs of contact. To make one wheel give practically the same grade action on both a 30-inch roll and a 6-inch one the wheel speed may be increased for the smaller roll, or the work speed decreased. The traverse rate may be decreased, the wheel face slightly dulled by dressing slowly, or lighter infeeds used. The same steps may be taken to offset softer wheel action due to reduction in wheel diameter caused by wear.

Dressing Desirable: Although a grinding wheel is partially self-sharpening, a wheel that is entirely self-sharpening would be too soft for ultra finish grinding. Therefore choose a wheel that will require occasional dressing to restore its cutting qualities when it becomes loaded or glazed.

Dress coarse wheels for every one to three rolls, depending upon roll size. Dress fine wheels from 60 to 220 grit before both rough and finish cuts. Wheels for ultra finish need be dressed only before roughing if they are manipulated as suggested in these articles. Prolonged



Is Too-Frequent Tube Replacement one of your *Problems?*

Are tubes in your condensers, evaporators, or heat exchangers eating into your profits and fattening your operating costs through premature failure and the necessity for too-frequent retubing?

Have you ever considered how much you might lengthen tube life and reduce maintenance costs by using stainless steel tubing?

Republic ENDURO* Stainless Steel in sheet, strip and other forms has proved conclusively its money-saving resistance to corrosion, its ease of cleaning, its prevention of product contamination and its long service life.

It can render the same service in tubular form —in Republic ELECTRUNITE Stainless Tubing, which is made of ENDURO.

*Reg. U. S. Pat. Off.

And in this tubing—made by the electric resistance welding process—you'll find, too, all the easy-to-fabricate ELECTRUNITE advantages. It is consistently uniform in diameter, wall thickness, concentricity, ductility and fine scale-free surface —with a weld as strong and as resistant to corrosion as the base metal itself.

Republic ELECTRUNITE Stainless Steel Tubing is made in popular analyses, in sizes from ¼ to 3-inch O.D., and in various gauges. Use it in a piece of equipment that is high in tube replacement cost—and see what it will save. For further information, write Steel and Tubes Division, Republic Steel Corp., Cleveland, O.

REPUBLIC STEEL DEFENSE FOR AMERICA

REPUBLIC

REG. U. S. PAT. OFF.

ELECTRUNITE

ELECTRIC RESISTANCE WELDED STAINLESS STEEL TUBING

grinding cycles may require more frequent dressing. Wheels finer than 60 grit should have their edges rounded off before and after dressing to prevent chipping by the dressing tool and to avoid the chance of traverse waves. It is well to round off the edges using fine aluminum oxide paper, held in place with the thumb.

Unless the wheel is far too soft in effect it should never be dulled for ultra finish cuts with either dressing tools or hand stones. Decrease cutting action of fine wheels only by machine manipulation.

Dress with Care: Ultra finish grinding is impossible without proper wheel dressing. A diamond tool is usually best for ultra finish work. It must be kept sharp by turning the diamond frequently so that only a sharp edge of the stone will be applied to the wheel. A dull diamond is apt to press abrasive grains into wheel pores. These will leave the wheel, roll between wheel and work, causing scratches or "fish-tails" fatal to an ultra finish. The same thing may happen if the wheel is dressed so coarsely that some abrasive grains are partially loosened. Clean wheel face and sides with a stiff bristle brush and plenty of clean water after each dressing.

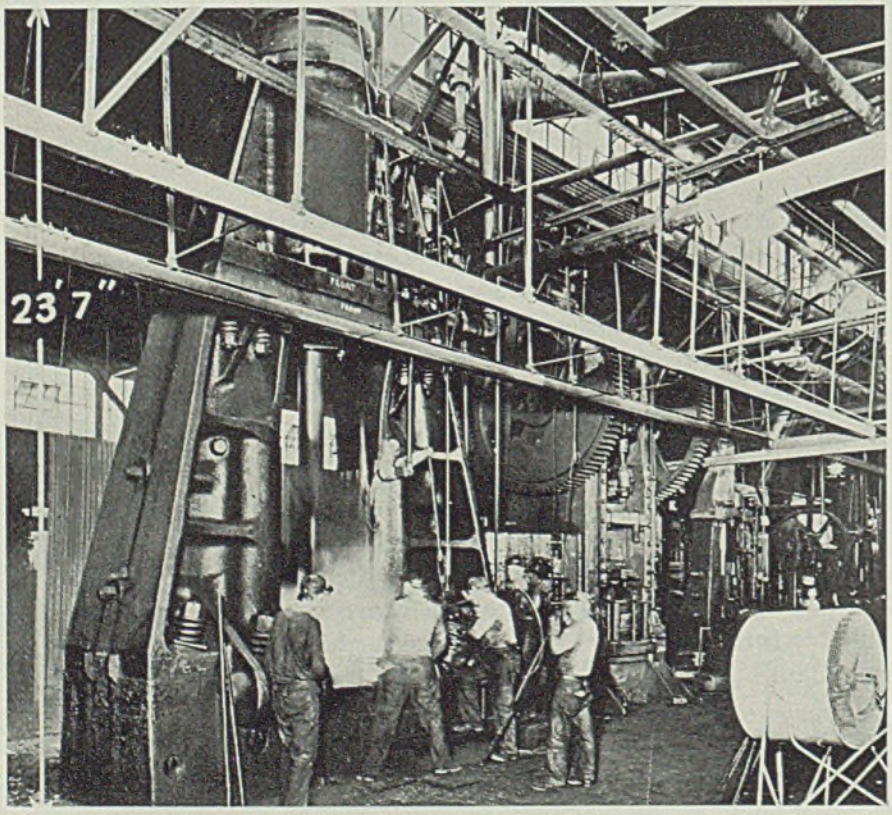
How To Avoid "Patterns": In ultra finish work, carefully avoid diamond marks from too great penetration of the diamond or by too rapid traverse when dressing. Either causes a pattern subsequently transferred to the work. To eliminate the pattern, hand traverse must usually be used. Wheels finer than 220 grit should never be contacted on their faces to "set" the diamond, for the resultant mark may require many dressings to remove. For the same reason, never rough dress fine wheels for ultra finishes. Remove diamond marks on fine wheels by a brief contact on the work at the roll ends, using neither coolant nor traverse.

In addition to slow traverse and shallow diamond feed, it is well to dress the wheel in the opposite direction to the traverse used on the roll as soon as possible after dressing.

Faulty dressing may result if done at a location on the machine different from the grinding position, because the normal parallel relation of the wheel and roll may not exist at that point. To prevent a tapered wheel face with a dragging edge, dress the wheel exactly on the line of wheel-work contact.

In the third section of this series, to appear in an early issue, the exact sequence of operations required to produce an ultra finish on various types of rolls will be detailed. In section four, instructions will be given on how to avoid specific blemishes.

Hammering "Plowshares Into Swords"



■ Parts for tanks destroyers, machine guns, artillery and aircraft are produced on this huge 20,000-pound drop hammer recently installed in the plant of Kropp Forge Co., Chicago, to increase armament output. The giant unit weighing 615,000 pounds, is estimated to produce the equivalent of its own weight in drop forgings per month. Including the foundation, its over-all height is 48 feet 2¾ inches. At present 92 per cent of the company's capacity is involved with defense production

Describes Influence of Stress on Rusted Metal

■ "Influence of Stress on the Corrosion Pitting of Aluminum Bronze and Monel Metal in Water" is the title of research paper RP1366, recently issued by National Bureau of Standards, United States Department of Commerce, Washington. Written by Dunlap J. McAdam Jr. and Glenn W. Geil, it is divided into nine sections, covering the results of the investigation.

According to the paper, cyclic stress tends to increase the size and sharpness of corrosion pits in aluminum bronze and monel metal and thus tends to increase the rate of lowering of the fatigue limit by corrosion. The form of corrosion pits in aluminum bronze is affected by the duplex microstructure. Pits in monel metal are not appreciably influenced by the microstructure.

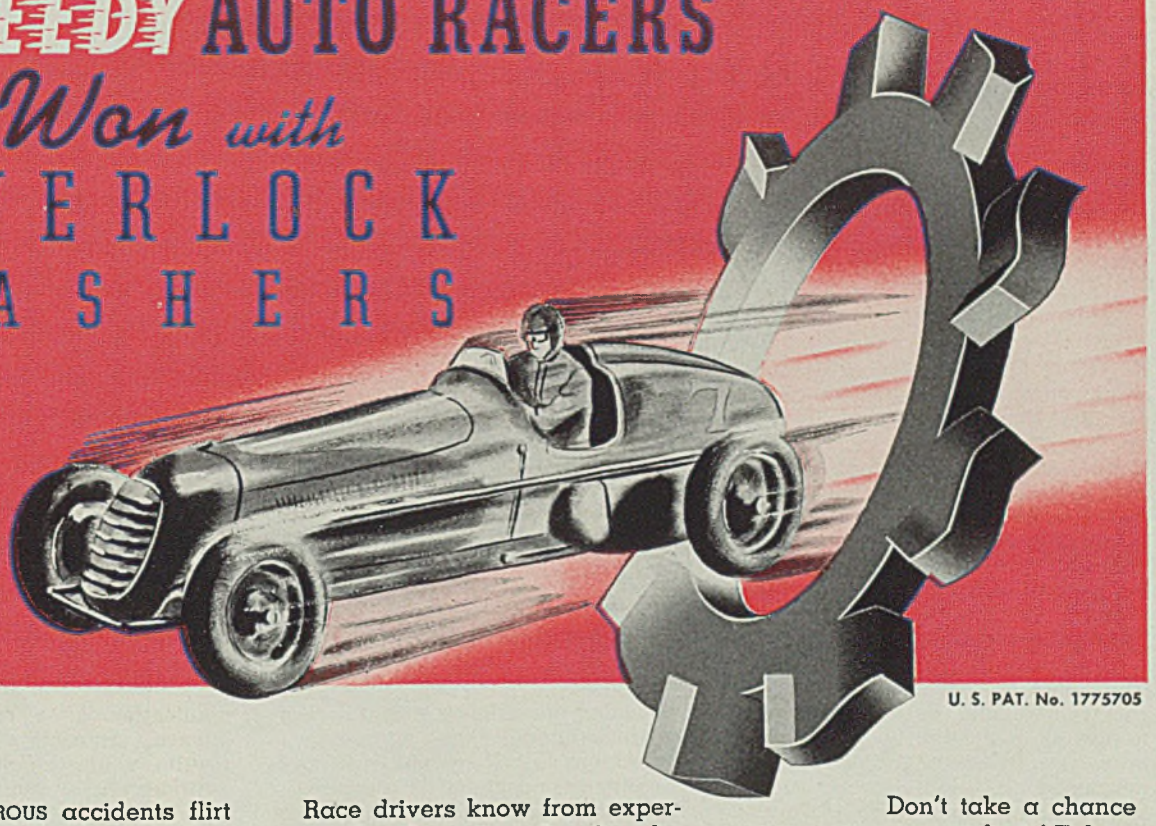
Curves of decrease of the fatigue limit, and constant-damage diagrams derived from these curves are very different from those obtained with steels. These differences may be attributed to the fact that the rate of corrosion of aluminum bronze and monel metal, unlike that of steel, is anodically controlled. Steady stress tends to increase the rate of corrosion pitting of aluminum bronze but has little apparent effect on monel metal.

Reports Electro-Blackening Process

■ A new process, Electro-Ebonol, for electrolytic blackening of almost all metals, including aluminum, steel, stainless steel, zinc, cadmium, nickel, silver, gold, lead, tin and various alloys is reported by Enthone Co., New Haven, Conn. It deposits a black coating in from 30 seconds to 3 minutes, depending upon current density. Before blackening, however, the work must be cleaned similar to the cleaning preceding plating. Salts for the process are supplied by the company ready for use.

FOR SIX CONSECUTIVE YEARS

SPEEDY AUTO RACERS *Won with* EVERLOCK WASHERS



U. S. PAT. No. 1775705

DANGEROUS accidents flirt with racing cars every second as they speed around the race track.

The daring drivers in the 1941 Indianapolis 500 mile Classic knew the dangers awaiting them if any nuts, bolts or screws loosened on their speeding cars. As a safeguard against this, all of the winners of the Indianapolis races for the past six years used EVERLOCK WASHERS and found them to be absolutely dependable.

What an endorsement for a lock washer!

Race drivers know from experience that the patented and exclusive construction of EVERLOCK WASHERS locks the nuts, bolts and screws tightly. Each EVERLOCK WASHER tooth digs in deeper and deeper as the vibration increases with the whirlwind speed of the motors. This digging-in action, coupled with the flexing of the EVERLOCK WASHER tongues, means a lock washer that stops the loosening of nuts, bolts and screws better than other locking devices.

Don't take a chance on your products! Take a tip from the auto race drivers and use EVERLOCK WASHERS on your assemblies. Your products too must be held intact during shipment and after being placed in service. EVERLOCK WASHERS will give your assemblies this security. Profit by the experience of champions and use them now.

There is an EVERLOCK WASHER of the right type and size for every purpose.

Congratulations to a real lock washer! We used EVERLOCKS on our cars and had a safe, confident feeling throughout the race. Every bolt, nut and screw was held tight.

1941 CO-WINNERS

Mauri Rose
Lloyd E. Davis

What a test for a lock washer! I used EVERLOCKS and they held perfectly.

SECOND PLACE Ira Mayo

Again I depended on EVERLOCKS and they did a real job.

THIRD PLACE Ted Horn

THOMPSON-BREMER & CO.
1636 WEST HUBBARD STREET
CHICAGO ILLINOIS

PRINTED IN U.S.A.

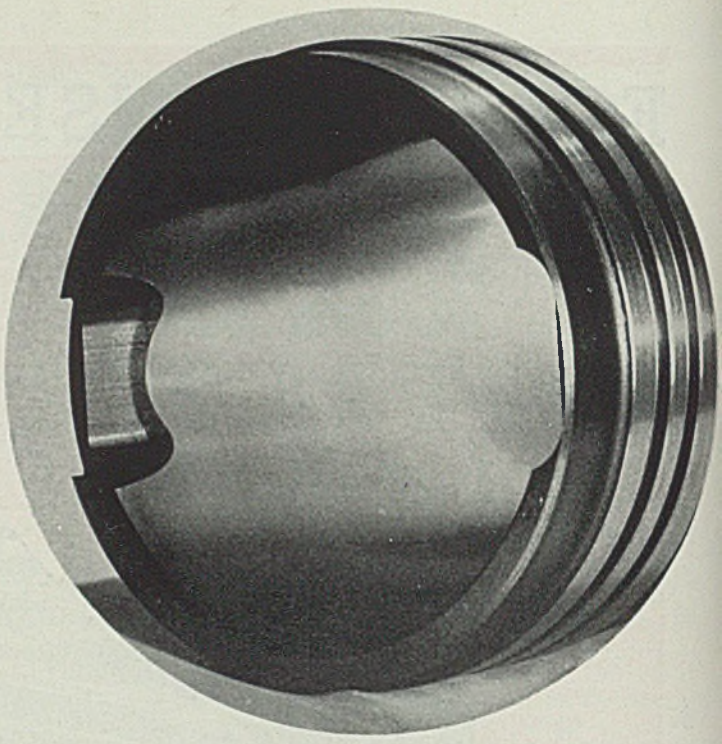
OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

Diesel Cylinder

LINER BORES

are

INDUCTION HARDENED



In this unretouched end view of a Caterpillar diesel cylinder liner, the sloping slot at left milled into the liner after hardening shows clearly the hardened zone, about 0.070-inch deep here

■ INDUCTION hardening is now employed on the bores of cast iron cylinder liners used in the entire line of Caterpillar diesel tractors. This is said to be the first 100 per cent production application of electric induction heating to the cylinder bores of internal combustion engines. It is done using equipment developed by Budd Induction Heating Inc., a subsidiary of the Budd Wheel Co. of Detroit.

The inside diameters of the cast iron liners are hardened to 52 to 55 rockwell C and subsequently are tempered to a slightly lower hardness. Depth of the hardened area developed is approximately 0.070-inch. Liners from 10 to 15 inches in length with bores varying from 3¾ to 5¾ inches inside diameter are in production. Following hardening and tempering, the bores are honed to the final finish before "Surfiding", after which the outside diameter is finish-turned for insertion into the cylinder blocks.

The finished sleeve is reported to be superior in physicals and wear-resistance—and the sleeves are not brittle. Quality and uniformity are excellent.

An interesting feature of this hardening operation is that it serves as an additional check on previous inspections as it emphasizes any porosity or imperfections which may have escaped visual and surface examinations.

How it Works: In the Budd method, the high-frequency currents are induced in the shallow internal surface zone to be heated and are so concentrated that the temperature of the zone affected is raised to hardening temperature before any substantial amount of heat can drift to the remainder of the piece.

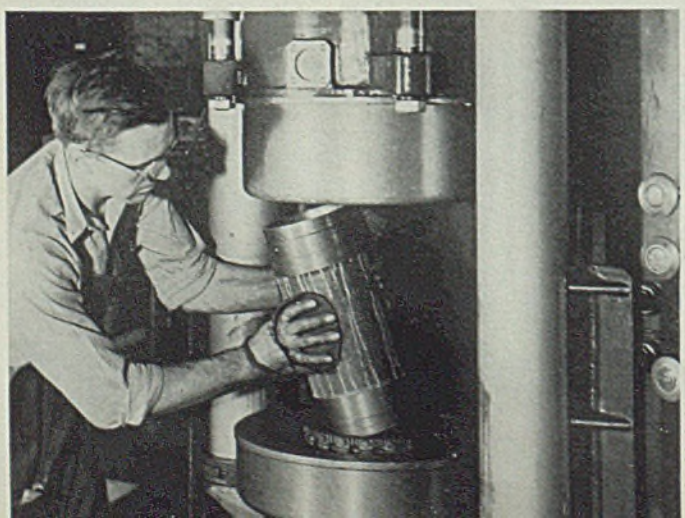
The required heat thus is generated almost instantaneously in the zone to be hardened and is then "trapped" through the immediate application of a controlled water quench. An extremely hard surface results, while the remainder of the cylinder has remained relatively cool due to the speed of the operation and has therefore not been affected.

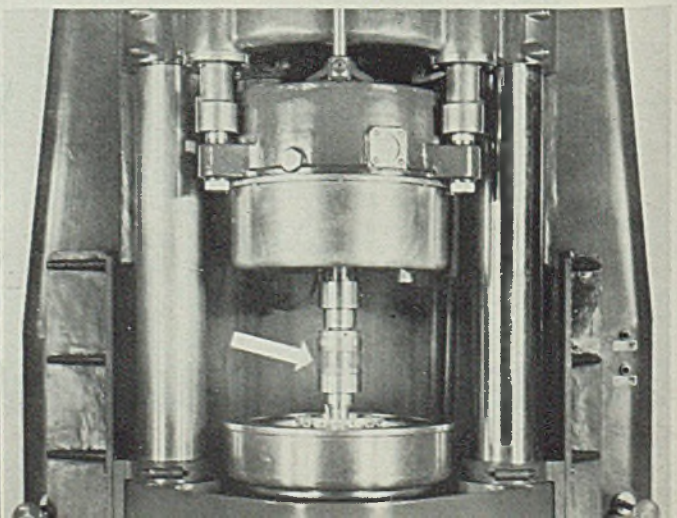
As all factors are accurately and automatically controlled, the characteristics of the area treated likewise are controlled within exceedingly close limits and excellent uniformity is obtained.

The first successful application of the process was to the bore of automobile hubs, in which a section of the inside diameter was hardened to form a roller bearing race. More than 4,000,000 of these units have been turned out for a major automotive manufacturer without a failure being reported, according to Budd engineers.

Composite heat treatment also is possible. A tube which has been heat treated throughout may, as

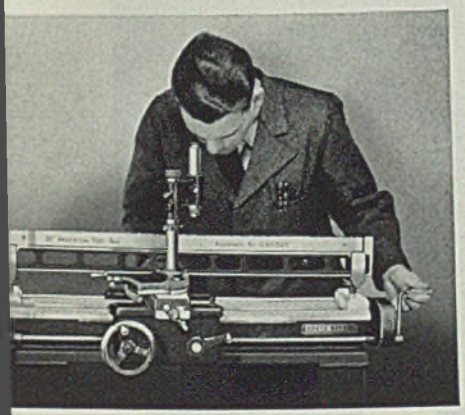
Left, the operator is placing a liner in the induction hardening machine while heads carrying the work-holding chucks have been separated to permit entry of the work. Note the three control buttons at extreme right, this view, labeled "Stop," "Heat Off," "Start." View at right shows appearance of heat head and quenching device in position but with no work in the chucks. The cylinder liner is held by the chucks while the head is drawn progressively through the bore





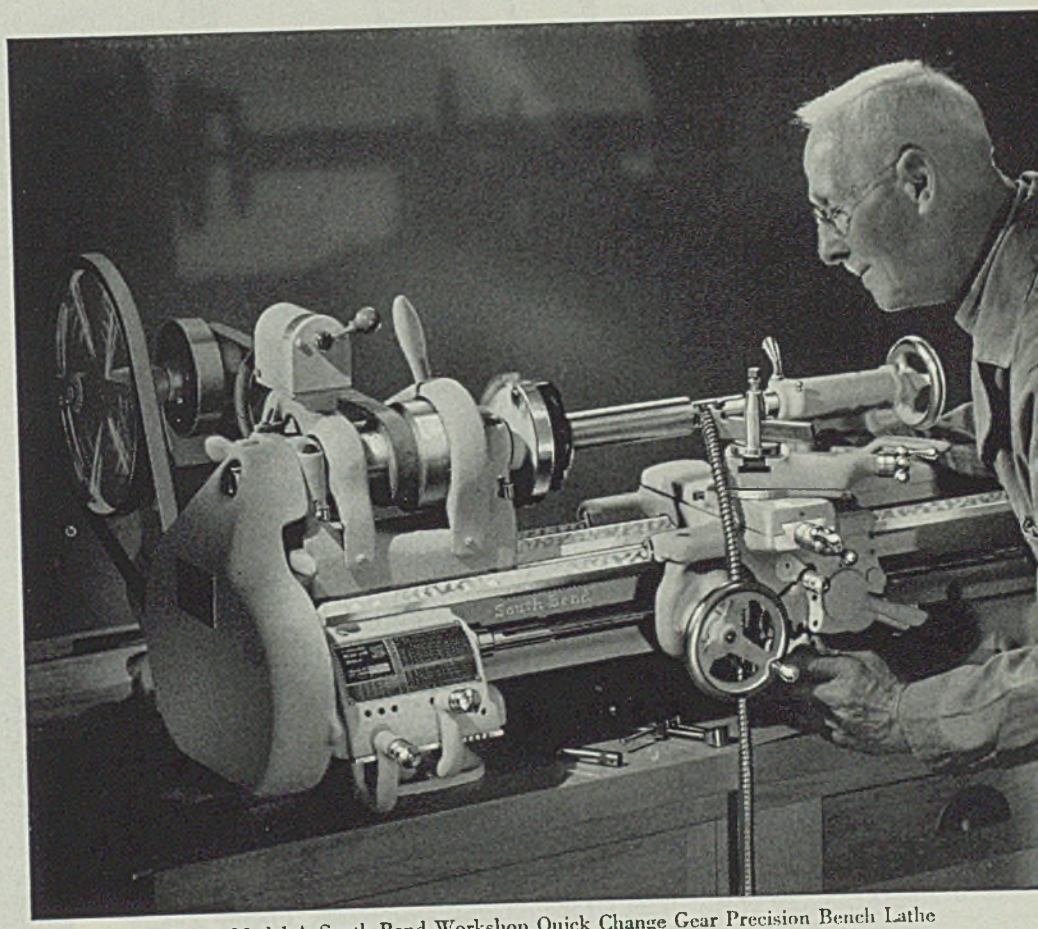
SOUTH BEND LATHES
for Precision Machine Work

Accurate facing operations can be performed on South Bend Lathes because the cross slide dovetail on each saddle is carefully tested for squareness with V-ways of the lathe bed.



The most exacting precision thread cutting operations can be performed on South Bend Lathes because their lead screws are tested for accuracy of lead with specially constructed optical measuring equipment.

The smooth, quiet operation of South Bend Lathes is the result of the careful inspection and testing of gears for accuracy of tooth form, pitch diameter and concentricity.

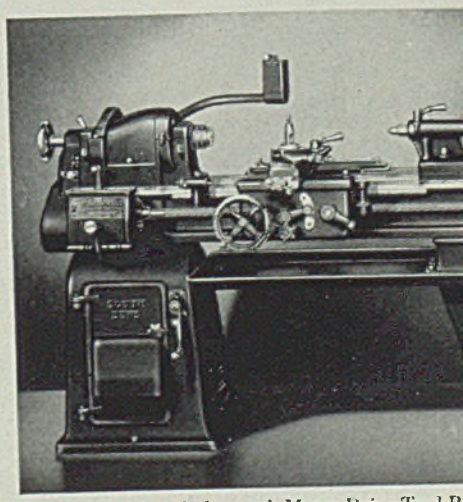


9-inch Model A South Bend Workshop Quick Change Gear Precision Bench Lathe

Sound design, expert workmanship, and quality materials are combined in So Bend Lathes to give them permanent accuracy. For more than thirty years t have been giving dependable, trouble-free service on the most exacting classes precision machine work.

Throughout the process of manufacture, parts and units for South Bend Lathes are frequently inspected and tested to assure accuracy in the finished product. Final tests are made with the lathe in operation. Each lathe must machine work to extremely close tolerances before it is approved for shipment from our factory.

South Bend Lathes are made in five sizes: 9″, 10″, 13″, 14½″ and 16″ swing, 3′ to 12′ bed lengths, in Tool Room or Manufacturing types, with countershaft or motor drive. Write for a catalog and name of your nearest dealer.



13″ swing Underneath Motor Drive Tool R

SOUTH BEND LATHE WORK

867 EAST MADISON STREET, SOUTH BEND, INDIANA, U. S. A.

BUILDERS SINCE 1906

We're on the job day and night!

"A shipbuilding company required 7 tons 1" Bamboo Bars — cut to lengths, in connection with building new docks to meet the Navy Department's demand for early delivery of ships. They were short 7 tons on mill shipments. Order was received by us at 10:35 a. m. and material was in customer's plant in New Jersey at 12:15 p. m."

— FROM SCULLY NEWARK WAREHOUSE

WORKING on defense business? Rushed with regular work? Whatever your problems—if you need steel, steel products, copper, brass, tools, equipment and machinery you'll find Scully a prompt, reliable source of supply. Our eight warehouses are located near the great industrial centers and are able to render unusual service—even today. Each warehouse knows that now, more than ever before, speed is vital and is making every effort to provide the type of cooperation that has made the Scully name famous. So why not phone, write or wire the nearest Scully warehouse . . . we're on the job day and night. And if you don't have a copy of our handy Stock List and Reference Book, ask for one.

Send for the Scully Stock List and Reference Book . . . it's free

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO
ST. PAUL - MINNEAPOLIS
NEWARK, N.J.

The Mark of Quality →

USS Scully Service

CLEVELAND · PITTSBURGH
BOSTON · BALTIMORE
ST. LOUIS

← *The Mark of Service*

UNITED STATES STEEL

one engineer has expressed it, be "kissed" on its inside diameter to produce a harder interior surface, thus improving wear-resistance of the bore, while retaining high physicals of the body.

High speed of production is another advantage. In the automobile hub application, for example, three to four hubs per minute are hardened on each machine in operation. Aviation cylinders can be treated at the rate of 60 to 100 per hour per machine.

Operation Explained: A current-carrying coil or "head" is drawn evenly through the bore under treatment—or conversely, the part is drawn progressively over the heat "head"—while a high-frequency current is applied, producing the magnetic lines of force which result in heating the metal under treatment. This operation is followed immediately by the controlled water quench—the whole cycle being a matter of seconds. Head movement, current application and quench operation are entirely automatic, thus removing any possibility of error in the process once the machine has been set.

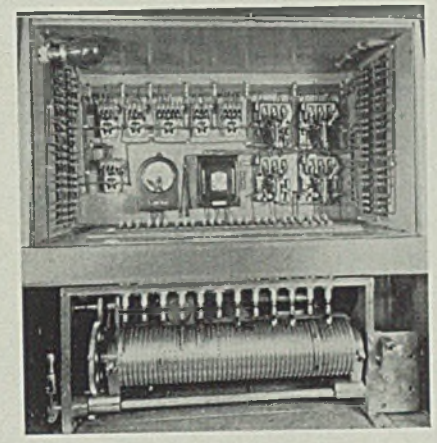
The machine is extremely flexible and is designed for rapid change-over from one size bore operation to another.

"Tailoring" to Requirements: The process now makes possible the production of improved units in nearly every type of machine in which cylindrical metal bores are subject to wear or stress. Hardness is developed at points of greatest wear, while a tough, ductile core is retained to provide maximum strength. Physicals of the parts treated are thus "tailored" to fit wear and strength requirements.

Further, where design permits, the outside diameter and all other unhardened areas can be machined after heat treatment of the inside diameter of the bore. As the depth of the hardened area is accurately controlled, the area which can be machined after the bore has been hardened can be determined precisely.

Parts often can be redesigned with lowered weights and costs as the integral localized heat treatment may favorably alter the metallurgy of the casting or forging to the point where a predetermined inside diameter area can be used as a wear-resisting surface.

Metallurgical Considerations: In materials containing temper or uncombined carbon, recombinations of this carbon at a greatly accelerated rate can be accomplished, thus markedly increasing the "hardenability" and strength of the area treated. The grain size of the treated material may be made consistently smaller, an advantage in most applications as improved physical properties can be developed in this manner.



"Brains" of the induction hardening machine are shown here—a highly accurate sequence of operations being controlled by the series of cam-operated switches actuated by cams mounted on the drum in the lower portion of the control. This particular drum is arranged to receive four sets of cams which by shifting the drum permits selecting any one of four different sequences of operations

Gross distortion, scaling, necessary straightening, decarburization, the necessity for using more stock in order to compensate for adverse distortion, and grinding checks due to lack of uniformity of structure, are no longer problems. The short cycle, in combination with the rapid quench eliminates oxidation.

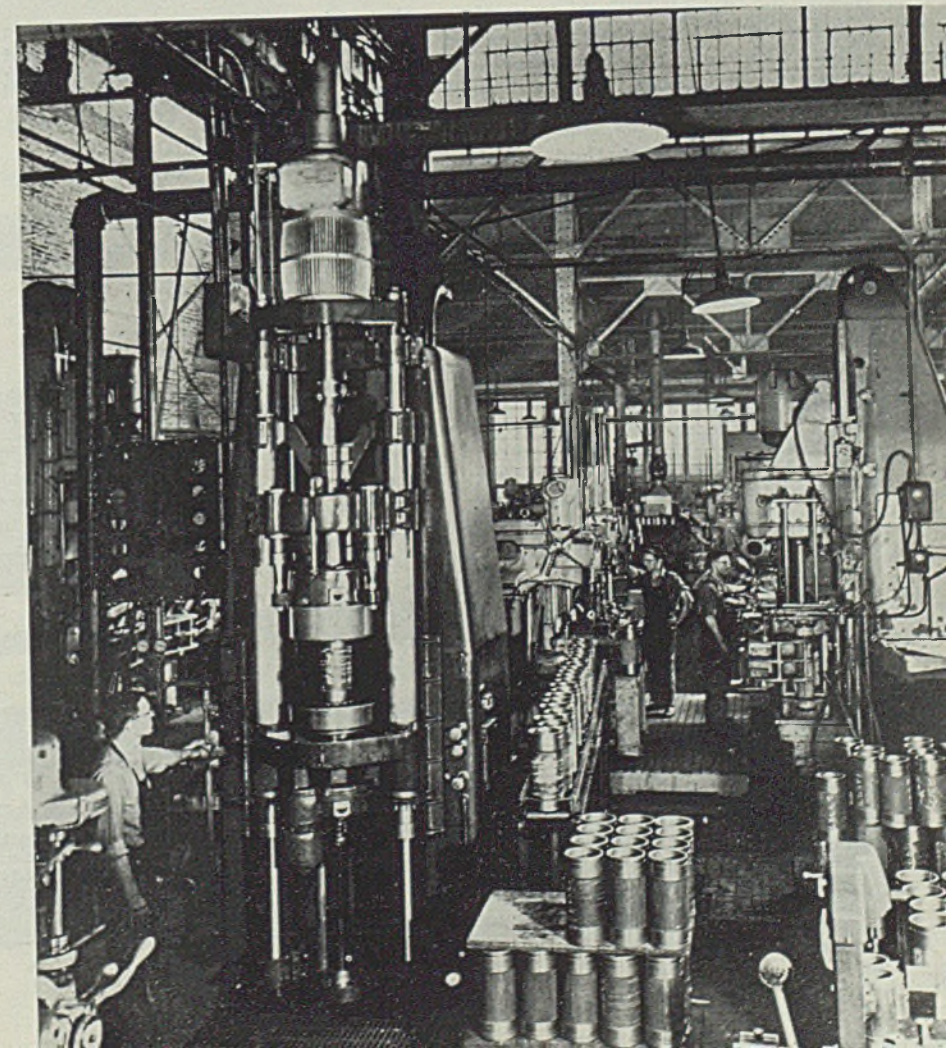
At the same time, it has been found that annealing or normalizing treatments are less frequently required before hardening.

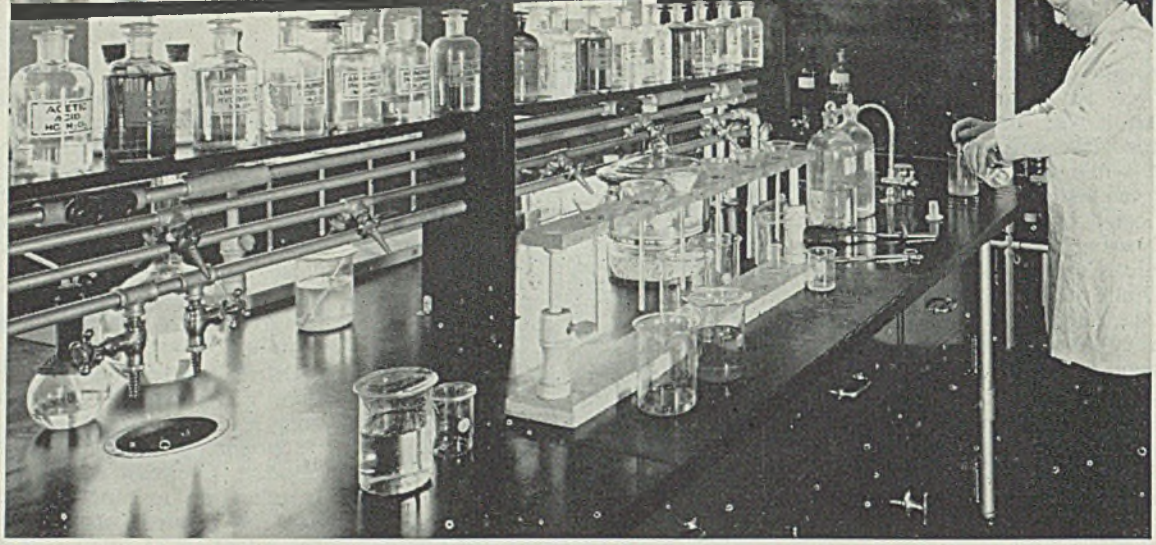
Other Applications: To the question, "How long a cylinder can you treat?" Budd engineers answer, "How long a bore do you have in mind?" Lengths varying from a fraction of an inch upward can now be treated. It requires only the adoption of known engineering principles to the design of equipment for lengths other than those now in production.

New applications of the process are many. Its use in aircraft engines, where light weight and resistance to wear are vital, is under consideration. Machines for the heat treatment of oil-well casings, to increase joint strength, already are under construction.

The process makes possible, engineers believe, the improvement of nearly every product having bores.

This is the Caterpillar installation. Note it is an integral part of the production line. The inside diameter of all liners for Caterpillar diesels are inductively hardened here





Out of chemical laboratories such as this often come simple methods for determining certain elements

DETERMINATION OF TIN IN CAST IRON AND PLAIN STEEL

Determining the percentage of tin in iron and steel in a minimum of time has been made possible by an improved method which affords a sharp and lasting end point. The method makes use of an alloy of iron and antimony designated "Stanreduce" which supplies its own reducing atmosphere

By E. T. SAXER
Chief Chemist
and
R. E. MINTO
Assistant Chief Chemist
Otis Steel Co.
Cleveland

AN IMPROVED method for determining the percentage of tin in plain steel and cast iron has been devised to overcome the poor, fading end points obtained in the short method for tin in steel. The fading of the end point is caused by a high concentration of copper ions in the solution being titrated, and other factors. The use of a nonoxidizing gas, such as carbon dioxide, nitrogen or natural gas, along with the cumbersome procedure attending the use of such a gas, has been eliminated. The time required for the actual reduction of stannic chloride to stannous chloride has been greatly reduced. The method is accurate and fairly rapid considering this accuracy. The end point is sharp and lasting.

To develop this method it was necessary to produce an iron-antimony alloy, herein referred to as "Stanreduce." To make a determination requires 10 grams of Stanreduce. Of this amount 0.6 gram is used up and the remainder may be recovered by washing in succession with water, then with alcohol, and drying. The alloy can be used over and over. Stanreduce also can be used to good advantage for the determination of larger amounts of tin in nonferrous alloys.

THE METHOD

1. Weigh 5 grams of the sample into a 300-milliliter Erlenmeyer flask.
2. Add 50 milliliters of HCl (2:1) and keep at boiling temperature until the sample is dissolved. The acid residue from a sulfur determination may be used. Samples of cast iron should be filtered and washed with hot HCl solution.
3. Add 100 milliliters of a solution containing 10 grams of NH_4Cl and 10 milliliters of concentrated Na_4OH. If some Fe $(OH)_3$ separates, redissolve with a few drops of HCl.
4. Add concentrated NH_4OH dropwise until a slight precipitate of $Fe(OH)_3$ is discernible. This precipitate should be brown and not green.
5. Add a small quantity of paper pulp

(*Please turn to Page* 91)

Table I—Effects of Alloying Elements*

Sample, 5 grams	Present % Cr	% V	% Mo	% As	% Cu	Added, % Sn	Found, % Sn	End Point
							0.005	
Gov't. No. 72...	0.91	....	0.15	....	....	none	0.006 0.048	Fades slowly
Gov't. No. 72...	0.91	....	0.15	....	....	0.05	0.044 0.008	Fades slowly
Gov't. No. 30C.	0.98	0.24	....	....	....	none	0.012 0.062	Fades slowly
Gov't. No. 30C.	0.98	0.24	....	....	....	0.05	0.064	Good
Fe by H_2.....	....	....	....	0.05	....	none	none	Good
Fe by H_2.....	....	....	....	0.05	....	none	none	Good
Battelle, "F"..	....	....	....	....	0.60	none	none	Good
Battelle, "G"..	....	....	....	....	1.10	none	none	Good

* The data in this table demonstrate that arsenic and copper ions do not interfere with the determination of tin by the method outlined. The chromium, vanadium and molybdenum in the government standards are much higher than that encountered as residuals in plain steel. It is thought that no serious errors will result from smaller quantities.

CARBON

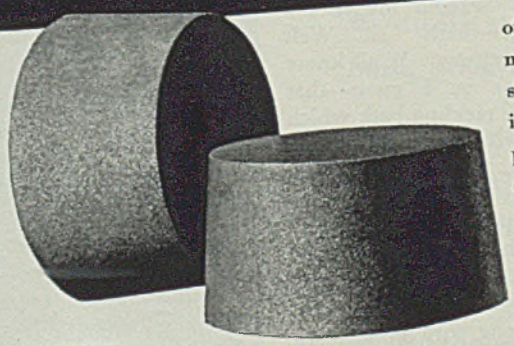
The Corrosion Resistant Lining Material

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

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

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

CARBON MOLD PLUGS



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

STANDARD SIZES

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

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

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC

Carbon Sales Division: Cleveland, Ohio
GENERAL OFFICES
30 East 42nd Street, New York, N. Y.
BRANCH SALES OFFICES
New York, Pittsburgh, Chicago, St. Louis, San Francisco

The word "National" is a trade-mark of National Carbon Company, Inc.

BETWEEN HEATS

WITH Shorty

■ Say Fellers:

Over in the picklin' department the other day the gang was holdin' a bull session 'n the fellers were firin' some pretty good stuff at each other along the lines of handlin' the acid. I don't always like to bust in on the fellers when they're goin' to the mat with some of their problems but I did this time without regret. I slid on to one of the benches 'n I sez, "Go ahead, fellers. Don't mind me. I'm jus' a sojourner stoppin' fer a second or two to rest some weary bones." I reckon I didn't interrupt 'em fer Ted Patty kept right on talkin'. He sez:

"Now look, y' guys. A 10 per cent solution of sulphuric is okay to get all the mill scale off the surface, 'n when acid is consumed y' gotta sweeten up the bath with a shot of fresh acid."

"O yeah," pipes up Slim Wiley. "We know that, already. What you're sayin' is ol' stuff. What I'm sayin' is, the ferrous sulphate takes the kick outta the bath . . ."

"Sure 'nough, big boy, you're right ag'in. Y' git 'bout five times the 'mount of ferrous sulphate as y' do iron. Fer instance, when y' got 40 per cent ferrous sulphate in your bath y' only get 'bout half the 'fficiency outta 'er," was Ted's comeback.

Pops a Fair Question

"Then why don't y' dump the pickle into the sewer 'n start over ag'in?" Slim asked.

"I suppose we would but we never wait 'til she gets up to 40 per cent. Whenever we find the ferrous sulphate up 'round 25 per cent we stop addin' slugs of fresh acid now 'n them, 'n we keep on picklin' 'till we run the bath down to 'round 5 per cent acid then we yank the plug outta the tank and let the juice run into the sewer."

"Howdaya get away with dumpin' 'er in the sewer?" Slim asked. "Don't the authorities jump y' fer pollutin' the stream?"

"Naw. Y' see we dump the tanks into the sewer 'n then over in settlin' basin we give 'er a shot of lime to kill the acid 'fore we turn 'er into the creek. No harm in doin' that, is there?" sez Ted.

"Naw, far as I can see there isn't. I remember a few years ago when I was picklin' at a plant in Ohio makin' sheets we were dumpin' our spent acid in the river. One day the boss came 'round and told us we'd have to treat the pickle liquor with lime before we let 'er go into the river. Seems as though a little blast furnace plant down the river was settin' up a kick cuz the water they were takin' from the river for coolin' purposes was cuttin' a lotta hot blast valves on the stoves 'n they had to install new ones every now 'n then," sez Slim.

"Hey Slim, y' believe that?" inquired Skinny Boynton.

Falls Back on the Boss

"That's what the boss told me, that's all I know. But when we started puttin' the lime to 'er to kill the free acid, we never got any more complaints from the blast furnace fellers."

"I don't doubt your word, y' understand Slim. Jus' wanted to git the account straight—that's all. Well anyway let me tellya one. Y' all know what an inhibitor is, I guess—that stuff we put in the pickling bath which causes a molecular film to be deposited on the sheets after the scale is all off. Once y' git a film on your base metal the acid won't attack 'er 'n there's no more pittin' of the surface nor waste of acid."

"Skinny, y' sound like a school teacher, but go along with your story."

"Well not long ago I was a talkin' to Phil Russell of the Grasselli Co., 'n he was tellin' me that long before inhibitors were recognized, the steel industry ran across such effects without realizin' the cause. He sez, 'Some years ago, one of the mills doin' some picklin' sent in a complaint to an acid maker. He kicked because there was somethin' hay wire with his last shipment of acid. Seems as though his picklin' foreman complained that the sheets weren't picklin' in the regular way. They were bein' burned or overpickled. 'N so the acidmaker sent one of his service men to look over the job.' "

Skinny stopped long enough to light up 'is pipe 'n after he took a couple of drags he continued:

"Russell sez, 'the service guy checked up everything carefully 'n he found the acid they were usin' in the picklin' tubs was the same as that used before they bumped into the trouble. He thought there was somethin' screwy so he goes over to a guy working in the pickle house 'n starts firin' questions at him. It seems as though the pickle tub had been cleaned out jus' before the trouble started. The hunkey told the service guy that this was the first time 'she be cleaned out, mebbee, since they put 'em in tub, I betcha.'

Ted Patty interrupted to ask, "Didn't they have trouble with the iron content of the bath?"

Shoes Did the Trick

"Naw, guess not Ted—at least Russell didn't mention it. He sez, 'she didn't get a chance to get too high cuz of the leaks, wet steam, 'n overflows. The hunkey told the service man they found all sorts of junk in the bottom of the tub includin' a pair of ol' shoes. 'N try as he could the service man couldn't fix up the tub so she would pickle to suit the fancy of the foreman until he found a pair of ol' shoes 'round the mill and fired them into the tub. 'N after that the foreman put his okay on the whole shootin' match 'n told everybody 'round the diggin's that his fellers never turned out such smooth surfaced sheets. Not a pickler's kiss in the whole blame lot.' "

"Did Russell think there was anything to the thing of puttin' the ol' shoes in the pickle?" Ted asked with a funny look on his face.

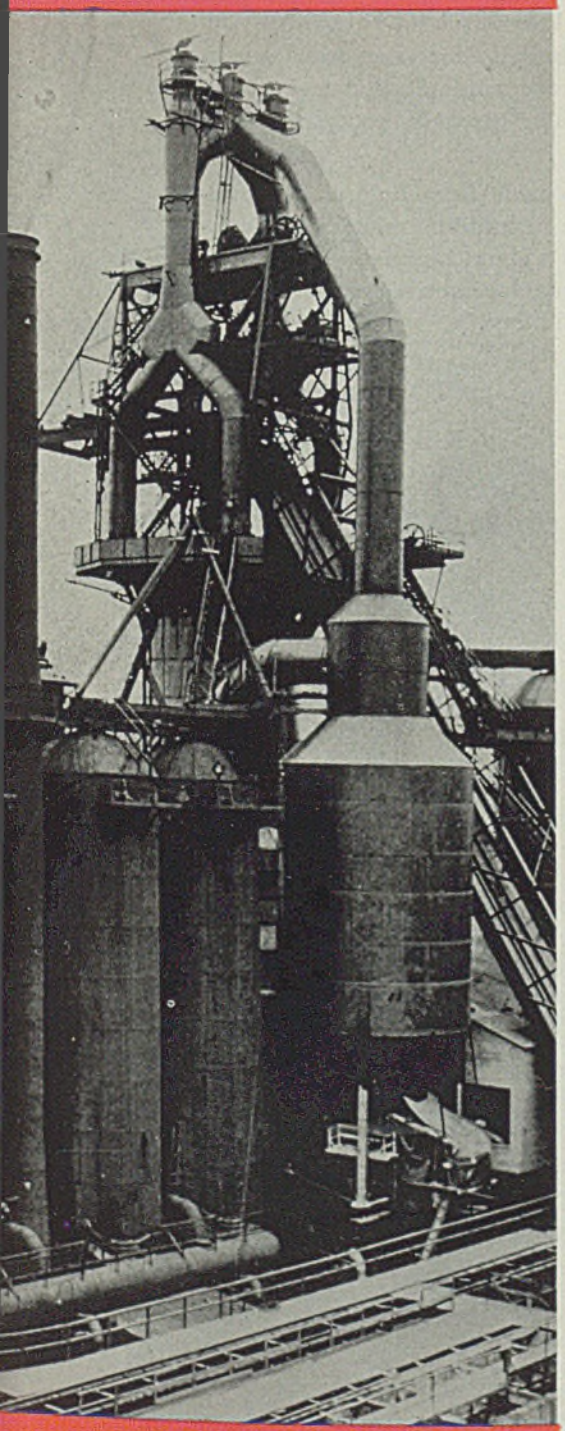
"Why his explanation was that the action of the pickle solution on the leather and its fillers formed a low-grade inhibitor of some sort that actually did some useful work in restraining the action of the acid on the base metal."

Well, fellers, that's the gift of gab I listened to 'round the pickle tubs that day. I don't know of anyone who has commercialized the use of ol' shoes as an inhibitor. They use 'em at weddin's alright but not for sweetenin' up the picklin' liquor. Anyway they're makin' better inhibitors nowadays.

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

"Shorty" Long

QUICK RESULTS



McKee iron and steel plant engineering saves you time five ways...

1 By saving the time ordinarily lost in preliminary negotiations, because you can place your work in the hands of Arthur G. McKee & Company with complete confidence in the ability, experience and integrity of this organization.

2 By duplicating designs of modern plants recently completed by McKee.

3 By placing orders immediately for material to duplicate equipment previously designed and built, McKee can get material on the job earlier.

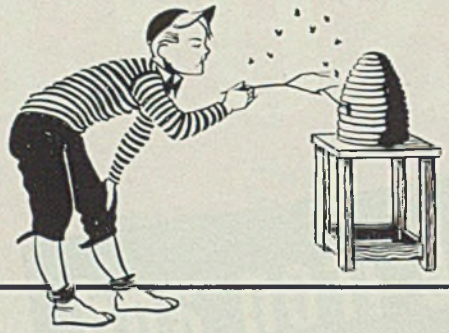
4 By handling your job under the McKee Method of undivided Responsibility in One Organization which results in faster, more efficient engineering and construction.

5 By the services of the large, well trained McKee staff which is organized to give you quick results in office and field.

Arthur G. McKee & Company

Engineers and Contractors

2300 CHESTER AVENUE · CLEVELAND, OHIO

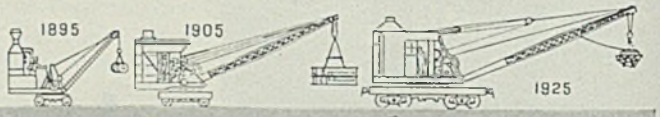


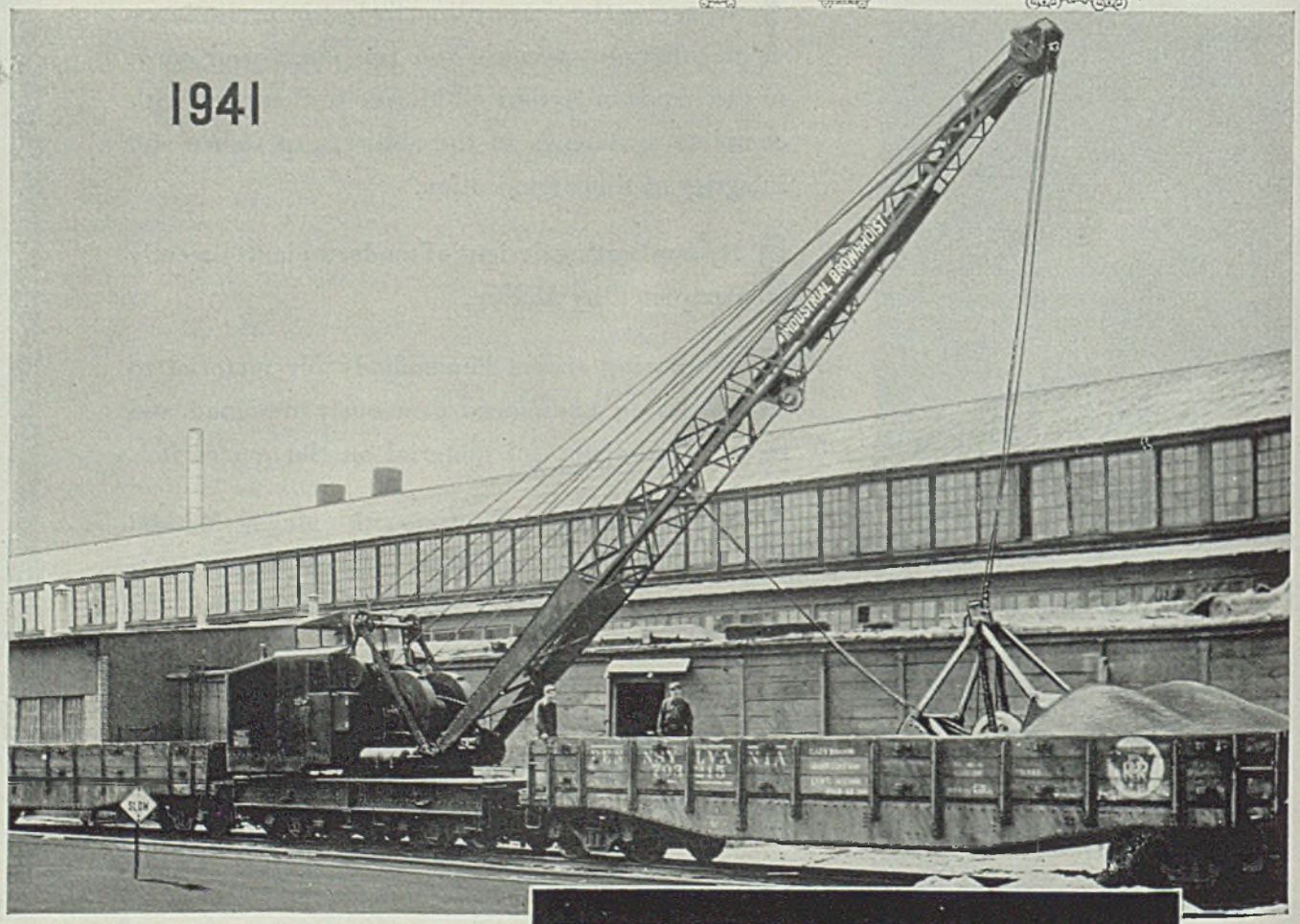
There is no substitute for experience !

Whether your materials can best be handled with a bucket, a hook or a magnet, it's a certainty that the speed of hoisting, the ease of operation and the sturdiness of your cranes are the really vital factors in your material handling costs. And that is why the 50 years experience gained by Industrial Brownhoist in the building of locomotive cranes is of importance to you.

The present day Industrial Brownhoist Gas, Diesel, or Steam locomotive cranes provide a wealth of advantages. Crab mechanisms operate with a smoothness never before thought possible. Cabs on Diesel and Gasoline models from 10 through 40 tons allow a full 360° visibility. Undercarriages are built to the same standards as the heaviest railroad tenders. Booms are constructed for greater strength combined with decreased weight.

It will pay you to profit from Industrial Brownhoist's experience in building cranes. Write today for further facts about Industrial Brownhoist Gas, Diesel, or Steam locomotive cranes in capacities from 10 to 250 tons.





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

INDUSTRIAL BROWNHOIST
BUILDS BETTER CRANES

HANDLING PAINT MATERIALS IN PIPES

.... eliminates refilling of spray guns
.... assures more uniform colors
.... permits continuous agitation of paint
.... concentrates responsibility
.... reduces fire hazards

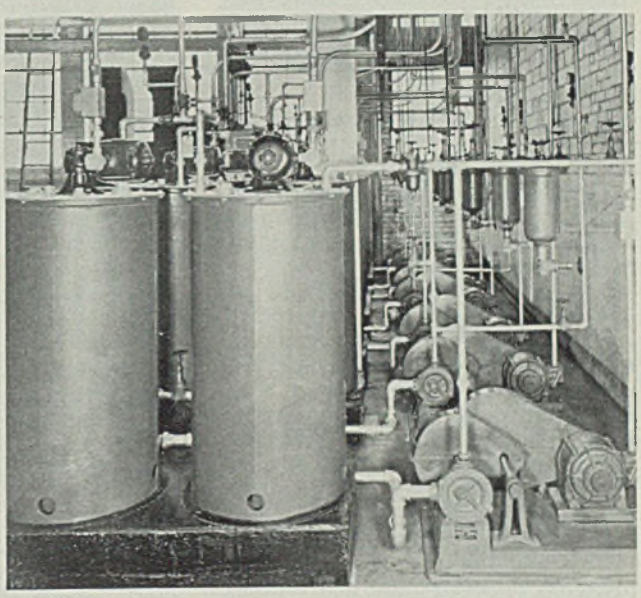


Fig. 2—Each pair of mixing and circulating tanks has its own pumping unit and filter as shown here. This is an end view of the same set of tanks in Fig. 1

■ WHEN Berger Mfg. Division of Republic Steel Corp. recently completed a sizable addition to its manufacturing facilities at Canton, O., an opportunity was afforded to streamline the plant paint handling methods. Accordingly, a new 9-pipe circulating system nearly 2 miles long was installed and now carries paint in nine different colors to more than 50 points where it is applied to shelving, steel furniture, kitchen cabinets, lockers and other metal products of this plant.

Prior to installing this new centralized paint mixing, circulating and distributing equipment, enamels and lacquers had been delivered in 50-gallon drums by factory trucks to four widely separated mixing stations located near the various finishing areas in the plant. At these points the finishing materials were prepared for use by reducing with thinners, stirring by hand with wooden paddles for 10 to 15 minutes, etc. Spray operators had to come to these decentralized sources of supply on an average of once every 2 hours to refill their containers from which they sprayed.

Paints mixed by hand at different locations at different temperatures at different times and by different individuals could not be expected to be consistent in viscosity, specific gravity or degree of agitation—all of which bear directly on the color uniformity to be obtained. Certain advantages from a centralized system therefore are obvious. Most important of these, perhaps, is continuous mechanical agitation now employed to afford a more complete dispersion of pigments and to maintain a homogenous solution at all times, thus a more uniform paint and a more uniform finished product.

When mixing is done in one room, it is possible to maintain a more uniform temperature. Also, viscosity and specific gravity tests are always made under the same conditions and therefore are more directly comparable.

Moreover, there is now undivided responsibility as a single individual is placed in charge of mixing operations on each turn.

Handling by truck of paint materials throughout the factory is eliminated, thus reducing the fire hazard always present where inflammable materials such as enamels and lacquers must be moved about.

Another important advantage is had by supplying paint continuously to each operator. Thus he need no longer leave his work to refill his container.

The present system includes two centralized mixing and paint storage rooms from which the circulating systems fan out to several areas on two floors of the plant. In the large mixing room, there are 20 mixing tanks, 14 of which serve a group of seven paint circulating systems. Five of these seven lines carry paint to an equal number of

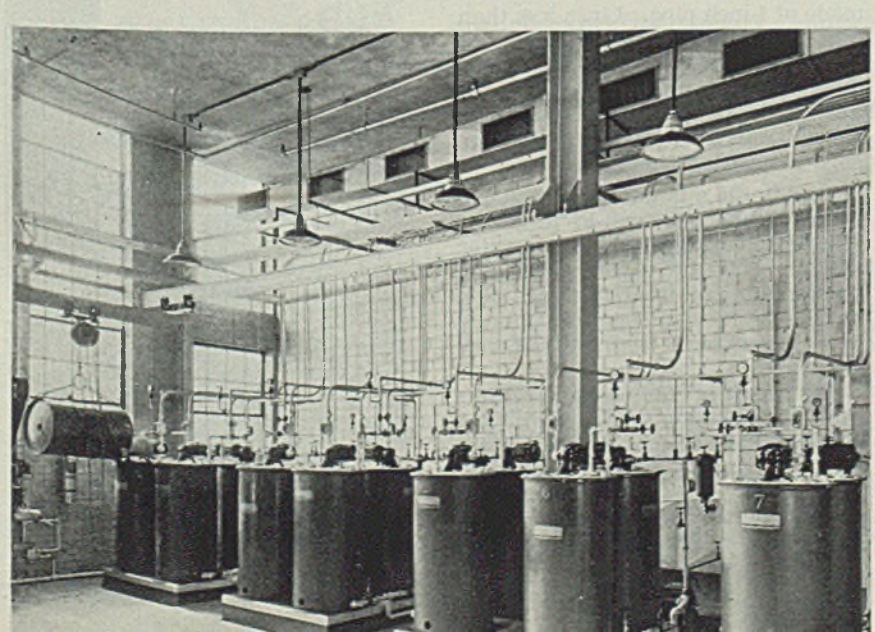
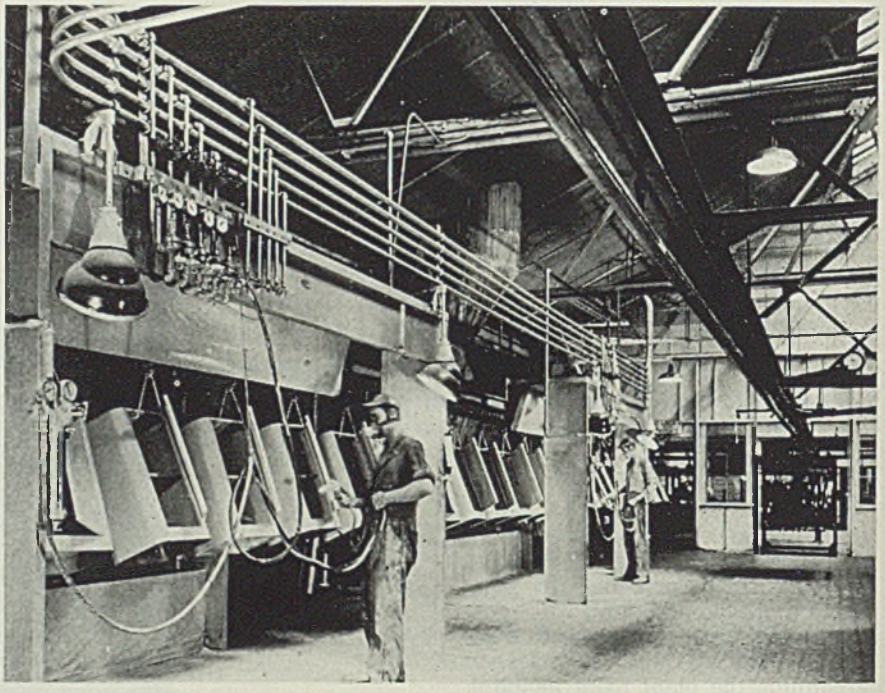


Fig. 1—This battery of 14 mixing and circulating tanks serves seven plant distributing systems. Each system requires two tanks, one for mixing and the other for reservoir. Note handling facilities for loading the tanks from drums as shown at the left using hoist on overhead monorail bridge

Fig. 3—Five paint lines serve each of five spray booths on the first floor, two of the booths being shown here. Note adjustable fluid regulators directly above operators' heads. Work passes in front of operators suspended from chain conveyor. Another overhead chain conveyor in the handling system can be seen at the right



spray booths on the first floor. Two of the five lines continue on to a group of four spray booths on the second floor. The sixth paint line serves the second floor booths only. A seventh line runs to a group of dip enameling tanks on the third floor.

The smaller mixing room has nine mixing tanks from which two circulating systems carry paint to the locker assembly line. These two rooms supply air-conditioned storage facilities for more than 20,000 gallons of enamels and lacquers. They are maintained at a temperature of 78 degrees Fahr. the year round.

Fig. 1 shows a battery of 14 mixing and circulating units which supply paint to seven plant distributing systems. Note here at the extreme left the method of filling these tanks from drums. The hoist is carried on a monorail bridge which traverses the entire working area in the room.

Fig. 2 is a view of the end of the line shown in Fig. 1. Each tank has its own agitating motor drive at its top of the tank. Each pair of tanks is provided with its own pumping unit and mechanical filter.

The first floor spray room has five spray booths, two of which are shown in Fig. 3. Each booth is served by five lines, and provision is made for two operators to work in each booth, although only one is shown in each booth in Fig. 3. Note the adjustable fluid regulators directly above the operators' heads. These regulate the spraying pressure to be obtained from each line. As will be noted from Fig. 3, each spray booth is provided with powerful floodlights to help in the spraying. A powerful exhaust system carries away overspray.

Fig. 4 shows two of the five tanks in the smaller mixing room used for preparing special dip enamel colors. The pumping unit to the left has been installed to handle solvent from an underground storage tank.

Fig. 5 shows one of the two compressed air circulating systems in the smaller mixing room used to circulate the paint from this point. Also a portion of the racks for storing drums of various paints can be seen in the background.

All distribution lines having a total length of 1000 feet or more are made of 1-inch pipe. Lines less than this length employ ¾-inch pipe. In every case, the same size pipe is used for the entire length of the line. For all changes of direction, 12-inch minimum radius bends are used instead of pipe fittings.

Back in the mixing room, each distribution line is served by a pair of mixing tanks, a pump unit, a filter and the necessary valves, gages, etc. Two tanks are used for each line since one is employed for mixing while the other is serving as a reservoir.

Each tank is equipped with a mechanical agitation unit. A vertical shaft extends nearly to the bottom of the tank and carries two aluminum paddles of the propeller type. A quarter-horsepower explosion-proof gear-head motor mounted on top of each tank revolves the paddles at 59 revolutions per minute. Antiwhirl baffles welded to inside of tanks prevent swirling of the material. Pitch of paddle blades tends to lift the material upward. Thus heavier pigments are kept thoroughly mixed in the solution.

Each of the seven circulating systems served by the large mixing room is equipped with an internal

(*Please turn to Page* 88)

Fig. 4—Two of the five tanks in the small mixing room are shown here. These are for preparing special dip enamel colors. Pumping units at left handles solvent from an underground storage tank

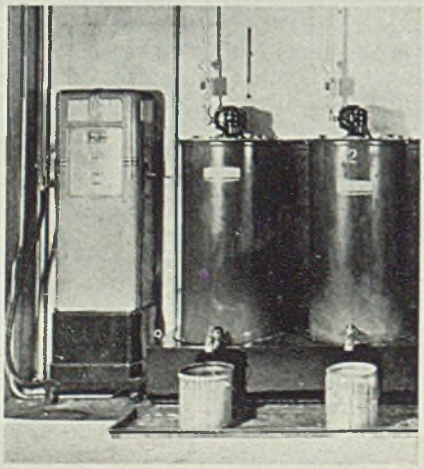
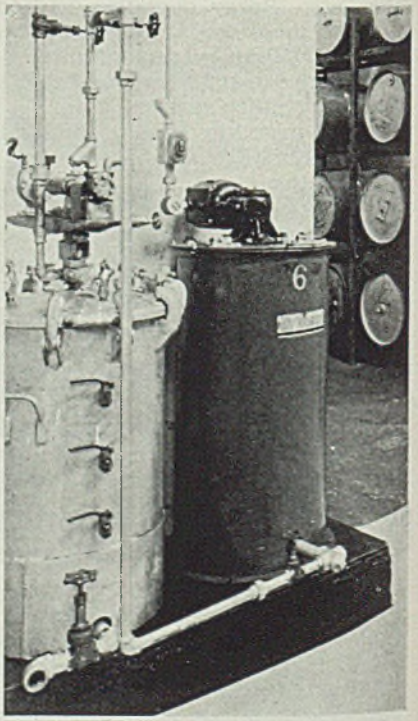


Fig. 5—This shows one of two compressed-air circulating systems in the smaller mixing room used to send out the paint from this point



Tote more tons a turn with power from Exide-Ironclads

HEAVIER COILS . . . higher handling speeds . . . more tonnage delivered more quickly . . . that's the order of the day!

When you equip your electric trucks with Exide-Ironclad Batteries, you're sure of

- Giant power to handle 15-ton steel coils easily.
- High voltage to maintain fast running speeds.
- Dependable performance throughout each turn . . . no breakdowns, no repairs.
- Longer battery life and correspondingly lower cost per ton-mile.

HELP FOR HARRIED OPERATING MEN:

We've developed the Exide System to improve battery performance, simplify maintenance and prolong battery life. You'll find complete details in the free booklet, "The Exide System for Better Material Handling." Write for your copy today.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

TIME RECORDERS control arc welding cost and procedure

An unusual incentive plan based on instrument chart records not only gives the operators an incentive to more and better work by enabling them to increase their incomes, but also reduces total overall welding cost while increasing output. Of equal importance, better work is done. System can be applied easily in any arc-welding shop

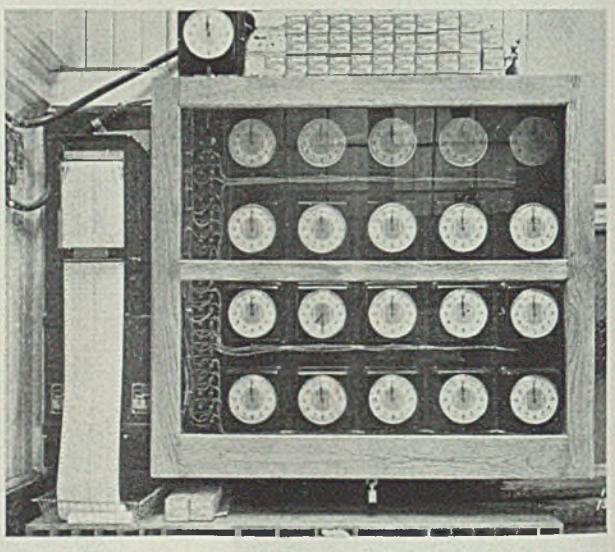


Fig. 1—A portion of Harnischfeger Corp.'s welding shop (top view). Note variety of work handled. Welding machines are arranged in a double row down the center of the shop, with another row along each outside wall. All machines are wired back to a single centrally located recording panel. All illustrations courtesy Esterline-Angus Co. Inc., Indianapolis

Fig. 2. (Lower view)—One of the recording panels: At the left is the 20-pen time recorder showing on a single chart the distribution of active and idle time on 20 different welding machines. At the right is a group of 20 synchronous clocks which act as time totalizers, showing the total actual welding time for each man and each shift

■ THE PROBLEM of how to reduce costs and yet improve quality at the same time is not easy to solve where the work performed is largely manual, such as in ordinary arc welding. Any effort to lower the cost usually results in less satisfactory work, while improved workmanship ordinarily is more expensive. Some companies compensate workers on a piece-rate basis; others employ a day-work or non-incentive method. Each system has its advantages and disadvantages, and it was only after a comprehensive study that an entirely new method of compensation was developed to gain the advantages of each system.

Since Harnischfeger Corp. employs welding widely in fabricating overhead cranes, electric hoists, excavating machinery and other equipment, much experience was had in both previous methods of compensation.

To obtain lower cost and better work in a manual operation it is essential that the system of compensation be such as to induce the operator, *in his own interest*, to desire to accomplish the ends you also are seeking.

The first step in developing the new incentive plan was to make a comprehensive study of the graphic method of recording elapsed time by means of the Esterline-Angus chart recorder shown in Fig. 4. This instrument produces a detailed record showing the uniformity and regularity of work done by each operator, shows when work is started and when it is stopped, and also shows how much welding time was lost by each man.

In addition to this graphic record, showing how each man handled his work, a synchronous clock is connected to the relay circuit from each operator's station to measure and totalize the actual welding time.

Fig. 5 shows one of these series current relays connected to a welding generator employed in this type of setup. The flow of current to the welding arc energizes this relay. Its contacts control a circuit to one of the pens on the distant time recorder as well as setting in motion the synchronous electric clock. Since the clock runs only when the arc is in operation, the clock indicates total effective arc time. This system furnishes all the information required for a most effective control as will be shown.

To insure the success of such a system, each operator is given the incentive to make the system function by a bonus payment based on records produced by the control system itself. It is recognized that any method of supervision and control which benefits the employer alone and not the workmen is likely to fail.

Operation of the System: Fig. 2 shows one of the recording panels with a 20-pen time recorder and chart at the left. This reveals the distribution of active and idle time on 20 different welding machines. At the right in Fig. 2 is a group of 20 synchronous electric clocks which totalize the welding time for each man and each shift. This equipment permits supervising three 8-hour shifts of 20 men each.

The first of these control boards produced such excellent results that at present time there are three such control boards in service in the Harnischfeger plant capable of checking simultaneously the work of 45 different welding machines and their operators (a 20-unit panel, a 15-unit board and a 10-unit board). The graphic meter of the instrument in Fig. 2 has 20 pen elements, each pen being operated by an electromagnet connected through a

By ERWIN C. BRECKELBAUM
Superintendent of Welding
The Harnischfeger Corp.
Milwaukee

SURVIVAL OF THE FLEETEST

Governor frame of welded design. Cost—$0.29. Weight—3½ lbs.

Governor frame of former design. Cost—$0.36. Weight—4½ lbs.

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

ALTER EGO: Look how simple and how quickly we can make this governor frame by arc welding.

Yes, but why should we tackle a new way of making it when we've had so much EXPERIENCE with the present way?

ALTER EGO: Don't let's kid ourselves, that's NOT experience—it's just HABIT and habits of production (even some good ones) will mow you down if you stick with them long enough.

But this governor frame was written up as tops when we first designed it.

ALTER EGO: Yes, and that was exactly the same year you paid $3000 for your Peerless auto. Suppose you had kept that car, unused, in a glass case and put it up for sale today—one of the best cars on the American market—do you think you could get $25 for it?

Boy! Haven't the times changed! Haven't values changed! Just look what better and speedier production have done.

ALTER EGO: You really mean that we've got to snap out of costly habits if we hope to survive in the faster era, just ahead. It is survival not only of the fit, but also of the fleetest.

• •

LINCOLN SUGGESTS: It's simple to change over your product to welded construction—to prepare for the tough sledding ahead. Change *one part at a time.* This doesn't interrupt your rush production schedule. Gives you the strength, rigidity, light-weight and pleasing appearance of welded design without delay. "How to Changeover," Bulletin 420, will guide you and will show you how Lincoln *guarantees* that you will profit!

LINCOLN "SHIELD-ARC" WELDING THE LINCOLN ELECTRIC COMPANY Cleveland, Ohio

Authoritative Information on Design • Production • Welding Equipment

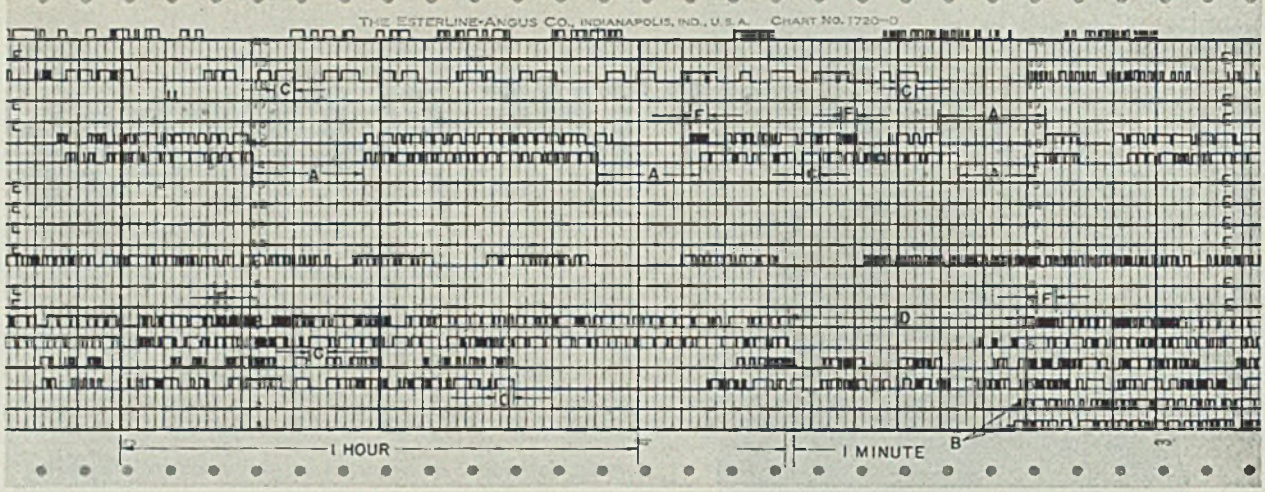
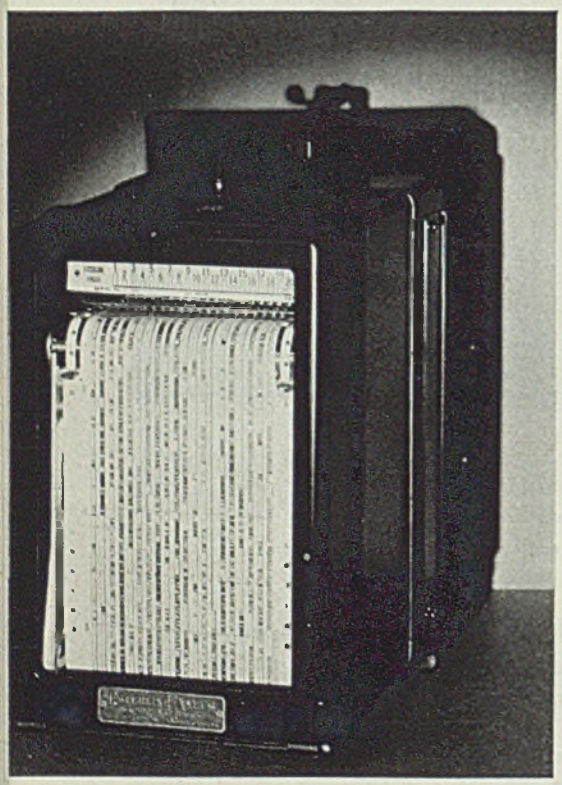
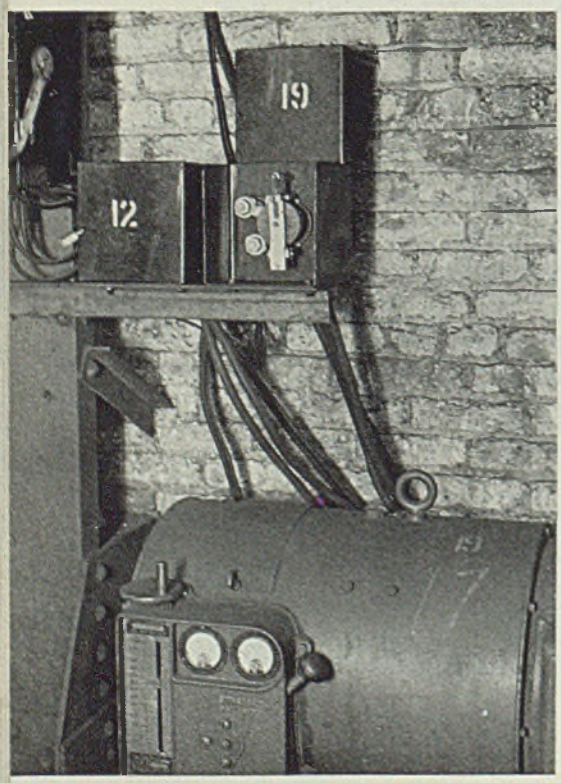


Fig. 3—A typical section of chart from the time records: The chart speed was 6 inches per hour and each small division represents 1 minute. Intervals marked "A" represent time required to move the work between welding operations. At point "B," welding machines Nos. 1 and 2 finished their task and were shut down for the remainder of the shift. The short intervals marked "C" show uninterrupted welding for the time required to consume one welding rod. The gap in the record marked "D" shows time between finishing one job and starting welding on the next. The straight lines marked "E" show that welders Nos. 7, 8, 10, 11, 12, 13, 16, 17 and 19 were idle during this shift. Points marked "F" show an unsteady welding arc





current relay in series with a welding circuit of a welding generator.

Referring to a typical chart, Fig. 3, note the record shows the successive operations of each welder, each delay or interruption and the continuity of operation. This permits comparing the performance of different operators on the same class of work and quickly uncovers delays so their cause can be eliminated. These charts are extremely valuable in assisting men to improve their performance because they show just how each man performs in comparison with other operators.

"Arc-Time" Pays: The synchronous electric clocks automatically add up the arc time increments shown on the chart for each individual welder. Since the arc time is a direct measure of the actual amount of work done by each welder, it forms an ideal and fair basis for the bonus payment system. Not only does this system quickly disclose whether the proper welding procedure is being employed, but it also shows whether the proper electrode size, current setting and other factors affecting arc time in relation to the amount of work actually produced are being handled properly.

The bonus payment is based on the "arc efficiency" of the welding operator. This efficiency figure is obtained by dividing the total time shown by the clock by the total time the welder was at work. For example: If at the end of an 8-hour shift the clock of one operator shows 4.0 hours arc time, then his efficiency for the 8 hours is 50 per cent. By establishing standard efficiencies for different classes of work, the operator is paid a bonus based upon how much he has exceeded the standard efficiency rating for that job.

The average arc efficiencies on each class of work obtained under a day-work basis are taken as standard, and each workman shares with the company the result of his increased efficiency.

The Advantages of Graphic Control: This system has the following distinct advantages over straight piece-work system (where a definite price is paid for each job):

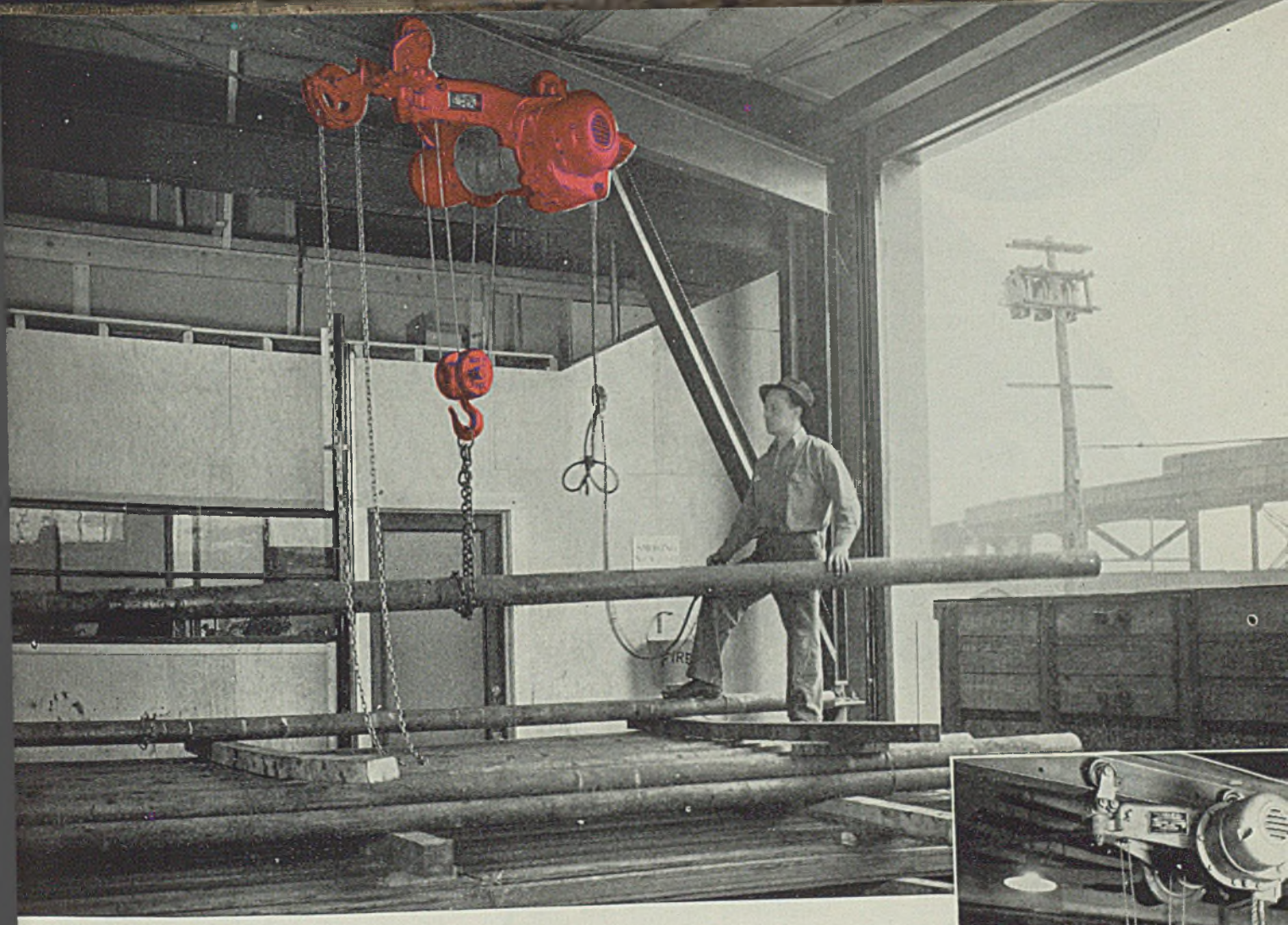
Each inividual is paid strictly according to the results of his own efforts as efforts of other men do not influence his own compensation. When on piece work, often as many as 20 men were worknig in partnership on a large job and there was no way to determine whether each man had done his share or not.

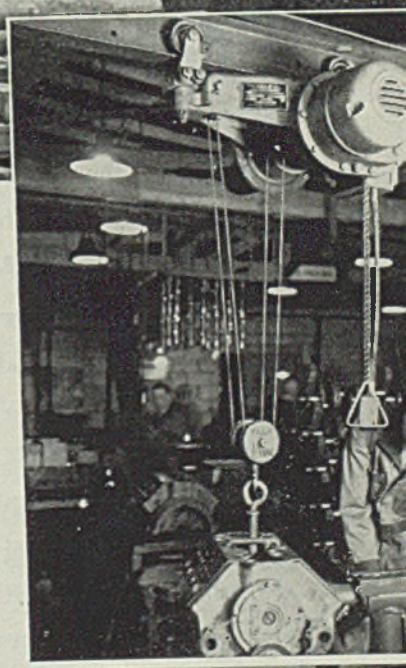
The arc-time basis gives a definite measure of effort, whether or not a given amount of welding has been done and whether the procedure has been followed. This is not true in the case of a straight piece-work

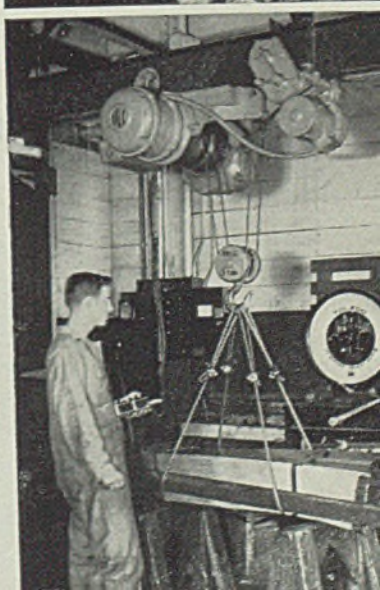
(*Please turn to Page* 90)

Fig. 4. (Center Photo)—A close-up of a time recorder: Twenty separate pens, each actuated by an individual electromagnet, write on a single strip chart. The chart is 6 inches wide and is propelled at the constant speed of 6 inches per hour by a synchronous motor

Fig. 5. (Bottom)—A close-up of one of the welding machines showing the series current relay. The flow of current to the welding arc energizes this relay, and the contacts control a circuit to one of the pens on the distant time recorder







SPEED DEFENSE PRODUCTION...CUT TIME LOSSES ...WITH A CABLE KING!

Every period of time lost in your plant is a loss item that lowers production output. Now, when things really have to hum to keep up defense production, you need Cable King Wire Rope Electric Hoists.

Cable King's exclusive air-cooling principle allows it to meet today's stepped-up production schedule, accomplish more at less cost, do it longer, better and faster. Cable Kings are built to care for rush periods and take them in their stride.

Your operators will like the Cable King, too, because it is a dependable performer. It has everything . . . speed—long life—adaptability—minimum maintenance, and gives maximum service. There is a Cable King for every job. Capacities: ¼ to 10 tons.

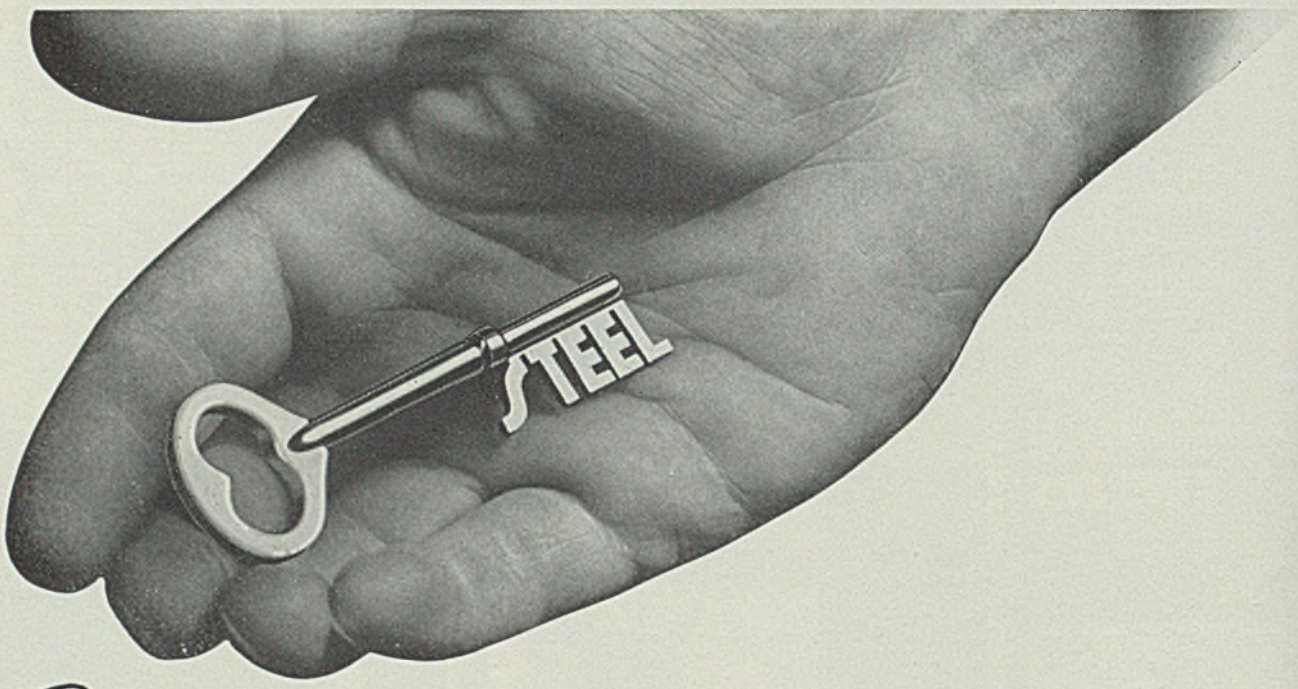
Let your nearest Yale distributor tell you about this Cable King Hoist that's setting new performance standards. Or, write to us for full information.

THE YALE & TOWNE MANUFACTURING CO.

PHILADELPHIA DIVISION—PHILADELPHIA, PA., U. S. A. IN CANADA: ST. CATHARINES, ONT.

YALE TRADE MARK

Hand and Electric



Your key, Sir!

To overcome the problem you are facing today—and get you into the plants where doors are barred to salesmen's contacts—use STEEL.

Like a master key, STEEL magazine opens for you those doors—gets your product story to the men with the power to say "yes" or "no"—keeps alive these vital contacts upon which future orders depend.

Through its selective coverage, STEEL reaches the plants with rated buying power in the METALWORKING and METAL PRODUCING industries. Have you seen the specially prepared market study which proves the rated buying power of STEEL's coverage? If not, drop us a line, please. Advertising men and sales managers tell us it's an eye opener.

"SORRY... YOU CAN'T SEE HIM!"

What about those men your salesmen cannot reach today? Safeguard established connections—and future markets—by using STEEL to reach them regularly.

"Steel" is Modern

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

CLEVELAND

NEW YORK • PITTSBURGH • CHICAGO

WASHINGTON • LONDON

Gothic Type Church features All-Welded Frame

Fig. 1—Architect's rendering of new Fairmount Presbyterian Church of Cleveland. Gothic effect is achieved by all-welded steel framing

■ A NEW church, first in which a Gothic effect, see Fig. 1, is achieved in an all-welded steel-framed building and the only free-standing structure in existence with such great roof pitch, according to the designers, is being completed at Cleveland. This church, the Fairmount Presbyterian, is 150 feet long, 55 feet wide and 50 feet high, costing approximately $250,000. The framework is entirely welded and, according to the structural engineer, welded construction is the only method by which the structure is feasible. The tremendous pitch of the gable frame roof, see Fig. 2, and the fact that the entire structure is free standing make it unique. Roof pitch is exactly 45 degrees, more than twice that of average roofs (20 degrees). There is no lateral bracing whatever.

Bent channels and plate were arc welded to form the haunch section of columns. In fabricating these, first a V was cut into each channel. This was followed by bending to desired contour, placing the two bent channels together with a cut plate in a special jig, the plate touching each channel at center line of web, then fillet welding at each side of the plate. Columns and roof frames are 18-inch 70-pound I-beams. Haunch section web plate was butt welded to webs of columns and beams while the haunch channel flanges abutted the I-beam flanges in a V-shaped joint, see Fig. 3.

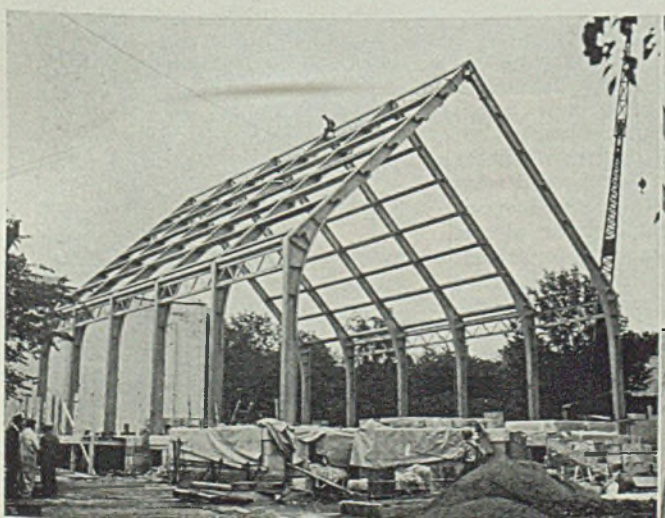
Column, haunch and roof frame, comprising one half a frame bent, constituted one fabricated unit. They were trucked to the site after shop fabrication.

In erection, the two halves of a bent were placed, held in position until the other was erected, then both were allowed to assume positions, butting together at the peak. All steel was placed in less than two days, the erector stating that one day would be ample for a second job of the same type.

Design was by Walker & Weeks, structural welding engineering by C. Merrill Barber, steel fabrication by the Austin Co. and erection by Vogt & Conant, all of Cleveland. All welding was by the shielded arc process with electrodes and equipment supplied by the Lincoln Electric Co., Cleveland.

Providing as it does the most efficient possible use of steel and a degree of rigidity which the structural engineer claims could not be matched by any other design, this new development is expected to find wide usage in all types of free-standing structures.

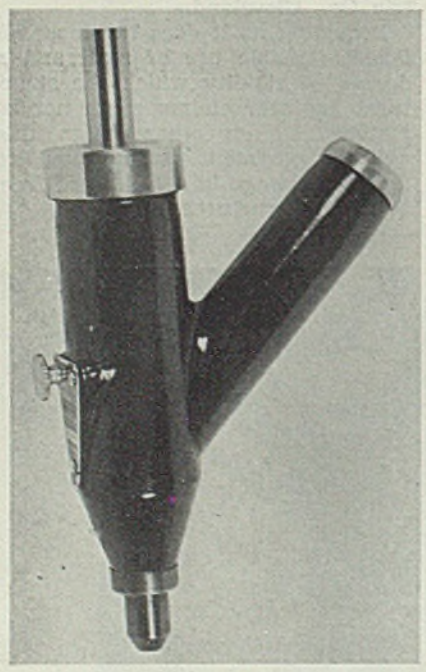
Fig. 2—All-welded steel frame, left, of new Cleveland church, first ever built in which channels comprise the principal load-carrying members in column haunches
Fig. 3—View of frame, right, at junction of columns and roof beams showing haunch sections fabricated by arc welding bent channels and plate



Industrial Equipment

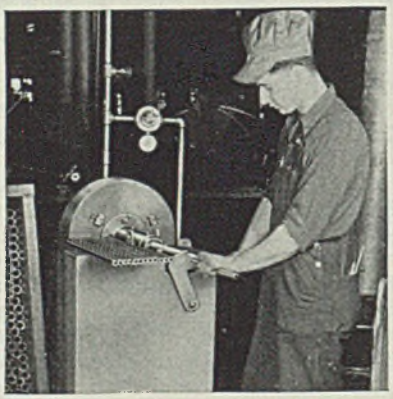
Centering Device

■ Center Scope Instrument Co., 633 South La Brea avenue, Los Angeles, announces an optical instrument or center scope which will locate lines, edges or points to the exact center of the spindle shaft of any machine tool. It is fast, accurate, and is not subject to any human or mechanical errors. Furthermore, the instrument is available in three models known as the Variable, Rotating and Special. The first will function on any of the various types of machine tools from a jig borer to a bench drill. The other two are built more for special uses. The Variable model is not factory centered, but is equipped with a trimming knurl screw allowing operator to center work to the spindle shaft of the machine tool. Its body assembly is about 5½ inches long and its steel shank is ½-inch in diameter and 1¼ inches long. The instrument has a magnification of 40X. The field of vision is large enough to enable operator to find his work lines in the image with little trouble. The instrument also has sufficient eye point position to enable the wearer of glasses to observe the entire field without discomfort. Guide lines in the eyepiece are properly spaced for all general shop practices. These, however, may be changed. The center scope is brought into focus by moving the quill until the nose of the instrument is approximately ¾-inch above the work—and a sharp image of the layout is obtained. The instrument is centered to the machine tool in which it is placed by coordinating the trimming operation and the adjustment of the work. While a slide table makes centering more convenient, it is not necessary. The Special model is constructed with various taper shanks, and it is designed for use on jig borers, lathes and other machine tools. It is factory centered to its fixed taper shank. It also may be used in conjunction with gage blocks and micrometers.



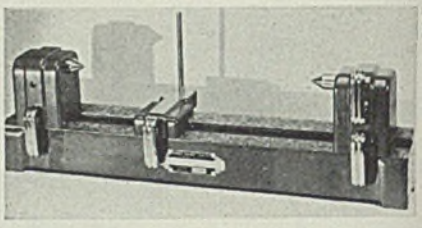
Burring Machine

■ Pines Engineering Co., St. Charles, Ill., announces a horizontal spindle burring machine for reaming, burring, facing, threading or honing tubing and rods. It features an air-operated work chuck controlled by a limit switch which is tied in with the feed movement lever that advances the spindle. On some work the operation with this mechanical-electrical arrangement is capable of production speeds up to 1200 pieces per hour. Pictured is a typical production set-up where three operations are performed in a single pass: Tube outside diameter is burred, end is faced and inside diameter is reamed.



Bench Center

■ Barber-Colman Co., Rockford, Ill., has introduced a new bench center for inspecting a variety of small work up to 6½-inch diameter by 18 inches long. It provides an accurate, fast method for inspecting cylindrical and circular pieces. The base of the bench center is cast from nickel cast iron and is of ribbed box construction with finished ways cast integral. Both headstock and tailstock are adjustable, and may be clamped at any position on the bed. The tailstock has a spring-loaded sliding center which also can be readily locked in position. The headstock center is fixed and all three sliding members locate from the same reference surfaces. The slide, or indicator base, is provided with a vertical post and is used with a standard type indicator clamp. Other types of indicator holders can be easily attached if desired. The work on the unit is inspected usually by being rotated by hand under a dial indicator which registers the amount of runout or eccentricity. In addition work may be checked axially to determine side runout or "camming" action on the sides of shoulders or collars.



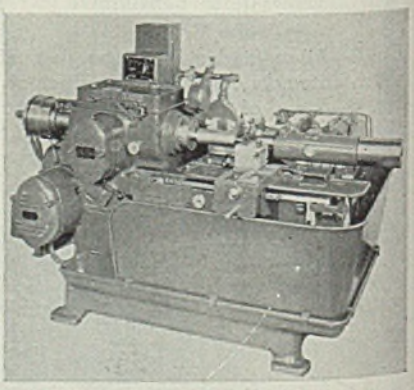
Lightweight Air Hose

■ B. F. Goodrich Co., Akron, O., has developed a new lightweight air hose so flexible that the ½-inch size can be bent to a 3-inch radius without collapsing or cutting off the air supply. Its design makes it very adaptable for use with pneumatic tools.

Made in a light gray color, the hose is stocked in ½ and ¾-inch sizes. Of the 2-braid construction, it easily can withstand working pressures of 80 to 125 pounds. The hose is oil resistant and has good heat resisting characteristics.

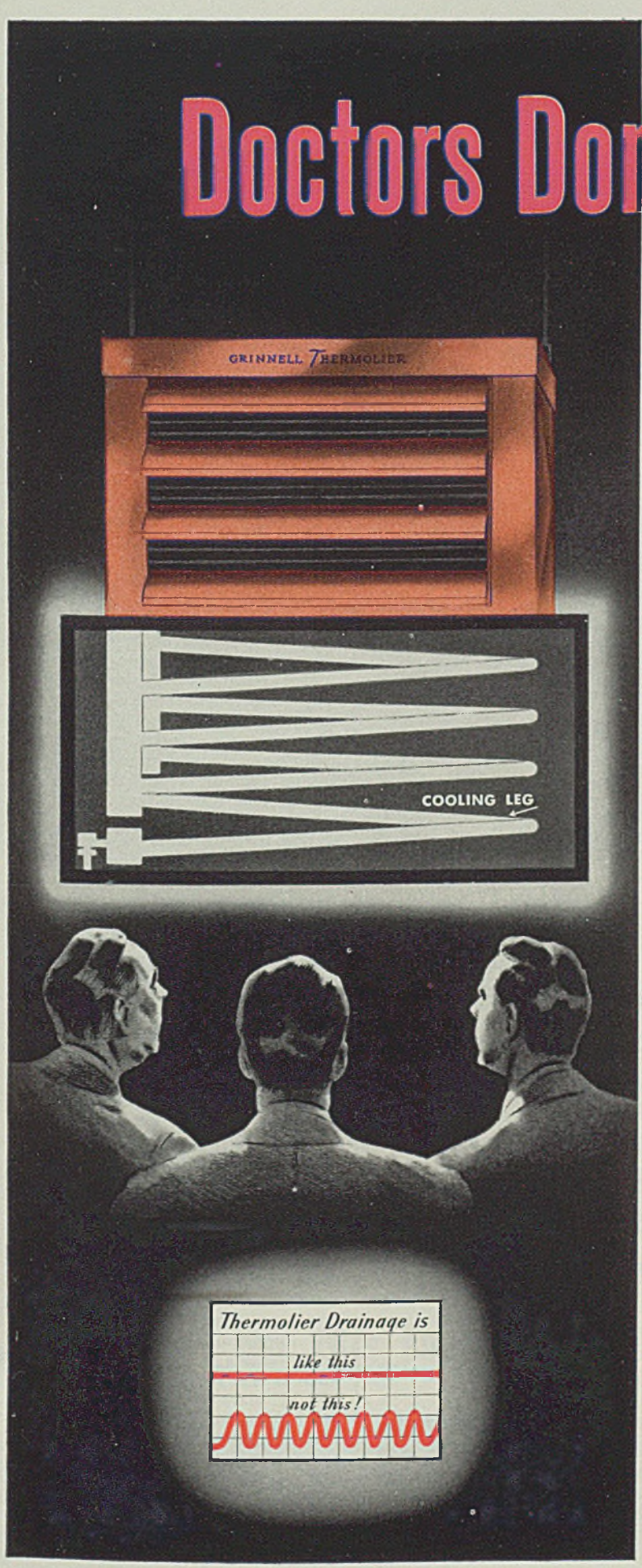
Shell Lathes

■ Sundstrand Machine Tool Co., Rockford, Ill., has introduced two new types of lathes for expediting production of shell—a model 10 automatic for turning 3-inch anti-aircraft shell and an automatic for band turning four different sizes of shell. The former, shown in the accompanying illustration, rough and finish turns the outside diameter and faces both ends of a 3-inch



Doctors Don't Guess

Why Should You?



It takes more than a superficial examination to find the strength and weakness of Unit Heaters, too.

You're buying HEAT not ornaments, so don't stop at the housings (they're all smartly styled). Performance depends upon what's inside.

Outstanding among all Thermolier features is an efficient *Internal* Cooling Leg, integral with the unit. It removes condensate *continuously* instead of intermittently; keeps *all* of the heater working all the time; eliminates "air binding" and hammer; permits use of simple thermostatic trap and is equal in actual cooling effect to *more than 100 feet* of exterior cooling piping.

This one feature *alone* places Thermoliers ahead of all other unit heaters in heating efficiency. Send for complete Data Book explaining Thermolier features. Grinnell Company, Inc., Executive Offices, Providence, R. I. Branch offices in principal cities of the United States and Canada.

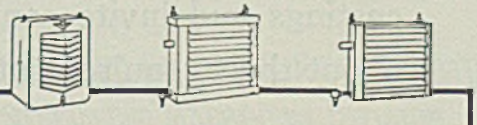
Grinnell Company, Inc. • Grinnell Company of the Pacific • Grinnell Company of Canada, Ltd. • General Fire Extinguisher Company • American Moistening Company • Columbia Malleable Castings Corporation • The Ontario Malleable Iron Company, Ltd.

• • •

OTHER THERMOLIER ADVANTAGES:

1. *U-Shaped Tubes* eliminate expansion strains the simplest way . . . insure dependability.
2. Positive *Built-In Drainage* – every tube is pitched for complete drainage of condensate.
3. *Superior Fin Design* – square fins instead of round – 24% more radiating surface. Dirt and lint collection is reduced to a minimum.

DeLuxe *Industrial* *Factory*



GRINNELL
THERMOLIER

THE UNIT HEATER WITH 14 POINTS OF SUPERIORITY

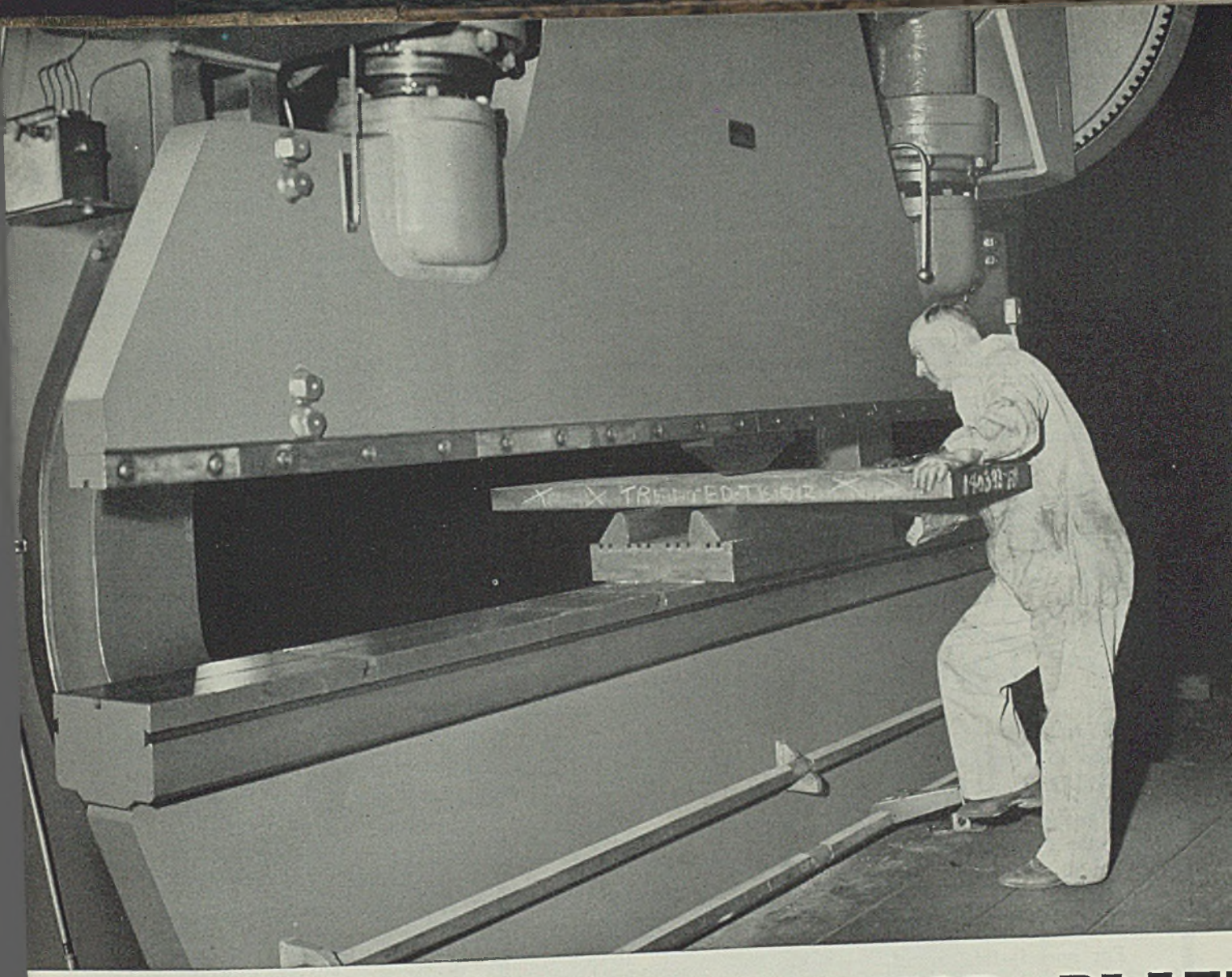
anti-aircraft shell made from tubing. The rough shell, in the lathe, is held on an expanding type mandrel attached to the machine spindle.

This mandrel in turn has two sets of three pins which expand on the inside diameter of the part. One set of these pins grips and drives the work at one end while the other set centralizes the part from the opposite end. The outer end of the mandrel has a pilot which registers in a support bushing in the tailstock. The tailstock support is mounted on an air-operated slide so that it can be moved into and out of position quickly. The shell is positioned end-wise on the mandrel by a swinging locator attached to the headstock. The longitudinal feeding front carriage has a cam bar actuated tool slide on which is mounted a turret type tool block. Two tools are incorporated in the tool block, one of which is used for the rough turning cut, and the other for the finishing cut over the same surface. In between cuts, operator indexes the turret type tool block so that both cuts can be taken with but one handling and chucking of the part. The complete outside diameter of the shell including the ogive is turned in this operation. Turning of the ogive is made possible by a special contour turning cam bar which controls the cross movement of the tool slide. Three tools are carried on the cross feeding rear tool slide. The two outermost tools face the end of the shell to length, and the center tool produces the shoulder on the bourrelet. Machine's production is rated at 18 pieces per hour.

Shell Bands Differ

The other automatic introduced is for turning the copper rotating band on four different sizes of shell. These four shell, the 105 and 155 millimeter, the 5-inch common projectile and the 5-inch anti-aircraft navy shell, all have different types of bands which require special features in the tooling. Tooling, however, is as universal as possible so only little time is required for changing over the machine. A 3-jaw air-operated chuck is attached to the machine spindle. This has a set of form fitting jaws for each different size of shell. These jaws grip the outside taper diameter of the boat tail and have a shoulder which locates the shell endwise. The nose of the shell is supported in a cup type center which is moved into and out of position by an air cylinder. To the machine's longitudinal-feeding front tool slide is mounted a double deck tool block which carries two tungsten carbide tipped turning tools. One of these is set approximately ⅛-inch ahead of the other so that a rough and finish cut is taken over the band surface with one cycle of the front tool carriage. On the cross feeding rear tool slide is mounted a vertical type tungsten tipped form tool which finish forms and grooves the band. Attached to the form tool is a high speed steel corner break tool which breaks all sharp corners on the grooves. The same front tool block and tools are used for all four sizes of shell. Different form tools, however, are required for each shell inasmuch as there is a different width and spacing of the grooves in the band. The 5-inch navy shell has an angular undercut in the band. To machine this undercut, an angular feeding third or overhead slide is mounted on the headstock. This third slide is fed at an angle of 45 degrees by the longitudinal movement of the front carriage. As this auxiliary slide is not required for machining of other sizes of shell, it can be moved out of position. Both machines feature regular automatic cycle of rapid approach, feed, return and stop, all timed and interlocked with the starting and stopping of the machine.

The chuck and movement of the tailstock center on the model 10



STRAIGHTENING 2½" ARMOR PLATE

● On heavy jobs like this, Steelweld Bending Presses truly demonstrate their quality. Straightening heavy, heat-treated armor plate having a tensile strength of 170,000 pounds per square inch, requires tremendous power. Every part of the machine must be built to take it.

The machine runs continuously at 20 to 40 or more strokes per minute depending upon plate thickness. Every stroke of the ram hits at full tonnage capacity. 100 or perhaps several hundred strokes are required as condition of plate demands.

Dozens of Steelwelds have been purchased for arm plate work because production-minded executives ha found they will perform month in and month out, 24 ho a day unflinchingly.

The extra heavy construction that makes Steelwelds desirable for this work, is also advantageous for ma bending and forming operations. If you work with m steel, alloy steel, monel or other metals of high ten strength, whether light or heavy gauge, it will pay yo check into the many possibilities of Steelweld Bend Presses.

GET THIS BOOK!

THE CLEVELAND CRANE & ENGINEERING
STEELWELD MACHINERY DIVISION
1125 EAST 283RD STREET • WICKLIFFE. OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING

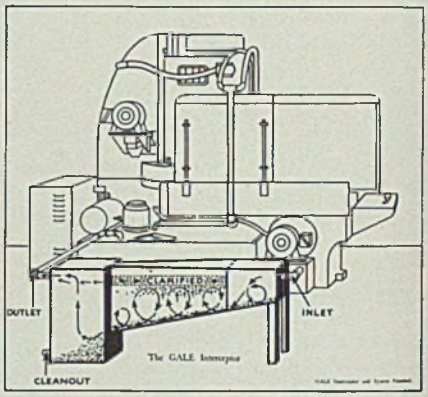
STEELWEL

BENDING PRESSES

is controlled by a foot valve. The machine produces 75, 28, 37 and 37 pieces per hour respectively for the 105, 155 millimeter, 5-inch common projectile and 5-inch navy shell.

Oil Clarifying Units

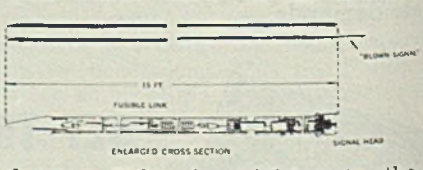
■ Gale Oil Separator Co. Inc., Chrysler building, New York, has introduced two new developments for clarifying cutting oils. One, an interceptor for use in conjunction with automatic machines and the other a reclaimer system. Both operate entirely by gravity system. The former can be installed directly to a machine by locating it on its pumping system. Dirty oil entering this unit is directed downward and is broken apart by a specially designed breaker wedge. The wedge slows the incoming liquid, directs the lighter cutting oil upward and the heavier material downward to the bottom of the interceptor. The heavier material is riffled and rolled, breaking away the lighter oil which flows to the surface. Through the turbulence in the bottom of the unit the heavier material flows into a bucket. The lighter liquid on the surface flows to the outlet and into a compartment where the final clarifying occurs. This unit is available in sizes capable of handling 5 gallons per minute or more. It can be installed with or without filter element. When using the reclaimer, impure oil taken from



combustion engines, etc., is poured into a tank above it. The dirty oil entering the unit is guided by a direction baffle to the bottom of the reclaimer, which at the same time, disperses it outwardly to the sides. Immediately, desludging or separating impulses are created so that the lighter oils rise to the surface. This inflowing current of oil comes in contact with a specially designed breaker wedge that further splits and separates the oil. The heavy sludgy material is bounced, rolled and scrubbed to separate impurities. As the oil is released of the heavy sludges, it rises to the surface and flows in a separate stream with the previously separated oils to the filter chamber. Here through a filter unit, small atoms of carbon or silt are filtered from the oil. Meanwhile, the heavy sludge and other impurities are collected in a sump where it can be drained off and discarded.

Hot Spot Indicators

■ Coal Specialties Co., 50 Church street, New York, has now placed on the market improved Hot Spot indicators for use in connection with coal piles and other stored material subject to spontaneous combustion. These units now incorporate fuse links which "blow" at 125 and 180



degrees Fahr. in addition to the regular temperature of 150 degrees Fahr. The last, however, is the one which is most generally acceptable for average conditions throughout the country where coal is stored, but in some cases because of peculiar qualities of the coal which may heat up more rapidly or more slowly these other

Preparedness calls for *Precision*

★ Since Preparedness got under way, Acco Registered Sling Chains have been first choice for operations which call for strength and dependability and *precision*.

Here you see Acco Sling Chains handling the delicate assembly of a pinion in the reduction gear of a Type C-3 cargo ship.

Each pinion conveys 4250 horse power of a Diesel engine at a nominal speed of 200 revolutions per minute.

For precision jobs such as this specify Acco Registered Sling Chains. Look for the tag attached to each chain. That's positive identification.

Engineering counsel involves neither a charge nor an obligation. Tell us your problem.

AMERICAN CHAIN DIVISION
YORK • PENNSYLVANIA

ACCO
Registered
SLING CHAINS

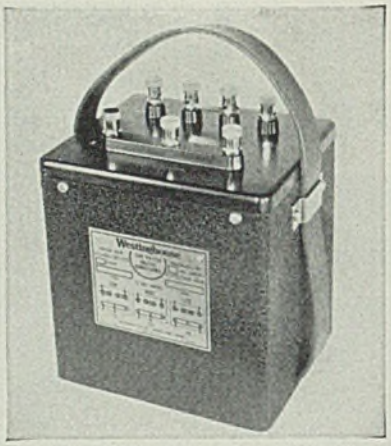
AMERICAN CHAIN & CABLE COMPANY, Inc.

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

links may be more desirable. Each of these indicators measure 15 feet in length. It consists essentially of an outside casing of ¾-inch special acid-resisting iron pipe, filled at one end with a fluted bronze tip for facilitating the entrance of the unit into the coal pile. The other end of the casing is fitted with a cap held in place under tension of a spring by a series of 2-foot units comprising a felt insulating disk, a patented fusible link and a wire connecting link. The principle involved is that the development of the "critical" temperature in any part of the coal pile causes the nearest link to part, breaking the chain, which in turn releases the signal head, which is forced outward by the pressure of the spring (see illustration). When this signal is given, it is easily visible for several hundred feet and a casual inspection of the pile will reveal the particular location at which the coal has reached the dangerous temperature. The indicators are easily installed and after once being "blown" can be refilled and used again.

Portable Transformer

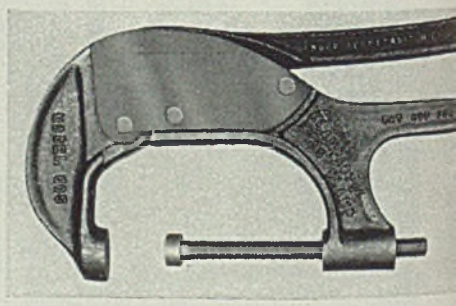
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has placed on the market a new portable PV-130 potential transformer for use



with portable instruments and recorders. Enclosed in an aluminum case, it is available for input voltages between 230 and 2300 volts with 115 volts output on 60 cycle lines. All terminals are of polished nickel and terminal markings and polarities are clearly marked. Accuracy of the unit is plus or minus ¼-per cent both on ratio and phase angle between 0 and 200 per cent rated values.

Improved Clamp

■ Knu-Vise Inc., 16841 Hamilton avenue, Detroit, announces a new Klampacto C-clamp for use in erecting shed, shipyard, round-house or work shop, combining the deep



throat of the standard clamp with the holding pressure of a toggle movement. Its lower jaw swings clear of the work when released. It is equipped with two handles and makes it unnecessary to hang onto it and work when fixing it into position—for just a squeeze of the hand applies it with 2000 pounds pressure. It also is furnished with threaded spindle and lock nut for use when arc welding to avoid spatter. The clamp comes in three models with a 5, 6 and 10-inch jaw.

Machinists' Tool Chest

■ George Scherr Co., 128 Lafayette street, New York, introduced a new line of GS machinists' toolchests featuring drawers and compartments of various sizes to accommodate tools. Chests are available in solid oak, leatherette and poplar.

Handling Paint

(*Concluded from Page 72*)

geared-type pump delivering 5 gallons per minute and driven by a 1-horsepower explosion-proof motor.

In the smaller mixing room, compressed air is used to force the paint out into the lines. Small air-motor-driven internal-gear pumps keep the liquids circulating. Less expensive than the others, this latter type unit is satisfactory for short runs of pipe which have only one or two outlets, as in this case.

Located in each pipe system just beyond the pump is a mechanical filter. Since the circulating cycle is from the tank to the pump, through the filter, out into the line and return back to the tank, the paint is continuously filtered as it is circulated. It is this continuous circulating system that assures against any settling of heavier particles in the supply lines.

A fluid pressure regulator at each outlet in the distribution system reduces the line pressure to the desired value for spraying. Each regulator has a removable key adjustment and a pressure gage to indicate the selected spraying pressure. Only the supervisor holds a key to the regulators. This centers in him the responsibility for establishing correct spraying pressures.

Already the advantages derived from installing this paint circulating system with centralized mixing and storage facilities are returning handsome dividends. An extra advantage is that there no longer is any chance of dilution or settling of the paint since it is now delivered to the spray guns exactly as mixed. Also, it is kept in an entirely closed system, which eliminates any possibility of dirt getting into the paint.

Most important is that absolute uniformity of color is assured since paint of the same color is sprayed under exactly the same conditions of pressure, viscosity and specific gravity and from the same mix, regardless of the location of the spraying operation in the plant. This is particularly important where parts finished on different production lines subsequently are expected to match identically as to color.

Also, due to the large storage facilities now available and the ability to maintain a uniform temperature of 78 degrees Fahr. the year round, larger quantities of paint materials can be purchased at one time, the last step in assuring uniformity of color.

It is evident the thought and planning devoted to providing an efficient system for handling paint materials here can be applied equally well to many other plants with only minor variations.

Facilitates Study of Spectrographic Plates

■ A rapid and precise means of studying spectographic plates is provided by a new photometer recently designed at the General Electric general engineering laboratory, Schenectady, N. Y. Particularly useful in the control of the manufacture of alloys for turbines, generators and all kinds of castings, the instrument enlarges the spectral lines approximately 20 times and provides a means of determining their intensities by measuring the light passing through them to a photoelectric cell. From these data, the concentration of the constituents of the alloy is determined.

Optical parts remain fixed after final adjustment and require no additional movement for focus. The focusing of the spectral lines upon the screen is accomplished by moving the spectographic plate with respect to the condenser and objective.

The plate is mounted horizontally and all light-control devices and scales are immediately in front of the operator. The equipment is arranged to operate on a 6-volt supply of either direct or regulated alternating current.

Dear Mom:

Well, here it is another week-end and I'm not a General yet. But give me time.

Matter of fact, I have too much time on my hands—on evenings and weekends.

The nearest village is 5 miles away. All you find there is a general store, a garage and a canning factory—nowhere to go for any good clean fun, unless you drop in at a smoke-filled juke joint on the way.

Well, Mom, there's a big favor you can do me. The U. S. O. is trying to raise $10,765,000 to run clubs for us, outside of camp. Places with lounge rooms, dance floors, games, writing rooms. Places you can get a bite to eat without paying a king's ransom.

I know you don't have an idle million lying around, but if you could get the family interested and some of the neighbors, and if that happened all over the country, the U. S. O. could raise $10,765,000 overnight.

I'd appreciate it a lot, Mom, and so would every other mother's son in the U. S. Army and Navy.

Love,
Bill

They're doing their bit for you. Will you do your bit for them? Send your contribution to your local U. S. O. Committee or to U. S. O., Empire State Building, New York, N. Y.

OPEN YOUR HEART
OPEN YOUR PURSE
GIVE TO THE

U·S·O·

UNITED SERVICE ORGANIZATIONS

These organizations have joined forces to form the U.S.O.: the Y.M.C.A., National Catholic Community Service, Salvation Army, Y.W.C.A., Jewish Welfare Board, National Travelers Aid Association.

Time Recorders

(*Concluded from Page 76*)

system. Thus it is a more fair basis of compensation.

The operator is not penalized for circumstances beyond his control, such as poor fits in the work which might entail extra welding.

Makes Time-Study Records, Too: An extremely accurate cost record and detailed time study of every or any welding job in the plant is available at little clerical and time-study cost for the chart records contain all the necessary data. With the piece-work system, detailed time studies or elaborate footage calculations with preliminary footage standards have to be made for each job. With continually changing jobs of small quantities, this method becomes simply impossible to work. Thus the time recorder and synchronous clock figures afford another valuable record.

Results Obtained: The installation of this system has brought exceptionally good results—in fact, far beyond the original expectations. Not only is a great mass of detailed work and much supervision saved, but the output of the welding plant actually has been increased 26 per cent without lowering quality of the workmanship whatever.

Costs have been reduced correspondingly. At the same time, the welding operators have increased their individual income an average of about 15 per cent. This increase has certainly sold the men on this system, and they are constantly striving to improve their performance.

Because the system is based on reliable records and because it gives them an opportunity to increase their individual earnings, the men are co-operating wholeheartedly with its use—especially since the system enables the men to increase their earnings and since no one "polices" their work.

After the system had been devised but before the installation was made, the apparatus and its operation were carefully explained to a committee of the operators and the system approved by them.

Since the system has been installed, there has not been a single welding problem that has not been solved satisfactorily. The graphic time recorder system affords a definite production and cost control and aids in maintaining high welding quality. The original installation of 20 circuits has now been supplemented by other installations, extending the control to continuous supervision of all production welding operations in the Harnischfeger plant. Equipment was furnished by Esterline-Angus Co. Inc., Indianapolis.

Arc Welding Lessons Cover Practical Work

■ *Lessons in Arc Welding*, simulated leather, 176 pages, 5½ x 8½ inches; published by Lincoln Electric Co., Cleveland, for 50 cents in the United States; 75 cents elsewhere.

This volume brings to industry and engineering schools, trade and vocational centers the accumulated welding instruction information from the Lincoln welding school, which has been in continuous operation for 24 years. Its early edition has become the standard textbook of educational institutions which include courses in arc welding.

It is a series of 60 lessons, which present in a concise manner fundamental facts of welding, knowledge of which will enable the welder to utilize the process successfully and economically.

Beginning with an introduction giving preliminary instruction to the welder, including suggestions for making and following a definite plan for learning the fundamental principles and for practicing continually, examining welds, wearing proper protective apparel, the lessons cover subjects thoroughly. Explanations are supplemented by drawings and illustrations.

Determination of Tin

(*Concluded from Page 66*)

and replace the flask on the hot plate; bring contents to a boil.

6. Remove flask from hot plate; filter through a 11-centimeter No. 1 Whatman filter paper, using a filtering flask and gentle suction. Wash flask only sufficiently to remove the paper pulp.

7. Place the funnel containing the precipitate in a funnel stand and dissolve the precipitate off the paper with repeated washings of hot HCl (1:2). Catch these washings in the original flask. Continue washing until 150 to 175 milliliters of the acid solution has passed through the paper.

8. Add 10 grams of Stanreduce and place a 1-hole rubber stopper, through which passes a capillary tube, lightly on the mouth of the flask. Place on the hot plate and bring the solution to a boil. Boil gently for 3 minutes. If the tin content is above 0.10 per cent about five minutes may be required to reduce all of the tin.

9. Remove the flask from the hot plate, tighten the stopper, cover the capillary tube with a rubber policemen, and place the flask in a cold water bath until the contents are at room temperature.

10. Add 10 milliliter of starch solution to a clean 300-milliliter Erlenmeyer flask. Decant the cool solution carefully into this flask, wash the original flask once with water, and add to the titrating flask. Titrate immediately with iodate solution to a permanent blue.

A blank should be run and deducted from this titration.

11. Compute the percentage tin as follows:

$$I \times S = \% \text{ Tin}$$

where:

I = Milliliters Iodate — blank

S = Per cent tin value of 1 milliliter

SOLUTIONS

Standard Tin Solution

Dissolve 0.1 gram of chemically pure tin and 2.0 grams of K_2SO_4 and 20 milliliters of concentrated H_2SO_4. The acid must be hot. Cool in the air, dilute to 100 milliliters in a volumetric flask and mix. This produces stannic sulphate. 1 milliliter = 0.001 gram tin.

Standard Potassium Iodate Solution

The same solution as used for sulfur in steel is employed. This is a 0.0156 *N* iodate solution.

2.97 grams KI
0.4955 gram KIO_3
0.25 gram NaOH

Dissolve in a small amount of water and dilute to 1 liter. The NaOH must be added to the KI and KIO_3 before adding water for best results.

More KIO_3 must be used if the salts are old and slightly decomposed.

1 Milliliter = .005% S on a 5 gram sample
1 Milliliter = .0185% Sn on a 5 gram sample
1 Milliliter = .000926 gram Sn (Theoretical)

Ammonium Chloride—Ammonia Solution:

100 grams NH_4Cl
0.5 gram $(NH_4)_2S_2O_8$
100 Milliliter NH_4OH

Dilute to 1 liter with water.

The ammonium persulphate is added to make certain that a small amount of ferric iron is present to precipitate as $Fe(OH)_3$ in procedure No. 4 of the method of analyses. It is not necessary where samples are dissolved directly in open flasks, but it is necessary when the residue from a sulfur determination is used as a sample.

Standardizing

Weigh 5 grams of Fe (by hydrogen) into a 300-milliliter Erlenmeyer flask. Pipette exactly 5 milliliters of the standard tin solution into this flask and run exactly as in the method. Determine a blank.

$$\frac{0.005}{\text{(titration-blank)}} \times 20 = \text{Sn value of 1 milliliter of iodate expressed in \% when a 5 gram sample is used.}$$

This has been found to be about 0.021 per cent and not 0.0185 per cent (theoretical).

Stanreduce

Chemists have used many metals to reduce tin in the determination of tin. The authors have used the following metals with the results noted:

ALUMINUM: The action is too violent. The solution is liable to foam over unless the aluminum is added a little at a time. If the conditions are not correct the tin will be reduced to the metallic state and, consequently, results will be low.

NICKEL: Chemical reduction of the tin is too slow.

TEST LEAD: Same objection as for nickel.

COMMON IRON NAILS: These are usually too soluble. By the end of the reducing period so much iron is in solution as to cause a marked green color, a high blank, and sometimes a fading end point.

No. 40 Swedish Iron Wire: This is a good reducing agent but is a nuisance to use.

Electrolytic Iron: This material comes in squares and is a good reducing agent. Care must be exercised not to break the flask when introducing the squares as they are rather heavy. For a number of years it has been impossible to purchase this grade of metal.

Antimony: This the authors have always ground to a fine dust, over a 24-hour period, in a pebble mill. Its reducing action is somewhat slow. Whenever iron has been used the authors have used it in combination with antimony. Lord and Demorrest claim this is necessary.

Stanreduce: This material is active chemically, yet it does not cause excessive foaming. 0.45 gram of tin has been reduced in 12 minutes with 10 grams of Stanreduce. It is not soluble and so does not impart a green color to the tin solution. Stanreduce supplies the ideal volume of gas during the cooling process. The flask containing the boiling, reduced tin solution can safely be taken directly from the hot plate, stoppered and placed in a cold water bath. It may be said that it supplies its own reducing atmosphere and no additional reducing or neutral atmosphere is necessary. The residue may be recovered and used over again. Being in a granular form, it is convenient to use.

Table II—Analyses of 5-Gram Samples of Steel for Tin*

Tin added, per cent	Titration	Titration — blank	Tin, per cent
0	0.5	0	0
0	0.5	0	0
0	0.5	0	0
0.02	1.5	1.0	0.021
0.02	1.4	0.9	0.019
0.02	1.4	0.9	0.019
0.04	2.4	1.9	0.039
0.04	2.4	1.9	0.039
0.04	2.3	1.8	0.037
0.06	3.3	2.8	0.058
0.06	3.5	3.0	0.062
0.08	4.2	3.7	0.077
0.08	4.2	3.7	0.077
0.10	5.5	5.0	0.104
0.10	5.4	4.9	0.101
0.12	6.3	5.8	0.120
0.12	6.4	5.9	0.122
0.12	6.3	5.8	0.120
0.16	7.9	7.4	0.155
0.16	7.9	7.4	0.155
0.16	8.5	8.0	0.166
0.25	12.5	12.0	0.248
0.25	13.0	12.5	0.259
0.25	11.7	11.2	0.235

* The factor, 1 milliliter = 0.0207 per cent tin, as used, was developed by dividing the total number of milliliters of iodate employed into the total percentage of tin added to the first 12 determinations. This gives the value of 1 milliliter of iodate expressed in per cent tin when a 5-gram sample is used. The theoretical factor for an iodate solution standardized so that 1 milliliter equals 0.005 per cent sulphur is 1 milliliter equals 0.0185 per cent tin.

A shown by the research, the maximum deviation from the mean, in tin determinations up to 0.10 per cent Sn, is ± 0.004 per cent. This determination can evidently be determined with that degree of accuracy.

In conducting routine analyses the accuracy might be slightly lower, i.e., greater deviation from the mean. It is thought best to report the tin to three decimal places on results up to and including 0.045 per cent. Results above this amount are reported to two decimal places, i.e., 0.046 per cent becomes 0.05 per cent and 0.073 becomes 0.07 per cent for reporting.

Effects of Interfering Elements

Theoretically, any oxidation-reduction system lying between: ($Sb^{\cdot} = Sb^{+++} + 3e$) = 0.1 V, and: ($2I^{-} = I_2 + 2e$) = —0.53V will interfere and cause high results by reducing I_2. Copper was found to be the chief interfering element. Since the voltage of the system: ($Cu^{+} = Cu^{++} + e$) = 0.17V is close to the stannous-stannic system the end points will fade slowly if small amounts of CuCl are present, and they will fade quickly if appreciable amounts of CuCl are present. Copper is retained in solution by NH_4Cl in operation 3, and eliminated with most of the iron in operation 6.

Antimony will titrate with iodine

in a weak HCl solution, but when strong HCl, (1:2) is used, operation 7) no iodine whatsoever is absorbed.

Arsenious arsenic is theoretically oxidized by I_2. The voltage of this system, however, is so close to the ($2I^- = I_2 + 2e$) system, that, under the conditions prevailing, it must reduce I_2 slowly. This element was found to have a negligible influence.

Other elements, which, chemists have claimed interfere, are: chromium, vanadium and molybdenum. Theoretically, I_2 will not oxidize reduced chromium and vanadium ions, as shown in Table 1. Large amounts of chromium, however, seem to introduce an additional color blank and some fading of the end point.

In the case of Government standard No. 72 containing 0.91 per cent chromium and 0.15 per cent molybdenum, the tin found was 0.005 per cent showing that there could not have been an excessively high blank. On adding an additional 0.05 per cent of tin the result was 0.048 per cent, this result being a trifle low. These titrations were not permanent end points, but were the first blues which could be detected through the green coloration due to Cr^{+++}.

Research

Tin usually is determined in steel volumetrically by titrating the reduced Sn^{++}, in strong HCl solution, with iodine. The reaction being:

$$Sn^{++} + I_2 = Sn^{++++} + 2I^-$$

Iodine usually is employed in the form of the iodate-iodide solution, and the one used in the steel laboratory for the determination of sulfur in steel is found readily applicable.

Theoretically, any metal such as lead, silver and antimony, which lies between the systems:

$$(Sn_s = Sn^{++} = 2e) = 0.13V$$

and

$$Sn^{++} = Sn^{++++} + 2e) = -0.13V$$

can be used to reduce all tin to the stannous condition and still have no tendency to reduce tin to the metallic state. Some of the metals above tin in the reduction potential series often are used. In this application the H^+ is reduced to H_2 and in turn reduces all tin to the stannous condition. Among these, iron, aluminum, zinc and magnesium have been studied. Iron was found to be an excellent reductant with no tendency to reduce Sn^{++} to Sn_s. Aluminum, magnesium and zinc have a decided tendency to reduce Sn^{++} to Sn_s, especially if H^+ concentration is low. They should not be used except under carefully guarded conditions.

Antimony in a finely pulverized state is an efficient reductant for tin, and it has been used in the laboratory of the Otis Steel Co. for a number of years. The acid solution of Sn^{++}, when reduced with antimony, must be protected from the atmosphere while being cooled. This is done usually by supplying carbon dioxide or nitrogen during the cooling process. It was the one goal of this work to find a reductant which would efficiently reduce all tin to the stannous state, and keep it reduced during the cooling process, without resorting to the use of a neutral atmosphere. An alloy of iron and antimony was found which is an excellent re-

Table III—Log of the Determination

Operation	Working Time (Min.)	Required Time (Min.)	Total Time Elapsed (Min.)
Weigh	1	1	1
Dissolve		30	31
Adjust acidity, precipitate tin	2	2	33
Bring to boil		2	35
Filter	3	3	38
Dissolve Sn $(OH)_4$	3	3	41
Reduce		5	46
Cool	1	10	56
Titrate	2	2	58
Totals	12		58

ductant, and which supplies sufficient H during the cooling process to keep all tin reduced to the stannous state. This alloy thus supplies its own reducing atmosphere.

Tin usually exists in steel within the limits of zero to 0.25 per cent. This was the range studied. Table I shows the analyses made by the method as outlined. Five grams of iron (by hydrogen) was used as a sample and various amounts of tin added in the form of $Sn(SO_4)_2$.

Abstracts of some of the experimental methods follow:

Method No. 1

Attempted. The steel was dissolved in dilute sulphuric acid (1:12). The undissolved portion filtered off and treated with concentrated nitric acid. The resulting white precipitate thought to be metastannic acid was filtered, washed and ignited.

Objections. Subsequent work proved that this precipitate was not stannic oxide, but a mixture of alumina and silica. Tin is partially soluble in dilute sulphuric acid. See "Sampling and Analysis of Carbon and Alloy Steels," page 221, by chemists of the United States Steel Corp.

Method No. 2

Attempted. The steel was dissolved in hydrochloric acid, the tin precipitated with ammonia in an ammonium chloride buffered solution. The stannic hydroxide filtered off and redissolved with 1:2 hydrochloric acid. This solution then was reduced by adding finely powdered antimony and was filtered into a beaker containing liquid paraffin which hardened into removable seal on cooling. The seal was removed and the solution quickly titrated.

Objections. Various weights of antimony were used for reduction. This method worked fairly well, but there were too many discordant results (about 20 per cent) which were all low. The same method excepting that the antimony was left in for the final titration was also tried, but the end points faded too quickly.

Method No. 3

Attempted. Iron (by hydrogen) was used in addition to the finely powdered antimony. About 2 grams was added at the same time as the antimony. The remainder of this experiment was the same as attempted by method No. 2.

Objections. The reduction went to completion much faster than when the finely powdered antimony alone was used as the reductant. There was no advantage to this procedure over method No. 2.

Method No. 4

Attempted. Iron (by hydrogen) alone was used as the reductant. About 2 grams of iron was used. No filtration after the final reduction was necessary. The paraffin was added directly to the boiling solution. The remainder of this experiment was the same as attempted by method No. 2.

Objections. It was found that the iron, although an excellent reductant goes into solution completely and no reductant is left to keep tin from reoxidizing during the cooling process. Discordant results, all low, were obtained.

Method No. 5

Attempted. Method No. 4 was repeated using various amounts of antimony in the form of antimonous sulphate with the thought that the iron would reduce all tin present and also precipitate sufficient finely divided antimony to maintain reduction during the cooling process. The paraffin was discarded and the solution cooled before filtration. Same as above was also tried where antimony was left in for final titration.

Objections. The fine antimony does not seem to supply sufficient reducing power to keep the tin reduced during the cooling process. Discordant low results were obtained. Discordant results were also obtained when the fine antimony was not filtered from the final solution titrated. A quick fading end point was the objection to this latter procedure.

Method No. 6

Attempted. Method No. 2 was repeated up to the point where the tin chloride was ready for reduction. The final reduction was attempted cold by pouring the acid solution over an alloy of iron and antimony contained in a Jones reductor.

Objections. The alloy, working in the cold, is not an effective reductant. It seems that hydrogen is the effective reductant. The secret lies in supplying enough hydrogen to reduce in the hot and to keep all tin reduced during the cooling process.

Method No. 7

Attempted. Method No. 2 was again repeated up to the point where the tin chloride was ready for reduction. Steel drillings containing 4 per cent nickel and about 0.30 per cent carbon were added as a reducing agent.

Objections. This type of steel was much too active in the hot acid solution. The solution foamed excessively and the procedure was entirely unsatisfactory.

Method No. 8

Attempted. It was thought that the activity in method No. 7 could be reduced by increasing the nickel content

as in Invar. Rods containing 35.05 per cent nickel, 0.23 per cent chromium, and 64.72 per cent iron were tried.

Objections. Satisfactory reduction could not be obtained with this alloy. The solution was heated for a long period of time and then finally set aside in the cold for several days; no reduction, even of ferric chloride, was effected.

Resin Treatment Makes Castings Less Porous

■ Used to a limited extent for some time, a new treatment to make castings less porous is now being adopted on a wider scale due to the necessity for maximum production with minimum rejects, according to Durez Plastics & Chemicals Inc., North Tonawanda, N. Y.

The treatment consists of phenolic resin (7347A) especially formulated for impregnating the casting. The impregnation is accomplished by forcing the resin into the pores of the casting under air pressure. After the resin has been forced into the casting, the latter is baked to thoroughly set or polymerize the resin.

Small castings are baked in an oven for several hours at 250 to 275 degrees Fahr. or preferably in a pressure tank by applying steam at 20 pounds pressure for two hours followed by 100 pounds for two hours. Large castings may be baked by applying steam direct at the same pressures. Thus hardened, the resin is practically impervious to water, solvents, mild alkalies and acids. This method of impregnation has been approved by the navy for use on certain types of castings.

Mirrors of Motordom

(*Concluded from Page* 36)

ten-day inventory starting July 28.

It was "tap day" in the Plymouth plant last Tuesday as ordnance and plant officials went around to inspect a number of machine tools earmarked for removal to new locations where they will be devoted to defense work. More than 200 structural parts for Martin medium bombers will be produced by Plymouth, as well as a number of parts for the Bofors antiaircraft gun. Throughout all Chrysler plants 400 machine tools have been tagged for withdrawal to defense jobs, almost matching the 500 new and different type machines which will be purchased.

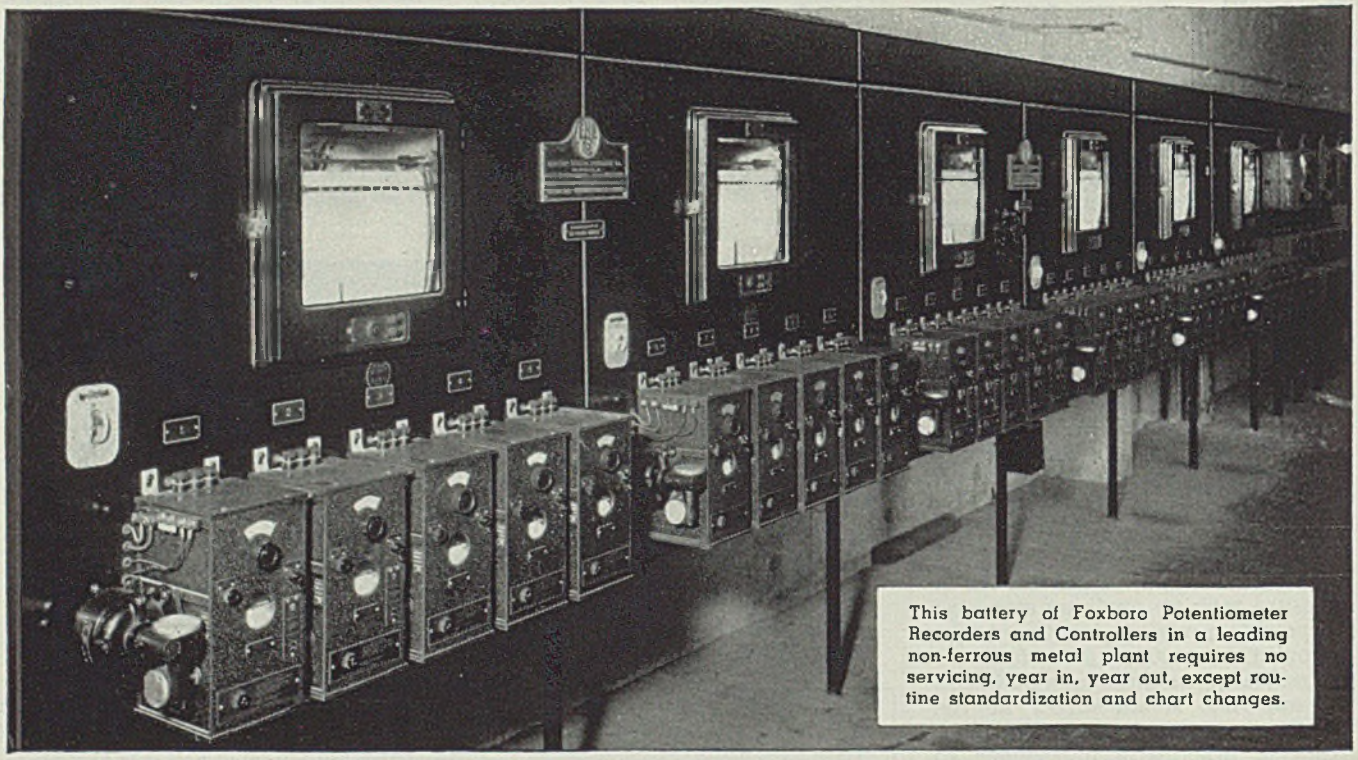
Finishes To Lose Glint

Changes in automobile finishes are being worked out for new models because of inability to obtain aluminum powder for mixing with body paints to produce the metallic glint effects. All General Motors lines, for example, have had to abandon this type of finish and to evolve new colors and color combinations without benefit of aluminum powder. Few persons probably will realize the change, however, since the metallic sheen is detectable only upon close inspection.

Something cataclysmic is portended if the public's choice of car colors is the trustworthy indication it always has been. Black has been superseded by maroon as first choice, according to Pontiac tabulations, for the first time in the company's experience. Black is now second, followed by dark gray, dark blue and the two-tone combinations. The latter now constitute 32 per cent of Pontiac's production, despite the fact they command a price premium. A year ago they were only 10 per cent of the total.

Among disclosures in a recently issued survey of automobile usage, prepared by the Automobile Manufacturers Association, is an interesting analysis of passenger mileage by types of travel. Out of 346,522,000,000 total passenger miles traveled in this country in 1940, passenger cars accounted for 79 per cent, exclusive of recreational driving, electric railways 7.8 per cent, steam railways, 6.9 per cent, buses 6.0 per cent and airlines 0.3 per cent. What —no boats?

AUTOMATIC in their upkeep, too!



This battery of Foxboro Potentiometer Recorders and Controllers in a leading non-ferrous metal plant requires no servicing, year in, year out, except routine standardization and chart changes.

Exclusive Foxboro Refinements Make These Potentiometers "Wear-proof". . . Permanently Trouble-free!

With today's shortage of trained instrument personnel, defense industries just haven't time for "temperamental" pyrometer equipment. That, in a nutshell, is the reason why so many of the leading metal-working plants are specifying definite preference for Foxboro Potentiometer Recorders and Controllers on their re-orders.

Dependability in these instruments is the sum of exclusive Foxboro refinements and simplifications in every detail of design. For example, here are a few typical developments to make Foxboro Recorders and Recording Controllers the most dependable pyrometers on the market . . .

Galvanometer Suspensions that do not break, because they are designed, end-to-end, to escape shear-action, corrosion and fatigue. **Balancing Mechanism** that gives instant, accurate response to every split-hair movement of the pointer, without fast driving of moving parts. **Integral Mounting** of slide-wire contact and recording device that eliminates a complete gear-train subject to wear and lost motion. **Anti-Friction Ball Bearings** at every important bearing point . . . 14 or more in every instrument.

Foxboro Non-Recording Controllers, too, have many improved features which provide equally distinctive advantages. Get the complete story on both types of these more-dependable potentiometers. Write for Bulletins 190-5 and 202-3. The Foxboro Company, 118 Neponset Avenue, Foxboro, Mass., U.S.A. Branches in principal cities of United States and Canada.

—RECORDING • CONTROLLING • INDICATING— FOXBORO REG. U. S. PAT. OFF.

Potentiometer Instruments

Civilian Steel Allocation Cut Down More Severely

Some slashes as much as 50 per cent in few days. More turn to defense work. Fluorspar up $1. Scrap, pig iron short.

MARKET IN TABLOID ★

Demand
Still exceeds supply and current production.

Prices
Extremely conservative considering volume of demand.

Production
Down ½ point at 97.

■ CUTTING down allotments of steel to nondefense consumers, particularly in the flat-rolled products, is to become more severe. Last week regular customers of some large mills have had allocations reduced as much as 50 per cent or more. This move will reduce sharply the output of civilian goods, an effect that should become apparent in the very near future.

Operations of several plants which depend on some scarce specialty, such as silvery pig iron, are literally day by day propositions, plant managers speculating on whether fresh materials will arrive during the night.

With a rush nondefense consumers are striving to climb on the defense bandwagon in order to obtain priorities. A striking case is that of a mouse trap maker who is turning out army cots, soldier's uniform belt hooks and bullet cores, having bought automatic screw machines for making the last, a type of manufacture unrelated to his normal products.

More and more do shortages trace back to scarcity of steel scrap and pig iron. Such shortages now prevent expanded production in some cases and are expected to force reduction in steel output later this year. Though there is a wealth of substitutes for many of the finished lines of steel, pig iron and scrap are basic materials for which there are no alternate materials. Railroads are returning scrap in much lower than normal volume and after Aug. 1 automobile makers are expected to produce less scrap because of curtailed car output. Many are employing barter arrangements, so much scrap for so much finished steel materials. A hopeful phase is that the amount of scrap now being shipped abroad is relatively negligible.

After much preliminary experimentation and negotiation shell steel is about to be produced in mass proportions, estimated at some 2,000,000 tons of steel yearly. Pending inquiries for bars and billets for this purpose are estimated at 500,000 tons.

About 47,000 railroad cars could be built during second half of the year, provided sufficient steel could be obtained, according to estimates in well-posted quarters. Shortage of skilled workers and delays in gearing up car-building plants are a limiting factor. Of course the assumption of sufficient steel is a bold one.

Illustrating zinc scarcity a would-be buyer of galvanized sheets who had slab zinc on hand offered to turn it in for the manufacture of sheets he wanted, but was turned down for fear the zinc quality was not standard. A maker of hinges whose modest raw material wants were merely crop ends of skelp was turned down until he indicated his hinges were used for airplane hangar doors.

About 40,000 tons of reinforcing bars have been involved in the first allocation by the Reinforcing Bar Sub Committee of the Steel Industry Defense Committee of OPM. Allocation was on basis of capacity, with all mills participating. It is expected that the allocation will become a regular proceeding hereafter. This may force into the background most all commercial tonnage now on books.

The price of fluorspar has risen $1 per ton to $21 with brisk demand in the steel, aluminum and ceramics industries.

Leading steelmakers have established elaborate offices at Washington in order to co-operate to the maximum in meeting requirements under the defense program. Some of the few producers who had not yet opened books for 1942 delivery are about to do so because of pressure for places on books and completely sold out 1941 conditions.

Several steel makers disapprove of the partial priority system, stating that there should be either all-out priorities, or none at all. One of the present evils is shipping of steel to defense consumers long in advance of consumption, creating much idle material.

Steel ingot production for the country as a whole sagged a half point last week to 97 per cent of capacity. The only increase was New England, up 5 points to 95 per cent. Unchanged were the following: Pittsburgh at 99½, eastern Pennsylvania at 97, Youngstown at 98, Wheeling at 91, Buffalo at 93, Birmingham at 90 and St. Louis at 98. Four districts declined as follows: Chicago ½ point to 100, Cleveland 1½ points to 95, Cincinnati 2½ points to 85½ and Detroit 10 points to 86.

Scheduled automobile production for the past week was 109,912 units, down 4406 for the week, comparing with 53,020 for the like 1940 week.

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

	July 19	July 12	July 5	One Month Ago June, 1941	Three Months Ago April, 1941	One Year Ago July, 1940	Five Years Ago July, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.63	$33.49
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.40
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	18.56	12.89

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

	July 19, 1941	June 1941	April 1941	July 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	2.21	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

	July 19, 1941	June 1941	April 1941	July 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	24.22	24.22	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	31.34	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.20	$19.55
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	18.00	17.50
Heavy melting steel, Chicago	18.75	18.75	18.80	17.45
Rails for rolling, Chicago	22.25	22.25	22.65	21.65
No. 1 Cast, Chicago	20.00	21.50	22.31	16.95

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$5.50	$4.75
Connellsville, foundry, ovens	7.25	7.25	6.00	5.75
Chicago, by-product fdry., del.	12.25	12.25	11.85	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

Alloy S.A.E.	Diff.	Alloy S.A.E.	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, com. del. 3.06-3.50c
Pittsburgh, muck bar, .. 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 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., ⅝ and ⅝ x 6-in. and shorter.....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1¼ 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 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 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
18.00	4	3	1	87.00
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

In.	Blk.	Galv.
Steel		
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, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

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

Seamless

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

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$45.00-46.00
4-in., Birmingham.. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00
Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $5.00- 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. 12.30
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.) 14.25c
Do. (1000 lbs. or over) 13.25c

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

No. 2 foundry is 1.75-2.25 sil.; 50c 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	†24.50	.....	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, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

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	43.00
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	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	21.00
Do. barge	21.00
No. 2 lump	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. tl., 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% tl., 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, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

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	4.75	4.75	6.50	4.75	7.25	6.00	....	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	6.65	....	8.75	8.60	9.40
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 and over 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	7.40 1 16 9
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†	Kokomo, Ind.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$18.25
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50	18.25
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50	16.25
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75	14.25
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	14.50
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00	15.50
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00	17.75
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	13.75
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	.....	14.00
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50
Stove plate	19.00	.....	17.00	18.00	18.50	18.00	18.00	19.00	17.50	16.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50	23.75
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00
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	21.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Punchings and plate scrap†‡	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50	20.75
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50	19.75
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00	18.25
Med. heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50	16.75

	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; **⅝-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅜-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 $4 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.

Sheets, Strip

Sheet & Strip Prices Page 98, 99

Officials of OPM are holding meetings with makers of various household appliances to discuss possible methods of partially supplying their many civilian needs. It is recognized that sheets perhaps enter non-defense manufacture more than any other one steel item and hence the problem is all the keener for this reason.

Sharpest curtailment in shipments is to the automobile industry, which already in some instances has had its supplies reduced 20 per cent, and still more drastic contraction is ahead.

Restrictions are steadily increasing against civilian consumption of finished sheets as the defense effort becomes more intense. Currently, the trade in Southern Ohio is inclined to dispute government economists' estimates that only 25 per cent of total output will be needed for war materials and so far as the experience in that area is concerned, the feeling is that 50 per cent would be more nearer the facts. Mills are in full capacity operation, although the galvanized situation continues a serious problem. Shipments to jobbers are reported to be surprisingly adequate. Comment however about government purchases from warehousemen at carload and greater lots is highly critical. The feeling is expressed that federal purchases from this source are at greater prices than should the mills sell direct.

Recently several district mill representatives experienced cuts ranging from 25 to almost 50 per cent in their weekly allotments.

One mill representative, which has been having his allotments reduced from week to week with fair regularity, has been advised to expect a further cut of about 50 per cent on commercial tonnage tentatively promised for shipment in fourth quarter, with probably some additional shrinkage in rations meanwhile.

Most stovemakers are fairly well covered for the present, with enough steel either being processed or definitely on the way to handle the fall requirements. In the East, stovemakers aim to have their stocks completed by September, and consequently with about six weeks to go are in pretty good shape. However, the outlook for beyond is not encouraging.

Switch box manufacturers are trying to get an industrial rating, because much of their production is said to be for defense and essential civilian needs, which they are unable to definitely designate due to the number of hands through which their product passes. They are endeavoring to obtain an A-10 rating.

While sheet producers have not received instructions limiting the sale of straight chrome bearing sheets, they are expecting them most any day.

The bumper wheat crop is calling

for heavy tonnages of galvanized sheets for storage capacity and government orders have expanded sharply. Some districts are making galvanized sheets as low as 45 per cent of capacity.

At present, about 60 per cent of sheet mill output is available for commercial work. Only 40 per cent is required to fulfill priority carrying orders. The 60 per cent has been allocated according to amount of steel bought by the various customers during normal times, and it is expected the downward revisions, which will probably begin with an immediate cut on the order of 10 per cent, will be pro rata.

The price situation is confused, with smaller mills, particularly the nonintegrated producers, reverting to f. o. b. mill basis and the larger sellers holding to the normal basing point method. Principal reason for this is the desire to maintain the basing point system after the end of the emergency.

Most mills are turning down orders for galvanized sheets because of the lack of spelter. In one instance, a customer who was turned down on galvanized sheets for grain storage tanks, offered to furnish a substantial quantity of zinc. Still the business was rejected because there was no assurance as to the quality of the zinc for coating purposes.

Plates

Plate Prices, Page 98

Tank makers say the A-1-B rating which is now being given most of the work is working fairly well. With this rating they have getting promises of 10 to 11 weeks on plates and some is now commencing to come through on this schedule. Much of the work taking this rating is for underground storage tanks for cantonments and military bases, with the army and navy having more or less standardized on four sizes—7750, 13,500, 27,000 and 40,000 barrels.

Although plate deliveries unless covered by top priorities are uncertain, demand for small underground tanks for gasoline storage, 1000 to 2000-gallon capacity, continues active. Taking light plates, notably scarce, fabricators are partially meeting requirements from dwindling inventories, hoping for replacements when sheet and wide strip mills overcome the shortage by rolling plates in greater volume. Releases by shipyards overshadow activity in other lines, miscellaneous fabricating shops without defense orders shopping desperately. In some cases partial needs are filled, but at higher delivered costs on an f. o. b. mill basis, the consumer paying higher freight. Deliveries are subject to rolling vagaries. Steady and substantial demand prevails for floor plates with deliveries from six to eight weeks, shipyards being covered by priorities and taking the better part, though miscellaneous industrial buying is better than normal. Deliveries on semi-finished material, heads, flanged and dished work have lengthened, but average better than plates for less essential fabrication. Plates when tied-in with semi-fabricated orders are also somewhat above the average as to delivery. Warehouses are distributing relatively few.

PLATE CONTRACTS PLACED

400 tons, two 500,000-gal. tank and towers, military airport, Mesa, Ariz., to Darby Products & Steel Plate Co., Kansas City, Mo.

Unstated, fuel tank assemblies, war department, to Boeing Aircraft Co., Seattle, $98,830.

Unstated, gas storage and distribution system, Fort Lewis, Wash.; Lord & Loryea, awarded on low bid, $148,943.

PLATE CONTRACTS PENDING

175 tons, 400,000-gallon elevated steel water tank, Lake Charles, La.; bids July 15, U. S. engineer, New Orleans.

100 tons, 80 x 40-foot welded steel barge, U. S. engineer, Galveston, Tex., inv. 6, bids Aug. 2.

Tin Plate

Tin Plate Prices, Page 98

Tin plate demand from both army and civilian sources is showing a marked increase. The army demand, normally nonexistent, is reaching major proportions, and because of improving economic conditions, civilian consumers are increasing consumption of canned

goods. As a result, packers are increasing can stocks as far as possible which in turn is reflected by more rapid releases of plate from the can makers against orders on steel company books.

Mill operations continue unchanged at an estimated 94 per cent of capacity. Most mills are now operating at peak rates, although in some cases there has not been adequate steel to maintain capacity operations. Tin plate business takes priority over most other commercial business, although following orders carrying definite preference ratings.

Bars

Bar Prices, Page 98

Many bar departments of leading steelmakers are spending major time on shell steel requirements of bars and billets. It is estimated that present outstanding inquiry is for 500,000 tons, with prediction that in 1942 consumption in shell steel making will be 1,500,000 to 2,500,000 tons yearly.

Far more priority ratings are being noted on bars than ever before, due not only to the expanding defense demands, but to efforts of consumers to get ratings on work that has not had preferences heretofore. Much of this falls in the indirect defense category. With ratings becoming increasingly important, buyers have made a special effort to establish the character of their business, so that preferences could be obtained where justified.

Additional large contracts for small arms adds to already heavy consumption of alloy bars and forward orders covered by high priorities are large, extending well into next year. Shipments against steady releases are maintained in volume to hold production at peak. Two Massachusetts arsenals have heavy tonnage on mill books, Watertown recently placing 9500 tons of remelting carbon stock with two mills while production of the Garrand rifle at Springfield, which has trebled in the last year, is taking a corresponding increase of chromium-molybdenum bars. Current consumption of both carbon and alloy bars in New England is now at an all-time high, notably alloys and the same holds true of alloy forging stock and nickel-steel for forged chains.

Outside of defense, the situation is more drab. Extended shipments and limited supplies for civilian needs are holding this type of buying down and mills are restricting the volume salesmen may take by tightening allocations for this and other districts. Jobbers are feeling the pinch and whereas normally warehouses distribute the bulk of bar tonnage, the trend has been reversed and jobbers are now selling but a small fraction of the aggregate volume being consumed. Direct mill orders and releases account for most activity.

Narrow flats are among the most difficult to get. Manufacturers of files have large backlogs also and

are pressing for deliveries of high carbon flats. Jobbers are selling tool, drill, machinery and other specialties on a mill delivery basis in some instances, inventories having been lowered and broken as to sizes, although builders of machine tools are getting sufficient steel specialties to maintain peak production.

The Edgemoor Iron Co., Edgemoor, Del. recently received a contract for anti-aircraft shells, requiring 20,000 tons of steel.

Wire

Wire Prices, Page 99

Chicago notes that jobbers' stocks of wire, though a little below normal in relation to present requirements, are generally sufficient to meet current demand. On the other hand, manufacturers' stocks are low. A big difference between this and World war days is noted in demand for military barbed wire. That was a war of stagnation and fixed positions, taking much wire, compared with tactics which are mobile on land and with much emphasis on airplanes today.

In the Birmingham district consumers are not offering a great deal of pressure for delivery. The local wire mill is producing at about 70 per cent of capacity.

Deliveries on new nail orders extend to four months and merchant wire, 25 weeks.

Rails, Cars

Track Material Prices, Page 99

Railmakers are figuring on close to record purchases of rails for 1942 laying to handle the added traffic because of defense. Some tentatively estimate as much as 3,000,000 tons of steel will be bought by railroads over the rest of this year.

The Federal Court at St. Louis has authorized the St. Louis & Southwestern to buy materials for building 500 freight cars in its shops at Pine Bluff, Ark. Among the larger locomotive purchases recently were fifteen 4-8-4 steam freight engines and five 1000 horsepower diesel switchers from Baldwin Locomotive Works.

Some car builders admit that while the industry has plenty of business on order, it could not turn out more than 45,000 to 50,000 cars during the current half even if all the steel required were available, because of the shortage of skilled labor and the general low gear at which the industry has been forced to operate over past months. However, they do not see enough steel in sight to build half of that amount, at the very outside. They are probably more discouraged over prospects than they were a fortnight ago. They have not given up their efforts to obtain more steel, but recent attempts in Washington to obtain relief have failed to bring results hoped for.

LOCOMOTIVES PLACED

Lehigh Valley, three 44-ton diesel-electric switch engines, to General Electric Co., Schenectady, N. Y.

Louisville & Nashville, eight 4000 h. p. diesel passenger locomotives, to Electro-Motive Corp.

Navy, one 50-ton diesel-electric switch engine, to Atlas Car & Mfg. Co., Cleveland.

New York, Ontario & Western, five 44-ton diesel-electric switch engines, to General Electric Co., Schenectady, N. Y.

New York, Susquehanna & Western, four 1000-horsepower diesel-electric locomotives to American Locomotive Co., New York; these are in addition to two recently noted as placed with St. Louis.

St. Louis & San Francisco, fifteen 4-8-4 type steam freight locomotives and five 1000 h. p. diesel switching engines, to Baldwin Locomotive Works.

LOCOMOTIVES PENDING

National Railways of Mexico, twenty, 4-8-4 type locomotives and six 2-6-6-2 type locomotives; bids asked.

Terminal Railroad Association of St. Louis, ten diesel switching engines, costing $785,000.

CAR ORDERS PLACED

Army, sixteen 50-ton flats, to Haffner-Thrall Car Co., Chicago.

Central of New Jersey, 1000 seventy-ton gondolas, to Bethlehem Steel Co., Bethlehem, Pa.

Delaware, Lackawanna & Western, 600 fifty-ton steel sheathed box cars and 250 fifty-ton steel gondolas.

Illinois Central, two lounge cars, to own shops.

Navy, 50 10,000-gallon tank cars to the

General American Transportation Corp., Chicago, and 40 flat cars, ranging from 30 to 70 tons in capacity, to the Haffner-Thrall Car Co., Chicago.

Pullman Co., 20 coaches, to Pullman-Standard Car Mfg. Co., Chicago.

St. Louis Southwestern, 500 freight cars, to its own shops at Pine Bluff, Ark., following recent authorization by district court.

United Fruit Co., 1000 banana cars, to Pullman Standard Car Mfg. Co., Chicago.

CAR ORDERS PENDING

Argentine State Railway, 175 to 500 box cars and 50 baggage cars, bids asked.

Navy, one to ten 50-ton flat cars and one to six 50-ton boxcars for Sewells Point, Va.; bids July 22.

New York, Chicago & St. Louis, 250 fifty-ton drop-end gondolas and 100 fifty-ton automobile cars, bids asked.

Wabash, 100 freight cars, permission asked of District Court for construction in own shops.

BUSES BOOKED

Navy, forty-three 41-passenger a.c.f. motor coaches, Hall-Scott horizontal engine, to The a.c.f. Motors Co.

St. Louis Public Service Co., 340 buses, to Mack Truck Corp. and Yellow Truck & Coach Mfg. Co.

Twin Coach Co., Kent, O. has booked the following 33 coaches: From Denver Tramway Corp., Denver, twenty 27-passenger coaches; Bremerton-Charleston Transportation Co., Bremerton, Wash., one 27-passenger; New Haven & Shore Line Railway Co., New London, Conn., two 23-passenger coaches; Steinway Omnibus Corp., New York, five 40-passenger coaches; New York City Transit System, five 40-passenger coaches.

Pipe

Pipe Prices, Page 99

Plans seem to be fading on construction of new cross-country pipelines to alleviate transportation problems on crude petroleum and refined products. There is less push from Washington, with emphasis shifted to construction of tank cars and tankers.

Tubular goods sales offices are swamped with oil country buying. The new tonnage continues to flow in at unprecedented rates, although much is recognized as duplication on the part of buyers, who have no intention of taking delivery on 100 per cent.

Virtually all oil companies are placing their entire needs with several different sources of supply, which accounts for the tremendous aggregate of new business placed over the past few weeks. Recognizing that priority materials come first, oil country buyers have been actively competing, which has resulted in a pyramiding of new orders.

Other tubular goods markets remain fairly static. Orders show no inclination to slow down, and continue to exceed shipments in virtually all types and sizes. Jam in alloy and carbon mechanical tubing is unchanged. Galvanized pipe production is still declining.

At Boston, all types of steel tubing, including alloys, are active, producers taking but part of the ton-

nage offered and this under priority rating for defense needs. Furniture requirements, which are heavy, are becoming increasingly tight. Aircraft needs are getting first call for alloys, but consumption by bicycle manufacturers and miscellaneous fabricators continues high during a period when demand would normally be slackening. A builder of motorcycles at Springfield, Mass. has booked an order for 5000 special light army units for Great Britain, $2,050,000, deliveries to start in September and to be completed in February, 1942. Mostly for defense, partly indirect, steel pipe is active with galvanized stocks well depleted with most re-sellers. Black pipe is being substituted where possible. Distributors with stocks now being on a quota basis as regards replacements, inventories are husbanded cautiously. Cast pipe buying has improved materially, large tonnages having been placed to supplement steady releases against blanket contracts.

CAST PIPE PLACED

640 tons, water system, flying school, near Lemoore, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

CAST PIPE PENDING

328 tons, the Dalles, Oreg., 12-in. pipe, steel or cast iron; bids Aug. 4.

Structural Shapes

Structural Shape Prices, Page 98

The greater scarcity of structural steel is shown by the supposed opening of bids on seven hangars for the government in the South —but on the designated date there were no bids to open. So far this may indicate a choked-up condition among fabricators of the South only, but doubtless the rest of the country is not far different. Probably high priority ratings will have to be given defense structural work in the future to get inquiries honored.

There is talk of issuing priority ratings on bridges for main highways and railroads as the army recognizes that an artery of fast highways is necessary for proper defense. Much of the current work is state highway construction, which might be postponed but for the above reason.

Enough work is in sight to keep awards of average tonnage, provided builders can get the steel. However more and more do nonessential projects become abandoned. Fabricators can still make better promises on standard sections than on special ones. Thus 400 light shapes are needed for an extension of the Cleveland airport, the buyer so far refusing standard shapes because they are heavier than needed and more costly.

Chicago reports that in several instances recently wood piling was substituted for steel.

SHAPE CONTRACTS PLACED

10,000 tons, bearing piles, additional requirements, dry docks 5 and 5, navy yard, Brooklyn, N. Y., divided equally between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh; Dry Dock Associates Inc., New York, contractors.

6600 tons, three warehouses, army supply depot, Charlotte, N. C., 4400 tons to Bethlehem Steel Co., Bethlehem, Pa., and 2200 tons to Ingalls Iron Works Co., Birmingham, Ala.; William Muirhead, Durham, N. C., contractor.

4000 tons, shop building, gear reduction department, General Electric Co., West Lynn, Mass., to American Bridge Co., Pittsburgh.

2500 tons, low-lift pumping station, filter building and administration building, south district filtration plant, city of Chicago; to American Bridge Co., Pittsburgh, through Strobel Construction Co., Chicago; bids June 26.

1900 tons, foundry building, No. 290, Brooklyn, N. Y., for U. S. government, to American Bridge Co., Pittsburgh.

1800 tons, second addition, warehouse for navy at Oakland, Calif., to Columbia Steel Co., San Francisco; formerly reported to American Bridge Co., Pittsburgh.

1560 tons, three warehouses, Ogden, Utah, for army, to Kansas City Structural Steel Co., Kansas City, Kans.

1500 tons, Wolf Creek ordnance plant, Milan, Tenn., for government, to Wis-

SHAPE AWARDS COMPARED

	Tons
Week ended July 19	35,030
Week ended July 12	14,252
Week ended July 5	21,195
This week 1940	47,479
Weekly average, 1941	30,293
Weekly average, 1940	28,414
Weekly average, June, 1941	27,157
Total to date, 1940	562,025
Total to date, 1941	908,789

Includes awards of 100 tons or more.

consin Bridge & Iron Co., Milwaukee.

775 tons, addition, power house, Rivesville, W. Va., to Fort Pitt Bridge Works, Pittsburgh.

600 tons, overhead crossing, FAGM-414, Burlington, Iowa, for state, to American Bridge Co., Pittsburgh.

550 tons, bulkhead gates, spec. 1500-D, Coram, Calif., to Southwest Welding & Manufacturing Co., Alhambra, Calif.

453 tons, two bridges in Illinois for Nickel Plate railroad; 401 tons, Ramsey, and 52 tons, Charleston, both to American Bridge Co., Pittsburgh.

415 tons, six magazine buildings, Westland, Oreg., for army, to Poole & McGonigle.

400 tons, substations for Bonneville project, to Bethlehem Steel Co., San Francisco.

350 tons, shop hangar, Bolling Field, D. C., to Belmont Iron Works, Eddystone, Pa.; August Stang, Philadelphia, contractor; bars to Taylor-Davis Co., Philadelphia.

342 tons, piling, flood protection, Paducah, Ky., for U. S. engineers, to Bethlehem Steel Co., Bethlehem, Pa.; Hoeffken Bros. Construction Co. & G. E. Tillman, Centralia, Ill., contractors.

315 tons, machine shop extension and office building, Diesel engine division, General Motors Corp., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

300 tons, crane runway, General Electric Co., Buffalo, to R. S. McMannus Steel Construction Co., Buffalo.

285 tons, hangar, control tower and boiler house addition, Eglin Field, Fla., to Ingalls Iron Works Co., Birmingham, Ala., $70,483, based on evaluated bids (shipments on government B/L); bids June 27, U. S. engineer, Mobile, inv. 486, awarded July 2; Decatur Iron & Steel Co., Decatur, Ala., and Jones & Laughlin Steel Corp., New Orleans other bidders.

280 tons, hangar and boiler house, Fort Lewis, Wash., to Paxton & Vierling Iron Works, Omaha, Nebr.

265 tons, bridges for Illinois Central, East Dubuque, Ill., to American Bridge Co., Pittsburgh.

235 tons, state bridge, Becket, Mass., to American Bridge Co., Pittsburgh; Graves & Hemmes Inc., Great Barrington, Mass., contractor, $114,074.60.

233 tons, building, National Carbon Co., Clarksburg, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, crane runway and small structures, naval depot, Bayonne, N. J., to Harris Structural Steel Co., New York, through Wigton-Abbott Co., New York, contractor.

215 tons, three boiler houses, Kingsbury ordnance plant, La Porte, Ind. to American Bridge Co., Pittsburgh.

187 tons, Dayton bridge, La Salle, Ill., for La Salle county, to American Bridge Co., Pittsburgh, William J. Howard Inc., Chicago, contractor.

175 tons, building addition, Republic Carbon Company, Niagara Falls, N. Y., to the Bethlehem Steel Co., through DeHamel Contracting Company, Cleveland.

165 tons, bridge, Humboldt county, Calif., for state, to Minneapolis-Moline Power Implement Co., Minneapolis.

125 tons, telephone exchange extension, Melrose-Woodbine, Cleveland, for Ohio Bell Telephone Co., to Fort Pitt Bridge Works, Pittsburgh.

115 tons, various bridges, in Washington and Montana, for Northern Pacific railway, to American Bridge Co., Pittsburgh.

105 tons, shop and boiler house addition, Camp Stewart, Ga., to Ingalls Iron Works, through Albert & Harrison Inc., New York, contractor.

100 tons, galvanized bus and switch racks, Seattle light department substation, to Bethlehem Steel Co., Seattle.

100 tons, warehouse and fuse building, navy department, Oyster Bay, Wash., to Isaacson Iron Works, Seattle; Hoard Engineering Co., Seattle, contractor.

100 tons, addition, plate handling building, Corrigan-McKinney works, Republic Steel Corp., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

SHAPE CONTRACTS PENDING

18,000 tons, transmission towers, Bonneville-Midway Coulee line, Coulee to Spokane line and Covington to Chehalis line, Wash.; Columbia Steel Co., San Francisco, low.

2750 tons, buildings and warehouses, signal depot, Avon, Ky., war department.

2650 tons, airplane repair shop, Hill field, Ogden, Utah.

2500 tons, building addition, Bell aircraft Corporation, Niagara Falls, N. Y., Austin Co., Cleveland, contractor.

2000 tons, factory building, Allegheny Ludlum Steel Corp., Dunkirk, N. Y.

2000 tons, sheet piling, including 400 tons H columns, quay wall, Hunters Point drydock, San Francisco; Healey & Tibetts, 1100 Evans street, San Francisco, contractors.

1500 tons, three hangars, Lake Charles, La.; bids July 18 to U. S. engineer, New Orleans.

1300 tons, seven air corps hangars, 184-foot demountable type DH-1, three for Dothan, Ala.; three for Tuskegee, Ala., and one Hattiesburg, Miss., no bids received under pro. 477 to U. S. en-

gineer, Mobile, Ala.

877 tons, bridge over Los Angeles River and Southern Pacific tracks, Los Angeles county, California, for state; bids readvertised.

750 tons, plant addition, Champion Machine & Forge Co., Cleveland.

515 tons, bridge, route FA-5, 23-X1F, Lincoln, Ill., for state.

502 tons, beam bridge, Lincoln, Logan county, Illinois, Mississippi Valley Structural Steel Co., Decatur, Ill., low; bids July 15.

500 tons, tractor warehouse, J. I. Case Co., Racine, Wis.

448 tons, including 63 tons wrought iron plates, Wyman crossing under Maine Central tracks, Fairfield, Me.; bids Aug. 6, Augusta.

400 tons, H columns, De Haro Housing project, San Francisco; bids soon.

375 tons, bridge, Youngstown, O., for Mahoning county; bids July 15.

350 tons, buildings, Boeing Airplane Co., Connell, Kans., through Defense Plant Corp.

300 tons, garage, fire station and locomotive crane shed, Bayonne, N. J., navy.

240 tons, bridge, Mile Brook, Winslow, Kennebec county, Maine; bids July 23, State Highway commission, Augusta; also 44 tons, village bridge over Lemon stream, Stark, Me., same date.

220 tons, building, Everett, Mass., Boston, Consolidated Gas Co.

215 tons, boiler houses, Kingsbury ordnance plant, La Porte, Ind.

186 tons, highway bridges, state of Missouri; bids July 28.

175 tons, building, East River Drive, New York City.

165 tons, underpass, FAGM-44-(2), Mandan, N. D., for state.

140 tons, bridge construction, No. 2188, Milltown, Ind., for state.

115 tons, warehouse building, spec. 1530-D, Mountain Home, Idaho, U. S. Bureau of Reclamation.

110 tons, gas tank foundation, Brooklyn, N. Y., for Brooklyn Union Gas Co.

105 tons, fuse line boiler house, Kingsbury ordnance plant, La Porte Ind.

102 tons, factory and office building, Tremco Manufacturing Co., Cleveland; Paugh & Brown, contractors.

100 tons or more, 50 to 70 30-foot steel towers, various locations, Civil Aeronautics Authority, Washington; Blaw Knox Co., Pittsburgh, apparently low, $1000 each; bids July 3, pro. 1008.

Unstated, motor repair depot, Fort Lewis, Wash.; Teufel & Carlson, Seattle, low.

Unstated, steel warehouse, Anderson Ranch dam, near Mountain Home, Idaho; bids to Denver, July 25; 1530-D.

Unstated, 314-foot steel and concrete state bridge ($163,000 estimate) near Cut Bank, Mont.; bids to Helena, July 27.

Reinforcing Bars

Reinforcing Bar Prices, Page 99

First allocation of reinforcing bars was made Thursday by the Reinforcing Bar Sub-committee of the Steel Indudstry Defense Committee of OPM. Approximately 40,000 tons were involved, all carrying high ranking priorities. Tonnage was allocated on the basis of capacity, all mills participating. It is expected the action will become a regular procedure hereafter. Jobs requiring certain types of bending were allocated to mills equipped for such work. It will probably force into the background all commercial tonnage now on the books. It will probably make deliveries impossible on jobs carrying no priorities unless such jobs can be sold out of stock. Established prices will apply on the allocated tonnage. An effort was made to distribute tonnage according to location of the mills so that excessive freight would not be required on any job. Prices f.o.b. nearest basing point will probably apply.

Demand for mesh is heavier and close to 50,000 tons of bars and mesh await award along the mid-Atlantic seaboard. Original tonnages for numerous naval and army bases are being supplemented by substantial new releases.

Difficulty experienced by contractors in purchasing concrete reinforcing bars for non-defense projects is illustrated by inability to place close to 600 tons for a low-rent housing job at Providence, R. I.

CONCRETE BARS COMPARED

	Tons
Week ended July 19	14,972
Week ended July 12	15,360
Week ended July 5	5,437
Week ended June 28	8,861
This week, 1940	8,402
Weekly average, 1941	11,318
Weekly average, 1940	9,661
Weekly average, June, 1941	11,277
Total to date, 1940	237,149
Total to date, 1941	339,549

Includes awards of 100 tons or more.

REINFORCING STEEL AWARDS

3000 tons, Puget Sound navy yard storehouse, to Northwest Steel Rolling Mills, Seattle; H. S. Wright Seattle, and L. H. Hoffman, Portland, contracts.

2400 tons, housing project, Detroit, to Housman Steel Co., Detroit, through Cauldwell-Wingate Co., New York, contractor.

2200 tons, quartermaster warehouse, Seattle, to Bethlehem Steel Co., Seattle; Western Construction Co., Seattle, contractor.

2100 tons, supply pier Puget Sound navy yard, to Bethlehem Steel Co., Seattle; Sound Construction & Engineering Co., Seattle, contractor.

1000 tons, additional requirements, dry dock and facilities, navy yard, Portsmouth, Va., to Jones & Laughlin Steel Corp., Pittsburgh.

450 tons, three warehouses, army supply depot, Charlotte, N. C., to Easterby & Mumaw Co., Charlotte, N. C.; William Muirhead, Durham, N. C., contractor.

440 tons, Bureau of Reclamation, inv. 44,826-A-1, Friant, Calif., to Bethlehem Steel Co., San Francisco.

350 tons, additional requirements, army base, Trinidad, B.W.I., to Jones & Laughlin Steel Corp., Pittsburgh.

260 tons, navy magazines and storehouse, Oyster Bay, Wash., to Bethlehem Steel Co., Seattle; Hoard Engineering Co., Seattle, contractor.

235 tons, bars and mesh, state highway project, route 6, section 21A, Denville relocation, New Jersey, to Truscon Steel Co., Youngstown, O.; Union Building & Construction Corp., Newark, contractor.

225 tons, machine shop, Falk Corp., Milwaukee, to W. H. Pipkorn Co., Milwaukee; Klug & Smith Co., Milwaukee, contractor; bids June 30.

200 tons, U. S. Engineer, Ft. Crook, Neb., to Ceco Steel Products Corp., Omaha, Nebr.

166 tons, Bureau of Reclamation, inv. 17007, Mancos, Colo., to Sheffield Steel Corp., Kansas City, Mo.

161 tons, bridge, El Reno, Okla., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

160 tons, St. Mary's hospital, Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Faniel J. Meagher, contractor.

155 tons, building, American Medical Association, Chicago, to Concrete Steel Co., Chicago; George A. Fuller Co., Chicago, contractor.

150 tons, naval ordnance plant, Indianapolis, for Lukas-Harold Corp., to Republic Steel Corp., Cleveland.

150 tons, overhead viaduct, St. Johnsbury, Vt., to Truscon Steel Co., Youngstown, O.; Charles I. Hosmer Inc., contractor.

120 tons, overpass, route 58, Norfolk County, Virginia, to Virginia Steel Co.; W. N. Jackson, contractor.

113 tons, bridge, Barber, Kans., to Sheffield Steel Corp., Kansas City, Mo.

111 tons, building, Great Lakes Naval Training Station, Great Lakes, Ill., for navy, to Joseph T. Ryerson & Son Inc., Chicago; Henry Ericsson Co., Chicago, contractor; bids July 10.

110 tons, overpass, Little Rock, Ark., to Jones & Laughlin Steel Corp., Pittsburgh, through Arkansas Foundry Co., Little Rock, Ark.

107 tons, Bureau of Reclamation, inv. 33,507-A, Granger, Wash., to Bethlehem Steel Co., Seattle, Wash.

106 tons, building, Oscar Mayer & Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; Sill Construction Co., Chicago, contractor.

103 tons, bridge, Wyandotte, Okla., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

100 tons, WPA project, Kansas City, Mo., to Sheffield Steel Corp., Kansas City, Mo.

100 tons, Bird street bridge, Boston, to Northern Steel Co., Boston; Coleman Bros., contractors.

100 tons, administration building, naval training station, Great Lakes, Ill., to Joseph T. Ryerson & Son Inc.

100 tons, signal corps depot storage buildings, Fayette county, Kentucky, to Truscon Steel Co., Youngstown, O.; Fleisher Engineering Co., contractor.

REINFORCING STEEL PENDING

2350 tons, Anderson Ranch dam, Idaho; Morrison-Knudsen Co., Boise, and associates, low, $9,986,203, to Reclamation bureau; materials by bureau.

2000 tons, U. S. army base, Oklahoma City, Okla.

850 tons, propeller laboratory and test stand, Wright field, Ohio; Ferro Concrete Construction Co., contractor.

750 tons, bars and piling, estimated, engine test building, Brookley Field, Mobile; Foster & Creighton Co., Nashville, Tenn., low; bids under inv. 485 to U. S. engineer, Mobile.

660 tons, plane engine test building, Studebaker Corp., South Bend, Ind.; general contract to Consolidated Construction Co., Chicago; bids July 10.

600 tons, grain elevators, Standard Milling Co., Buffalo, N. Y.; McKenzie-Hague Co., contractor.

500 tons, storage buildings, ammunition depot, Hingham, Mass.

400 tons, engine test stand building addition, Patterson field, Ohio; Charles H. Shook, contractor.

352 tons, bridge, across Los Angeles River and Southern Pacific Co. tracks, Los Angeles county, California, for state; bids being readvertised.

300 tons, three small buildings, naval depot, Bayonne, N. J.

300 tons, building, American Can Co., Newark, N. J.; Turner Construction Co., New York, contractor.

225 tons, building, Boston Consolidated Gas Co., Everett, Mass.

210 tons, Washington state highway projects, King county; bids to Olympia, July 29.

200 tons, Broadlawn hospital, Des Moines, Iowa; bids July 15.

158 tons, high school stadium, Moline, Ill.; bids in.

100 tons, Washington state highway projects; bids in at Olympia.

Unstated, $200,000 plant addition Continental Bakery Co., Seattle; Daniels & Turnquist, Seattle, contractors.

Unstated, motor repair depot Fort Lewis, Wash.; Teufel & Carlson, Seattle, low $1,033,221.

Pig Iron

Pig Iron Prices, Page 100

The pig iron supply situation becomes more acute as steelmakers have less to sell in a merchant way, as Britain wants considerable and as scrap supplies tighten. Luckily, as yet there has been no great epidemic of worn out linings, though many producers have fingers crossed.

At Chicago an inquiry for 15,000 tons of pig iron has been issued by railroad supply interests, but thus far no producer has been willing to cover any part of it. Makers of iron car wheels report inability to obtain sufficient iron to meet the demand for new wheels.

The Boston district merchant pig iron producer has lowered reserves on all grades to a point current demand must be met by day to day output. As a result official priorities and allocation of iron supplies will be welcomed, thus removing the pressure on the furnace by regular and new customers. While allocations will not change materially the distribution of the unit, the seller will be taken off the spot by official rulings covering shipments. Production at Everett continues at capacity and the present blast is the most prolonged in recent years with no indications of a recess. Supplies of ore and other raw materials are ample. For months the Mystic has been allocating tonnage. To do this, reserves have been reduced, the load being heavy on merchant producers with supplies coming from steel works units and the South far below normal. Customers with foundries outside the district have been supplied from time to time, part for the New England unit and part to branch shops. Foundry and steel works melt in the district continues near peak with backlogs heavy.

Export inquiries (apart from the British) continue to be noted, some from American copper companies with properties in South America, where they have foundries for producing grinding equipment and the like.

Scrap

Scrap Prices, Page 102

The tendency is more and more to eliminate the dealer with transactions more direct from original source direct to mill. Often transactions are of a barter character, scrap for finished products. However the dealer is still recognized as performing a useful function and present tendencies are merely a product of the emergency.

At Chicago iron and steel scrap volume, while high, continues to fall far short of current needs. Some concern is expressed as to how long the situation can go on without the government taking action to stimulate the flow into consuming channels. Mills resort more to direct dealing with scrap producers, and while not necessarily circumventing brokers and dealers, are getting producers to earmark material for their own mills. Some consumers, like foundries, are sending their own trucks to dealers yards. Dealers yards are kept clean as scrap moves out almost as fast as it moves in. Numerous sharp practices are developing, but these, of course, are difficult to pin down.

At Buffalo a tighter situation rules as many smaller foundries work on a hand-to-mouth basis on supplies, but the trade is not without its more favorable points. The leading consumer of the district is able to add to reserve stocks, but not in the quantities necessary for adequate stocks for the future.

This consumer reports continued shipments from upper lake points and by barge from midstate and Seaboard collection centers. In addition, increased pig iron output is being used for ingot production.

At Pittsburgh scrap sources believe certain district mills will face serious curtailment of operations unless scrap flow increases shortly. Two to three weeks supply is about the most some mills can muster, and consumption runs ahead of supply. The situation is so tight that mills will be forced to slow down in August or suspend entirely. On top of this comes the well-known fact that scrap flow diminishes after Oct. 1 because of weather conditions, and the summer ordinarily is used to build up stockpiles in anticipation of the winter dry-up. However, this is obviously impossible now.

Cincinnati estimates that district steel producers are covered about 45 days ahead though foundry scrap piles are about two weeks' supply. From the Middle West generally come reports that numerous truckers who circulate among farmers and other sources of scrap have sold their trucks and gone to work on government projects or to the factories in the cities because of better wages and steady employment.

It is believed that the amount of scrap being exported now is negligible. There is confusion as to what the price limitations are on export tonnage.

Watertown, Mass. arsenal is offering for sale this week machine

shop turnings accumulated by Feb. 15, 1941, an estimated 2250 tons, top price to be $9.56 f.o.b. subject to any changes made in the general price setup at Washington.

Pacific Coast

Seattle — Contractors on non-defense find it extremely difficult to place orders for steel, both mills and jobbers giving preference to governmental requirements. Rolling mills and fabricating shops in this area face increasing backlogs despite capacity operations.

Awards of concrete bars featured the situation this week, 7500 tons having been placed for navy yard and army projects, of which 3000 tons went to Northwest Steel Rolling Mills, Seattle, the balance to Bethlehem Steel Co., Seattle. Largest project pending involved 2350 tons for the Anderson Ranch dam, Idaho, general bids in, materials to be furnished by Reclamation bureau. Washington state will open bids July 29 for seven highway bridges, requiring 210 tons.

Shapes awards were not heavy but fabricators are more interested in clearing current orders. Bethlehem took 400 tons for Bonneville project substations, and 100 tons for bus and switch racks, Seattle light department, while Isaacson Iron Works, Seattle, was awarded 100 tons for navy warehouse and fuze buildings, Oyster Bay, Wash.

While no large plate projects are pending, the shipyards use increasing tonnages. Gas storage and distribution systems at airports and cantonments call for considerable quantities of plates and sheets.

Important near future projects include the proposed aluminum plant at Tacoma, rebuilding the Narrows bridge and Tacoma's $11,000,000 Nisqually river power plant.

Cast iron business pending exceeds 750 tons for projects in Seattle and Shelton, Wash. No large tonnages are up for figure but dealers report a steady demand for small lots out of stock.

Jobbers state that while sheets and plates are most active, all stock items move in a heavy and steady volume. It is difficult to make replacements and on some items deliveries are uncertain. Most business comes from Eastern centers by rail due to lack of water transportation. Steamer space available is freighting mostly heavy materials required in shipbuilding.

While mills state supplies of steel scrap are ample for present needs, receipts are not large. Cast iron scrap continues scarce and in strong demand, as a rule maximum prices allowed under the code prevailing.

San Francisco — Outstanding was the opening of bids on 18,000 tons of transmission towers for lines between Bonneville - Midway Coulee, Coulee to Spokane and Covington to Chehalis, Wash., on which Columbia Steel Co. submitted the low bid of $2,042,846 tons. Awards of structural aggregated 4146 tons, bringing the year's total to 390,246 tons as compared with 116,293 tons for the corresponding period in 1940. Pending business has increased and now calls for more than 108,000 tons.

The largest plate letting went to Darby Products & Steel Plate Co. and involved 400 tons for two 500,000-gal. tanks and towers for the military airport at Mesa, Ariz. Awards totaled 600 tons, bringing the aggregate for the year to 423,828 tons, compared with only 41,878 tons for the same period a year ago. Pending business calls for more than 91,000 tons.

Demand for cast iron pipe, especially in small lots of less than 100 tons, remains strong and distributors still have difficulty in maintaining sufficient stocks to take care of immediate demands. Awards aggregated 1330 tons and brought the total to date to 31,339 tons as compared with 20,490 tons for the corresponding period in 1940.

Among the larger reinforcing bar lettings were 440 tons for the Bureau of Reclamation for delivery at Friant, Calif., booked by Bethlehem and 107 tons for the same governmental department for delivery at Granger, Wash., taken by the same. Awards totaled 679 tons and brought the aggregate for the year to 57,443 tons, compared with 89,578 tons for the same period last year.

Canada

Toronto, Ont. — Sustained heavy buying of a widely diversified nature continues in the Canadian steel markets with practically all orders directly associated with war. As a result of the piling up of backlogs mills are fully booked on sheets and plate and have withdrawn insofar as orders for delivery to the end of the year are concerned. There is no abatement in new placings and most of the business now is going to the United States. The big and increasing demand for steel on war materials production account is taxing to the limit Canada's rolling mill capacity and while expansion programs are underway at most of the steel mills here it will take several months before much additional capacity is available. The Steel Co. of Canada, Ltd., Hamilton, Ont., is expected to blow in its new furnace early in August and this will be followed by another open hearth, nearing completion. While warehouse operators are taking care of some of the smaller business, supplies are gradually disappearing and difficulty is reported in replenishing owing to the more rigid enforcement of priority schedules.

One of the principal sheet producers is now out of the market. While Canada's present production of plate is fully covered by contract and priority rulings to the end of the year, and well into 1942, demand continues to far outstrip the supply and many users are continually coming into the market in an effort to make large purchases. All new orders being closed are going to the United States and local representatives of American companies report a deluge of inquiries. Unless there is relief on a broad scale from across the border, there is a possibility that this country will be unable to maintain its shipbuilding program on schedule. Heavy demand also continues for armor plate for war tank construction.

Fresh orders for merchant bars pile rapidly and deliveries on new orders are being extended to the end of the year, producers not accepting contracts into 1942. About 90 per cent of the new orders come under priority rulings. There is some surplus output contracted for by the automotive industry, agricultural implement makers and various other consumers that cannot be strictly classified as war industries, these obtaining deliveries in a somewhat limited manner.

Structural steel awards continue in large volume, with individual orders ranging from 50 to 10,000 tons. Aluminum Co. of Canada, Ltd., has bought much in recent weeks for its $60,000,000 plant expansion program and will require an additional 15,000 to 20,000 tons. Big orders are appearing from the Government on war construction with upward of 10,000 tons pending.

Pig iron producers are unable to meet demands other than those engaged in almost full time war work. Under the priority rulings foundry interests that are working on war materials to the extent of 40 per cent or less do not come into the preferred list and therefore are unable to obtain iron. No improvement is reported in production of foundry and malleable iron, the output averaging about 1000 tons per week, against consumers' demands of more than double this.

The announcement of maximum prices for cast scrap and stove plate

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained
Solid scrap containing over 12%...1.80c
Solid scrap containing 5 to 12%....1.60
Turnings, millings containing over 12% 1.40
Turnings, millings, solids under 5%.1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium.....12.50
Turnings, millings, same basis...10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium 13.50
Turnings, millings, same basis.....11.50

by the Canadian Steel Controller is expected to bring some relief. The new consumers' price of $22 per gross ton for No. 1 machinery cast is more than $5 per ton under the rate prevailing previous to the new order. Steel scrap prices were fixed last February and since that time there has been no special price problems to contend with. It also is hoped to improve the supply of cast scrap, which at the present time falls far short of meeting consumers' demands. Imports from the United States are being urged in an effort to augment Canada's ordinary supply.

Ferroalloys

Ferroalloy Prices, Page 100

The drought in the South is expected to restrict ferroalloy production in August, as well as during the current month. The present situation is not due to "freak weather" this year, but, is a regular thing during the summer months in the South, with power production restricted weeks at a time. Meanwhile, there is demand for every pound being produced, with prices unchanged, due to the stabilizing influence of Washington. Ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

Steel in Europe

Foreign Steel Prices, Page 101

London — (*By Cable*) — The iron, steel and raw material supply situation is sufficient to restrict American imports of semi- and heavy steel, which is partly balanced by increasing imports of special steels. Hematite is still scarce. This quarter contracts are largely placed. War contract deliveries are satisfactory, but little is left for commercial users and exports are severely restricted.

Iron Ore

Iron Ore Prices, Page 101

The American Great Lakes ore fleet was again 100 per cent engaged in transporting iron ore on July 15, the same as a month before, with 292 vessels of a total of 292 engaged. A year ago, however, the fleet was 99.13 per cent engaged, with 294 in commission of a total of 297. At the middle of July of this year the trip capacity of the fleet stood at 2,688,040 gross tons, same as a month before, comparing with 2,717,040 tons a year ago. According to the report, a few Canadian boats are starting to load ore for American ports.

Fluorspar

Fluorspar Prices, Page 100

Prices are $1 per ton higher at $21 per ton for principal domestic grades and would be at this quotation for imported, if any were entering the country at this time. Not only are steelmakers buying unusual quantities because of unusual steel production but there is considerable demand from the aluminum industry which makes artificial or synthetic cryolite from fluorspar.

The fluorspar industry has been notified by Washington that it should be prepared to supply at least 225,000 tons of gravel spar during 1942 and from 60,000 to 75,000 tons of high grade spar, suitable for the aluminum industry.

The recent advance in price was a gradual one, without formal announcement. Greater demands on the enameling industry calls for increased fluorspar tonnage in the form of synthetic cryolite.

Nonferrous Metals

New York — Additional evidence that shortage of nonferrous metals is becoming more acute was presented this week. Leon Henderson, OPACS Administrator, declared that defense consumption of copper, aluminum, nickel, zinc and other materials will be so great "we won't have enough left over for consumers' durable goods." Mexico and the United States have made an agreement under which Mexico will export to this country for the next 18 months all surplus strategic and

Nonferrous Metal Prices

July	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
12	12.00	12.00	12.25	53.50	52.62½	5.85	5.70	7.25	17.00	14.00	35.00
14	12.00	12.00	12.25	53.62½	52.75	5.85	5.70	7.25	17.00	14.00	35.00
15	12.00	12.00	12.25	53.37½	52.50	5.85	5.70	7.25	17.00	14.00	35.00
16	12.00	12.00	12.25	53.25	52.37½	5.85	5.70	7.25	17.00	14.00	35.00
17	12.00	12.00	12.25	53.12½	52.37½	5.85	5.70	7.25	17.00	14.00	35.00
18	12.00	12.00	12.25	53.37½	52.62½	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	10.00-10.25
Cleveland	10.50-10.75
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	11.00-11.25
Cleveland, No. 1	11.00-11.50
Chicago, No. 1	10.25-10.50
St. Louis	10.00

Composition Brass Turnings

New York	9.75-10.00

Light Copper

New York	9.00-9.25
Cleveland	9.00-9.25
Chicago	8.25-8.50
St. Louis	8.00

Light Brass

Cleveland	6.00-6.50
Chicago	6.50-6.75
St. Louis	5.75

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.25-4.50
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

critical materials, including antimony, copper, graphite, lead, mercury, tungsten, tin and zinc. The Mexican government has ruled that exports of these commodities may be made only to points within the western hemisphere.

Copper—Major copper producers and defense officials are in agreement that some increase in present rate of domestic output is possible. Meetings are planned to work out methods of achieving the additional production. One plan under consideration is to permit increased prices for copper produced above the normal rate. High-cost producers in Michigan and Arizona may be allowed a premium above the basic 12-cent level.

Lead — Metals Reserve Co. has completed arrangements to buy up to 225,000 short tons of Canadian and Mexican lead during the second half of 1941. Of this quantity 50,350 tons represent metal now held in stockpiles by three contracting companies and which is expected to be allocated promptly by OPM to domestic consumers at prevailing prices. The balance will be delivered out of production during the remainder of the year.

Zinc—Heavier production coupled with larger imports is not expected to result in any marked improve-

ment in supplies for several months. It is felt likely that defense requirements will continue to mount, thereby exerting further restriction on the proportion of total tonnage available for ordinary commercial uses.

Tin—Prices declined steadily during the early part of the week from 53.62½ to 53.12½c before recovering on Friday to 53.37½c due to an advance in the Far Eastern market. Demand improved at the lower levels.

Coke Oven By-Products

Coke By-Product Prices, Page 99

Producers of phenol are heavily sold ahead and distributors are prorating available supplies against contracts without taking on new commitments. Heavy consumption by civilian industrial consumers is supplemented by strong defense needs, plastics taking substantial volume. While household demand for naphthalene has slackened, increase in chemical and miscellaneous requirements more than makes up the lag in that direction. No spot supplies of distillates are available and sellers are hard-put to meet contract obligations, this holding for benzol, toluol and xylol. For munitions, producers are taking full quotas of toluol. Production of coke oven by-products is at capacity and ahead of last year, but increase in capacity has not kept pace with heavier demand.

Equipment

New York—An early ruling making machine tools undelivered by Aug. 15 subject to draft for installation in bomber and other aircraft plants is expected from Washington shortly. Meanwhile large orders for machinery and other equipment are being allocated machine tool builders, the industry assembling production units at an all-time high with many shop extensions now in full production. Covered by top priorities supplies of materials are ample, including steel, and builders of motors and electrical equipment are doing a notable job in keeping pace.

Seattle—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offered the low bid, $2,697,785, to Reclamation Bureau at Denver for furnishing and installing three 150,000 h. p. generators at Coulee dam. Specifications call for completion in 710 days and will increase Coulee's capacity to 900,000 horsepower. Plans calling eventually for 18 generating units with capacity of 2,700,000 horsepower. Denver opened bids July 17 for 18 heating power boards for Coulee and July 28 will receive tenders for 2300 volt motor control equipment for Fallon pumping plant, Buffalo Rapids project, Mont., spec. 1532-D.

U. S. engineer, Portland, will open bids July 21 for 1910 outdoor switch and bus insulators for Bonneville. Northwest Hauling Co., Tacoma, subcontractor at Pendleton air base, has purchased a 10-ton Michigan truck crane with 75-foot boom. Seattle has awarded an $87,360 contract to Dual Parking Meter Co. for 1680 units and will open bids July 18 for 14,000 ft. conductor control cable; July 24 for Class A transformer. For Alaska air bases Northern Commercial Co. will furnish tractors and bulldozers; C. Kirk Hillman, Seattle, drills and cable at $21,743; Pacific Electric Welding Co. platform type trailers. Identical bids of $229,809 for furnishing conductor cable, etc. to Bonneville project were submitted by Anaconda and General Cable Co.

66-Foot Span Connects Ryerson's Offices

■ To accommodate rapidly increasing customer requirements, Joseph T. Ryerson & Son Inc. is installing a 66-foot glassed-in bridge connecting the two main office buildings at its 21-acre steel service plant in Chicago. The span will hasten the flow of work between departments and considerably speed customer service.

Rebuilt and enlarged loading doors also have been added to the plant service facilities, aiding faster loading and dispatching and assuring prompt pick-up for will-call customers. Thirty-five trucks now can be loaded at the Chicago plant at one time.

Construction and Enterprise

Ohio

AMHERST, O.—U. S. Automatic Corp., Jackson street, is building two additions to its plant.

CANTON, O.—Ohio Power Co., 305 Cleveland avenue, N. W., will spend approximately $20,000,000 this year in plant expansion and improvement. About $500,000 is to be spent at Torrey substation on Sherman-Church road, and $300,000 at Sunnyside station near Waco, O.

CLEVELAND—Cleveland Diesel Engine Division of General Motors Corp., George W. Codrington, general manager, is erecting a one-story addition, containing 25,000 square feet of floor space and will increase capacity of the engine assembly floor.

CLEVELAND—Thompson Products Inc. has leased for one year the T. H. Towell building at East Thirtieth street and Chester avenue. Operations to be transferred to the building, comprising approximately 110,000 square feet of floor space, have not been definitely decided.

CLEVELAND — Incorporation papers have been filed for Allied Machine & Engineering Co. Roy Wilt, 2121 NBC building, attorney, filed application for charter.

CLEVELAND—Jack & Heintz Inc., care of W. Jack, Hanna building, will soon let contract for one-story, 210 x 300-foot factory, and 40 x 80-foot boiler house. Cost $200,000. W. Watson & Associates, 4614 Prospect avenue, engineers.

CLEVELAND — Cleveland Chain & Mfg. Co., D. L. Round, president, Broadway and Henry streets, will soon take bids for one-story, 40 x 80-foot, and two-story, 40 x 60-foot steel factory

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 109 and Reinforcing Bars Pending on page 111 in this issue.

buildings. Cost $40,000. E. B. Hoefler, 5005 Euclid avenue, engineer.

CLEVELAND—Chandler Products Co., 1491 Chardon road, manufacturer of cap screws, is adding 8000 square feet to its plant.

CLEVELAND — Walters-Wilcox Co., 10006 Carnegie avenue, plans construction of factory containing about 50,000 square feet, location for which has not been decided. The company makes steel building parts and complete prefabricated steel buildings.

CLEVELAND—Gabriel Co., 1407 East Fortieth street, plans $10,000 factory expansion. J. J. Batterman is president.

CUYAHOGA FALLS, O.—Falls Screw Products Co., 1731 Front street, will enlarge factory with 45-foot square addition.

SPRINGFIELD, O.—Robbins & Myers Inc., maker of fans, motors and pumps, has purchased the former plant of the Piqua Hosiery Co. in Piqua, O., and will install new machinery there.

TOLEDO, O.—DeVilbiss Co. is planning a $40,000 addition to double its spray booth and exhaust equipment division.

TOLEDO, O.—Toledo Steel Products Co., subsidiary of Thompson Products Inc., Cleveland, has under way a $100,000 addition to its lower Summit street plant.

Connecticut

HAMDEN, CONN.—Acme Wire Co. has plans for a powerhouse addition, including a new boiler unit and auxiliaries. Wescott & Mapes Inc., 139 Orange street, New Haven, Conn., is engineer. (Noted June 23).

HAMDEN, CONN.—High Standard Mfg. Co. Inc., 61 Foote street, New Haven, Conn., will construct and equip plant for manufacture of machine guns. Defense Plant Corp. will finance project. Cost about $4,300,000.

Massachusetts

SPRINGFIELD, MASS.—Storms Drop Forging Co., 70 Storms court, will let contract soon through McClintock & Craig, engineers, Bridge street, for plant expansion, including a one-story office, one-story heat treating addition and one-story factory addition, to cost about $40,000.

WORCESTER, MASS.—Arter Grinding Machine Co., 15 Sagamore road, has awarded general contract to E. Whitehead Inc., 97 Union street, for one-story, 90 x 100-foot machine manufacturing plant. Cost over $40,000 with equipment.

Rhode Island

PROVIDENCE, R. I.—Standard Machinery Co., 1475 Elmwood avenue, will let contract soon for a one-story 80 x 120-foot plant costing about $40,000. Jenks & Ballou, 2600 Industrial Trust building, are engineers.

New York

BUFFALO — Niagara Ship Building Corp., 36 Washington street, will erect shipbuilding plant at cost of more than $400,000.

LOCKPORT, N. Y.—Harrison Radiator Corp., Washburn street, has plans by J. M. Tully, Bewley building, for plant addition, costing $50,000.

NIAGARA FALLS, N. Y.—Carborundum Co. has awarded contract for construction of three additions to its main plant, to cost over $150,000 with equipment. Plans are also in progress for construction of new plant in Niagara Falls, Ont., by Carborundum Co. Ltd., subsidiary, costing about $750,000.

New Jersey

BENDIX, N. J.—Air Associates Inc., Bendix Airport, has broken ground for the addition to its main manufacturing plant. The new building, comprising approximately 70,000 square feet of floor space, is being erected by Brown & Matthews Inc., 122 East Forty-second street, New York. Approximately $135,000 will be spent for land and building and $180,000 for equipment. (Noted May 19).

Pennsylvania

ERIE, PA.—Erie Concrete & Steel Supply Co. Inc., 1301 Cranberry street, will erect a one-story steel, concrete ship building plant, to cost over $40,000.

ERIE, PA.—Erie County Electric Co., D. W. Jardine, president and general manager, has plans for steel power plant addition and improvements. United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, engineer.

TRAFFORD CITY, PA.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will erect two one-story steel foundry additions, and three one-story manufacturing additions. Cost estimated at $500,000.

Michigan

DETROIT—American Blower Corp. will erect an office building, research building and generator house on Tireman avenue, Dearborn, Mich. Giffels & Vallet Inc., Detroit, architects.

GRAND RAPIDS, MICH.—Rademaker Chemical Corp., Eastlake, Mich., plans erection of plant for manufacture of dead burned magnesium oxide, cost of which is estimated at $500,000.

Illinois

CARBONDALE, ILL.—War department, Twentieth street and Constitution avenue, N. W., Washington, has preliminary surveys for construction of smokeless powder and bag loading plant near here, costing approximately $10,000,000. Giffels & Vallet Inc., 1000 Marquette building, Detroit, engineers.

CHICAGO—Kux-Lohner Machine Co., 2145 West Lexington street, manufacturer of die casting machines and presses for plastics, etc., is building a one-story addition with 25,000 square feet floor space at Harrison and Crawford avenues. Present plant on Lexington street will be continued in operation.

CHICAGO—American Varnish Co. has plans by Engineering Systems Inc. for construction of three-story fireproof addition to its plant on North Branch street. Cost more than $100,000 with equipment.

CHICAGO—E. F. Houghton & Co., 3534 South Shields avenue, maker and compounder of industrial oils and case hardening materials, is expanding its local facilities with a one-story addition to provide about 13,000 square feet. Cost, including new equipment, will approximate $35,000. Completion is scheduled in three months.

GENEVA, ILL.—Burgess-Norton Mfg. Co., manufacturer of automotive parts, screw machine products and stampings, is adding 9000 square feet to its plant at cost of $20,000.

Indiana

EVANSVILLE, IND.—Schnacke & Fawcett Mfg. Co. has been issued permit to construct a $5000 machine shop building, 36 x 125 feet. Anderson & Loer are contractors.

FORT WAYNE, IND.—General Electric Co., Fort Wayne works, South Broadway, plans new plant here to manufacture turbo superchargers. Cost over $500,000, with equipment.

GARY, IND.—Gary Screw & Bolt Co., manufacturer of bolts, nuts and rivets, is expanding steel bins and pickling tanks at cost of $35,000. W. S. Thomas, Gary, is contractor.

MARION, IND.—Anaconda Wire & Cable Co., 25 Broadway, New York, will construct and equip plant here for manufacture of assault wire, costing approximately $352,724. Defense Plant Corp. will finance project. (Noted June 30)

Maryland

BALTIMORE, MD.—Rustless Iron &

Steel Co., 1101 Edison highway, has let general contract to Cummins Construction Corp., 803 Cathedral street, for a one-story 60 x 440-foot wire mill addition, to cost about $100,000. (Noted April 28.)

District of Columbia

WASHINGTON—Navy Department, Bureau of Supplies and Accounts, will take bids until July 25, schedule 7856, diesel generators, switchboard sets and transformers; until July 29, schedule 7878, ten air-turbine driven portable pumps, delivery Puget Sound, Wash.; schedule 7880, four motor-driven grinder machines; schedule 7904, one horizontal hydraulic forging press, delivery San Diego, Calif.; schedule 7926, one motor-driven bevel gear generator, delivery Mare Island, Calif.

Kentucky

LOUISVILLE, KY.—B. F. Goodrich Co., 500 South Main street, is having plans made for a plant for processing Koroseal, to cost over $2,000,000.

Tennessee

CHATTANOOGA, TENN. — Ross-Meehan Foundries, Frank M. Robbins, president, plans $10,000 addition to plant.

Louisiana

HOMER, LA.—REA has allocated $520,000 to Ark-La Electric co-operative to aid on building 544 miles of rural electric line and a 10,000-kv. steam generating plant, to cost about $2,800,000.

West Virginia

CLARKSBURG, W. VA.—REA has allocated $700,000 to Harrison rural electric association to finance 601 miles of rural electric line and a steam generating plant.

Missouri

ST. LOUIS—War department has announced a $58,850,000 expansion of small arms plant at Goodfellow and Bircher boulevards, tripling present plant capacity.

ST. LOUIS—St. Louis Car Co., 8000 North Broadway, has been issued building permit for $75,000 for erection of three one-story buildings on the company's 60-acre tract, 162 x 232 feet, 240 x 300 feet, and 80 x 232 feet.

Arkansas

EL DORADO, ARK.—Lion Oil Refining Co. is having plans made for a gasoline manufacturing plant to cost about $400,000.

OZARK, ARK.—Arkansas valley electric co-operative, W. M. Milton, superintendent, has given contract to Killoran Electric Co., Appleton, Wis., for construction of 320 miles of rural electric line to serve 961 customers, at $211,105. H. B. Gleb, Dallas, Tex., is engineer.

Oklahoma

VINITA, OKLA.—Grand River Dam Authority, T. P. Clonts, general manager, Vinita, is considering erection of magnesium reduction plant, to cost about $12,000,000.

Texas

FORT WORTH, TEX.—Premier Oil & Refining Co., Longview, Tex., will make refinery plant improvements and expansions. Estimated cost $125,000.

GILMER, TEX.—Farmers Electric Generating Corp., Sam Scales, receives bids July 31 for generating plant, and approximately 250 miles of rural lines. Freese & Nichols, 407 Capps building, Fort Worth, Tex., engineers.

HOUSTON, TEX.—Hughes Tool Co., 300 Hughes street, will operate for the War Department bomber landing gear plant to be erected here at estimated cost $12,000,000.

PASADENA, TEX.—Owen Tool Co. will erect tool plant, to cost approximately $40,000.

PORT ARTHUR, TEX.—Texas Steel Co., 3901 Hemphill street, Fort Worth, Tex., will spend approximately $500,000 for steel mill, rolling plant, warehouses, shops, etc.

Nebraska

CARSON CITY, NEBR.—City plans construction of sewage disposal plant complete with auxiliary equipment, to cost over $50,000.

KEARNEY, NEBR.—Carl Weber has given general contract to J. E. Kaufman for a one-story machine shop 51 x 122 feet.

Idaho

POCATELLO, IDAHO—City will call bids soon for proposed $82,000 sewage disposal plant. Plans have been prepared by B. C. Lowrie, city engineer.

California

SAN DIEGO, CALIF.—Solar Aircraft Co. has application pending for additional plant and equipment here to cost approximately $500,000.

Washington

KELSO, WASH.—City has retained J. L. Henderson and R. G. Anderson, engineers, Vancouver, Wash., to survey and report on proposed $125,000 municipal water system improvement.

SEATTLE — Stetson-Ross Machinery Co., 3204 First avenue, south, is making extensive plant additions and improvements.

Canada

CLARKSON, ONT.—British American Oil Co. Ltd., Royal Bank building, Toronto, Ont., A. L. Ellsworth, president, is having plans prepared and will start work immediately on erection of oil refinery near here, to cost about $4,500,000 with equipment.

ETOBICOKE TOWNSHIP, ONT.—Ingraham Canadian Clock Co. Ltd., 411 Glendenning avenue, will erect plant here to cost about $75,000, with equipment. General contract awarded to Gatehouse Bros. Ltd., 989 Bay street, Toronto, Ont.

PETERBORO, ONT.—Outboard Marine & Mfg. Co. of Canada Ltd., Monaghan road will start work immediately on erection of plant addition to cost $28,000, exclusive of equipment, and has given general contract to Bradford & Hoshal Ltd., 1170 Yonge street, Toronto.

PORT HOPE, ONT.—Port Hope Sanitary Mfg. Co. Ltd. will build plant addition to cost $40,000, without equipment, and has given general contract to B. Pennington & Son, Ontario street, Port Hope.

WESTMOUNT, N. S.—Department of Munitions and Supply, Ottawa, plans erection of shipyards here to cost, with equipment, about $2,000,000. G. K. Sheils, deputy minister.

ARNTFIELD, QUE.—Francoeur Gold Mines Ltd. has awarded general contract to Hill-Clark-Francis Ltd., Ninth avenue, Noranda, Que., for erection of $250,000 cyanide mill.

LACHINE, QUE.—Dominion Engineering Works, First avenue, machinery and equipment builder, will soon call for bids for erection of boiler plant. Estimated cost, including equipment, $50,000.

LONGUEUIL, QUE.—Department of Munitions and Supply, Ottawa, has awarded general contract to Deakin & Stewart Ltd., Montreal, for erection of addition to plant of Fairchild Aircraft Ltd., here, to cost $40,000, exclusive of equipment.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, has given general contract to Magloire Couchon Ltd., Quebec, for erection of addition to Dominion Arsenal, here, to cost $56,000, without equipment.

USED and REBUILT EQUIPMENT
MATERIALS

FOR SALE

10-ton BRIDGE CRANE, 44' 2" span
NILES SEMI-QUICK CHANGE LATHE 30" swing x 12' bed
1250 lb. CHAMBERSBURG steam or air hammer
No. 15 GARVIN MILLING MACHINE working range 13½" x 21½" x 42"

This is but a small part of our large stock of Reconditioned Equipment—send for stock list 4101

MORSE BROS. MACHINERY CO.
2900 Broadway
Denver, Colorado

HIGH PRESSURE HORIZONTAL TRIPLEX PUMPS
FOR IMMEDIATE DELIVERY FROM STOCK

NUMBER OF PUMPS AVAILABLE	STROKE	WORKING PRESSURE LBS./SQ. IN.	CAPACITY U.S. GALLONS	CAPACITY OF DRIVING MOTOR H.P.
2	12"	2850	143	350
1	12"	3400	111	350
2	10"	2850	95	230
1	10"	2850	95	230
4	10"	4250	63	230
1	10"	4250	63	230

Inquire at: **ALBERT B. CUDEBEC**—*American Representative*
THE LOEWY ENGINEERING CO., LTD., 22 East 40th Street, New York City, N. Y.

SYNCH. MILL TYPE MOTOR

400 HP G. E., type TS, form AL, 3 phase, 60 cycle, 440 volt, 300 RPM synch. motor, serial No. 5280820. 230 volts excitation equipped with G. E. control panel and instruments.

Excellent condition—Immediate delivery

Utilities Electrical Machinery Corp.
614 National City Bank Bldg.
CLEVELAND, OHIO

For Sale

McMYLER, COAL BURNING, LOCOMOTIVE CRANE—1919

Serial No. 3177—Magnet Equipment
Immediate delivery. F.O.B. Erie, Pa.

Address Box 519
STEEL, Penton Bldg., Cleveland, O.

RAILS and ACCESSORIES

RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.
NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Accessories.
Although our tonnages are not as large as heretofore, most sizes usually available. Every effort made to take care of emergency requirements.

Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

Mere för Eder dollar!

IRON & STEEL PRODUCTS, INC.
36 Years' Experience
13462 S. Brainard Ave., Chicago, Illinois
"*Anything* containing IRON or STEEL"
SELLERS — BUYERS — TRADERS

FOR SALE

No. 1 Standard Forging Hammer, 100 lbs.
500 Ton Bethlehem Steel Shell Presses
No. 3 Williams, White Bulldozer
18" Canton Portable Alligator Shears
No. 3 Canton Alligator Shears

Address Box 490
STEEL, Penton Bldg., Cleveland

—REBUILT—
BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
Ventilating fans and roof ventilators.

GENERAL BLOWER CO.
404 North Peoria St. Chicago, Ill.

FOR SALE

Type S K Westinghouse 25 HP 220 volt variable speed, with automatic reversing control panel. Never used.

RAILWAY MAINTENANCE CORP.
P. O. Box 1888 Pittsburgh, Pa.

FOR SALE

LATHES—54" Gleason and 22" Putnam.
CRANES—5 ton Brown, 230 v. DC.
HOIST—100 HP Lidgerwood double drum hi speed.
SPEED REDUCERS—1 to 150 HP.
SLIPRING MOTORS—500 and 700 HP., G.E.
DIESEL ENGINE GENERATOR—219 kva. Buckeye horiz. 2300/220 or 440 v. AC.
M.G. SETS—200 kw. Ridgway—Synchronous.

Write for List

Duquesne Electric & Mfg. Co., Pittsburgh, Pa.

SPECIAL MONEY-SAVING EQUIPMENT OPPORTUNITY

THE MOTOR REPAIR & MFG. CO.
1558 HAMILTON AVE. • CLEVELAND, O.

WANTED

500 tons light grey iron castings from source within 200 mile radius of Cleveland or Buffalo. Reply Box 522, STEEL, Penton Bldg., Cleveland.

STEEL SHAFTING
FOR SALE

In Millimeter sizes. 3 or 4 tons ranging in size from 2" down to ¾". Good condition—will sell cheap. Write Box 518, STEEL, Penton Bldg., Cleveland.

WANTED—TRANSFORMERS

Of all descriptions and sizes
Burned Out or Good
Also interested in purchasing
Empty Transformer Cases
Will pay cash—send full description

PHILADELPHIA TRANSFORMER CO.
2829 Cedar St. Philadelphia, Pa.

CRANES
OVERHEAD ELECTRIC TRAVELLING
AC and DC

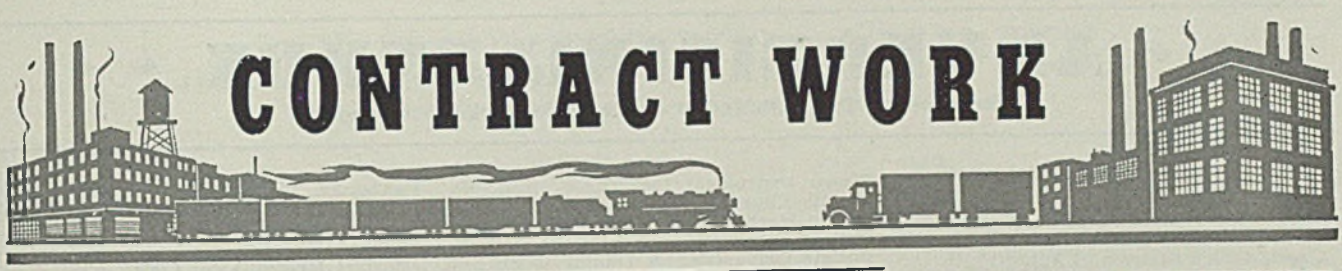
INDUSTRIAL EQUIPMENT CORP.
P. O. Box 1647 Pittsburgh, Pa.

DIE SINKER, E-3 Keller, M.D.
GEAR CUTTER, Spur, 84" Newark, M.D.
GEAR PLANERS, Bevel, 54" Gleason, M.D. (3)
HORIZ. MILL, Fl. Type, 3¼" bar D & H
VERTICAL MILL, 8' Betts, 2 Hds., Grd. Fds.
LATHES, 48"x22-1/2' & 48"x26-1/2' Johnson.
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.
TURRET LATHE, 18" Libby, H.S. 3-9/16", M.D.
PLANERS, 30"x30"x8', 36"x36"x11' .54"x54"x10'
SHEAR, 10'x3/16" Obi Squaring, M.D.

LANG MACHINERY COMPANY
28th Street & A. V. R.R. Pittsburgh, Pa.

IF YOU WANT TO BUY OR SELL

good used or rebuilt equipment or materials—Place an advertisement in this section. Write STEEL, Penton Bldg., Cleveland, Ohio



CONTRACT WORK

CLASSIFIED

Positions Wanted

SALESMAN NOW EMPLOYED BY REPUTable mill selling tool steel desires change for best reasons. Enviable record of production. Understand machine tools and machinery of all kinds. Will go anywhere. Twenty years' experience. Reply Box 520, STEEL, Penton Bldg., Cleveland.

GRADUATE METALLURGICAL ENGIneer with 2½ years' experience in research and production of seamless and welded steel tubing, carbon, alloy and stainless grades, desires position with a mid-western firm. Reply Box 509, STEEL, Penton Bldg., Cleveland.

COMPETENT STRUCTURAL AND PLATE SHOP SUPERINTENDENT WANTS POSITION WITH REPUTABLE CONCERN. INTELLIGENT, INDUSTRIOUS WORKER, WITH PROVEN ABILITY TO HANDLE MEN. ADDRESS YOUR REPLY TO BOX 515, STEEL, PENTON BLDG., CLEVELAND.

EXECUTIVE WITH BROAD EXPERIENCE in manufacturing, development and merchandising of small metal stampings, available immediately for sales or production. Familiar with quantity production, progressive dies, automatic feeds and finishing If you can use such ability, address Box 503, STEEL, Penton Bldg., Cleveland.

PURCHASING EXECUTIVE — EIGHTEEN years' experience, General Purchasing Agent Steel Company and Manufacturer. Qualified as coordinator, expeditor-supervisor of stock and equipment control, stores, receiving, production. Background particularly attractive for concern engaged in defense work. Character and business references. Prefer Central West. Reply Box 523, STEEL, Penton Bldg., Cleveland.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals, leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request.

Address your copy and instructions to STEEL, Penton Bldg., Cleveland.

Help Wanted

"WANTED—WORKS MANAGER, FORGE plant, located in East. Write fully giving age, experience, references, salary to start. Reply Box 521, STEEL, Penton Bldg., Cleveland.

GENERAL FOREMAN FOR FORGE plant, Die and Machine Shop. Location Pennsylvania. Give references, experience, age, salary wanted. Address Box 512, STEEL, Penton Bldg., Cleveland.

GENERAL FORGE PLANT SUPERINtendent, familiar with die machine and forge shops. Eastern location. Give experience, salary expected, age, references. Reply Box 511, STEEL, Penton Bldg., Cleveland.

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 31 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Castings

OHIO

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

Accounts Wanted

NEW ENGLAND SALES ENGINEER SELLing metal manufacturing and machine industry wants additional line. Long established in this territory with wide acquaintance among buyers and machine designers. Specialize on machine components. Represent nationally prominent gear manufacturer and would like another similar line. Address Box 517, STEEL, Penton Bldg., Cleveland.

WISCONSIN REPRESENTATIVE AVAILable. Established factory representative seeking an additional line for general manufacturers throughout Milwaukee and Wisconsin. Preferably one adaptable to defense needs. Write Box 524, STEEL, Penton Bldg., Cleveland.

ADVERTISING INDEX

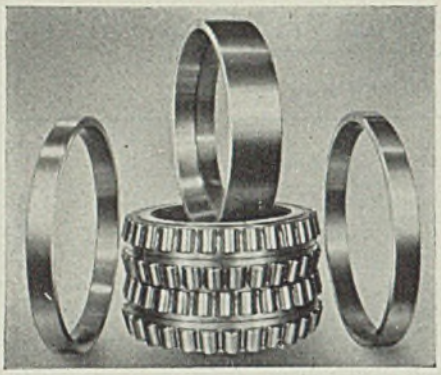
Where-to-Buy Products Index carried in first issue of month.

◆ ◆ ADVERTISING INDEX ◆ ◆

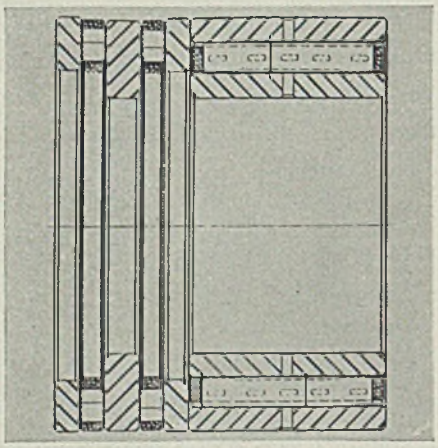
Where-to-Buy Products Index carried in first issue of month.

STEEL MILL NEWS

OF BANTAM BEARINGS

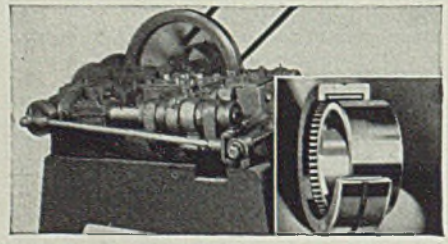


4-ROW TAPERED ROLLER BEARINGS, manufactured by Bantam in sizes up to 51" O.D., are especially suitable for such applications as back-up rolls and roll necks on hot and cold strip mills. Bantam Straight Radial Roller Bearings are also extensively used in this type of application.

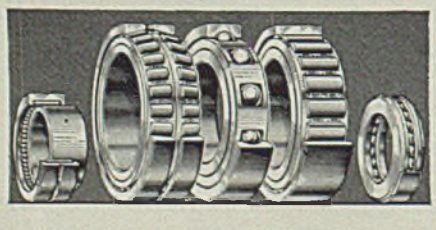


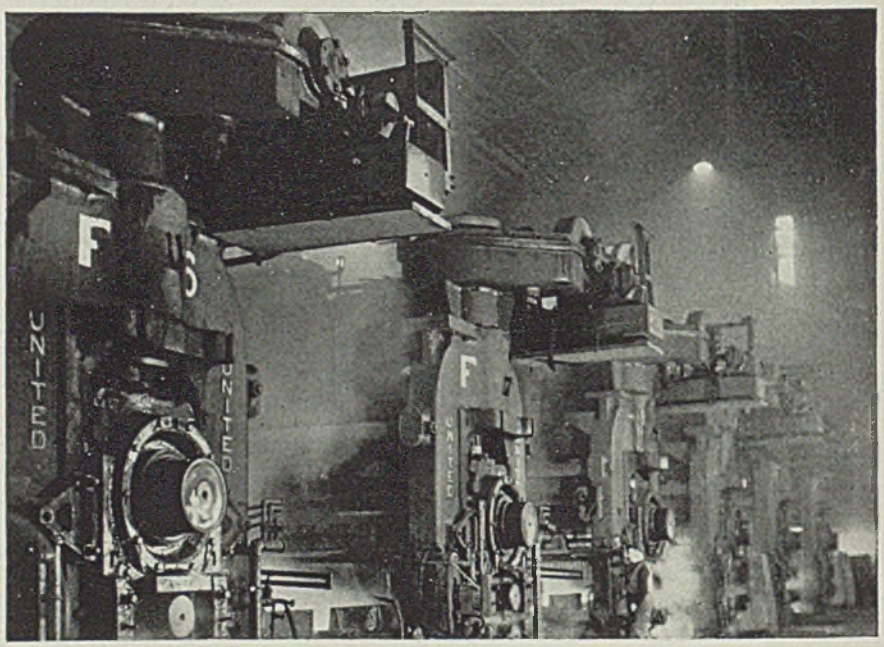
BANTAM-DESIGNED MILL TYPE BEARINGS combine a radial roller section with a double-direction thrust bearing. Used at one end of roll necks, these bearings provide necessary thrust capacity, permit use of Straight Radial Roller Bearings at opposite end. Bearings of this type are made in three lengths for each bore size, providing a wide capacity range.

BANTAM QUILL BEARINGS provide exceptionally high radial capacity in proportion to size. They find many applications in auxiliary equipment and in fabricating machinery such as the wire forming machine illustrated.



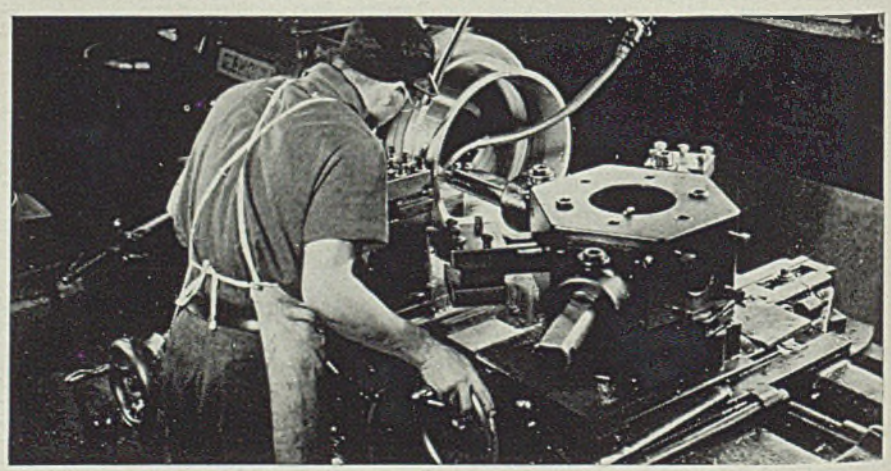
EVERY MAJOR TYPE of anti-friction bearing is included in Bantam's line—straight roller, tapered roller, needle, and ball. With this broad background of experience, Bantam's engineers are well qualified to cooperate in the selection of standard bearings, or design special ones, for every steel mill application. If you have a bearing problem of any kind, TURN TO BANTAM.





BANTAM SERVES THE STEEL INDUSTRY with a wide range of sizes and types of anti-friction bearings engineered for severe service requirements. Typical application of Bantam Bearings is on work rolls and back-up rolls of this continuous hot strip mill in one of the country's major steel plants.

ULTRA-PRECISION IN LARGE BEARINGS made by Bantam is assured by special machining and grinding methods that result in extremely low tolerances, both in dimensions and in concentricity. Hardening techniques developed by Bantam engineers produce unusual toughness and strength, and contribute to successful bearing performance.



BANTAM BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

BANTAM BEARINGS CORPORATION • SOUTH BEND • INDIANA