STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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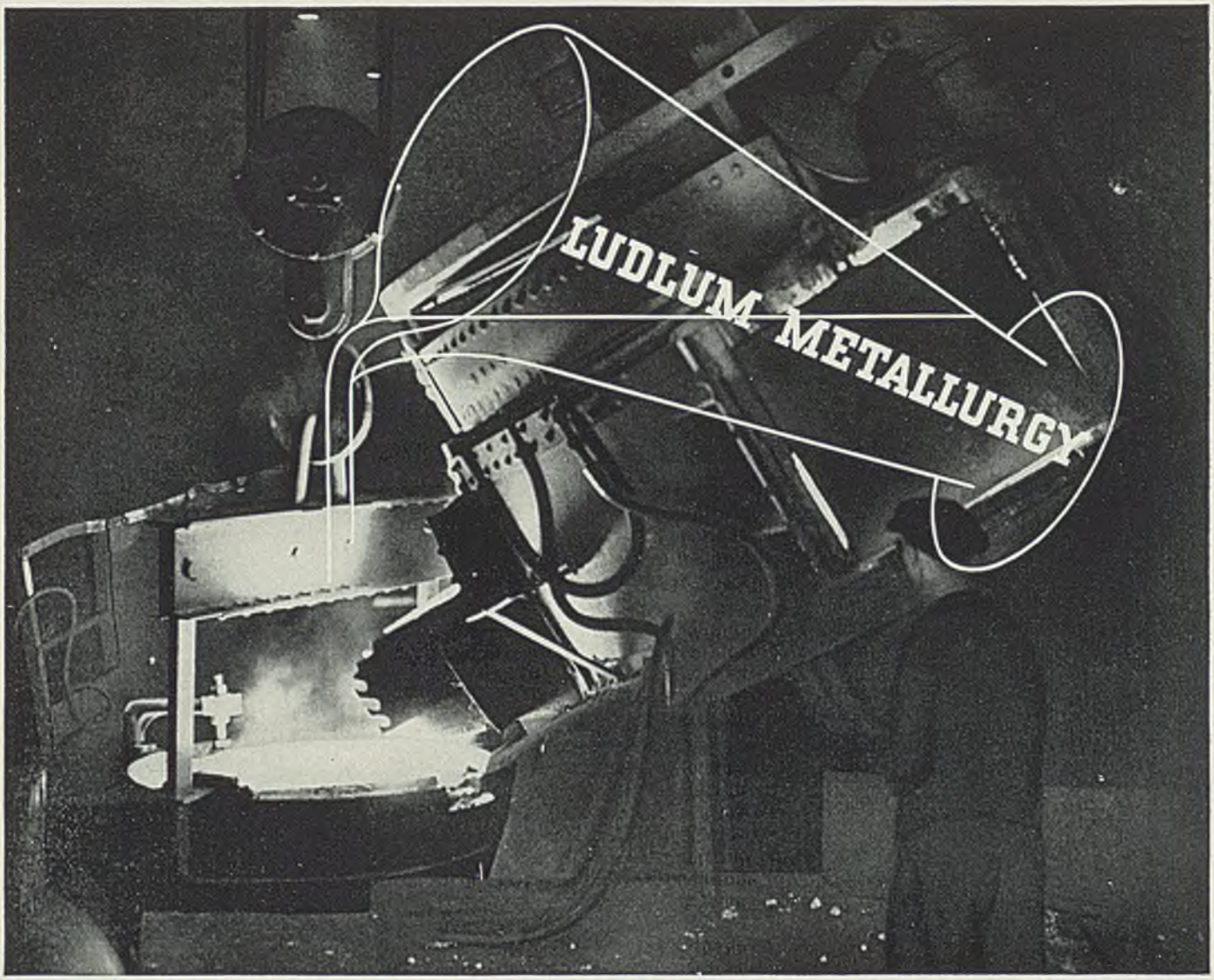

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

LAST week J. Edgar Hoover, chief of the G-men, took time out from rounding up members of the Karpis gang to declare that Public Enemy No. 1 is "Mr. Politics." It is more than a coincidence that almost simultaneously speakers at the fortieth annual meeting of the American Foundrymen's association were drawing the same conclusion. The only real difference in viewpoint lies in the fact that Mr. Hoover was referring to the demoralization in local politics, while the commentators at Detroit were deploring the destructive consequences of political fanaticism at Washington. A house cleaning is overdue in politics—locally and nationally!

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Production Key To Recovery

Foundrymen at Detroit applauded W. J. Cameron of the Ford Motor Co. (p. 22) when he assailed the futile attempts of politicians to effect business recovery and social reform through application of the philosophy of scarcity. He preached a doctrine diametrically opposed to the new deal idea. Mr. Cameron would make production the keynote of human endeavor. Promote production, reduce costs, extend employment, expand purchasing power. This cycle, he declared, is the surest approach to sustained recovery. Give the economy of plenty a chance and exalt the idea of low-cost production. Do these things, he declared, and we will be faced with a demand that will tax our facilities.

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Foundrymen More Confident

Last week the motor city had all the aspects of a busy, prosperous metropolis. Every hotel room was filled, largely because of the influx of foundrymen attending the fortieth annual convention of A.F.A. No one could visit the show or attend the meetings (p. 82) or converse with visitors without coming to the realization that the depression is over for the castings industry. New equipment, improved methods, and products of better quality and of greater diversity have inspired in foundrymen a new confidence that they are able to cope with the problems of reconstruction. The foundry industry is all set to go places. We cannot recall a time when the morale of foundrymen was keyed to a higher pitch. They set out to make the 1936 meeting and show a monument to the post-depression rebirth of the industry. They succeeded beyond expectations.

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Paradox of Unemployment

Flitting from one convention to another last week, we encountered a executive who was touring industrial cities in search of employes for his plants. The next day evidence of a distinct shortage of apprentices in certain trades was revealed. Concurrently a newspaper article appeared stating that 10,000 farm workers were needed in a certain area in spite of the fact 20,000 persons were registered as unemployed in the same district. Manifestly something is wrong in the unemployment picture which Washington paints for us. Undoubtedly this nation was remiss (p. 43) in its failure during the acute period of the depression to prepare jobless individuals for their return to activity. We will pay doubly for this mistake—in the shortage of skilled labor and in the burden of unemployables.

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Steel Return Only 1.64%

STEEL'S tenth consecutive annual analysis of steel company earnings (p. 42), covering the reports of 23 producers, shows that the industry's return on the $4,690,355,323 invested amounted to only 1.64 per cent. This is on the basis of total earnings before dividends and bond interest. Figured after bond interest, the earnings fell $40,916 short of meeting the requirements for preferred dividends. In other words there was a deficit of this amount for the common stock of the 23 companies. There is much in this analysis to interest every individual identified with the steel industry. While the showing is the best in five years, the report shows clearly that the industry still has much to learn about the technique of realizing a satisfactory profit.

E. L. Shaner

Quickened Foundry Industry Inspirits A.F.A. Convention

IN FUTURE years, wherever metals are cast, men will look back to the fortieth annual convention of the American Foundrymen's association in 1936 as the milestone which signalized the rebirth of confidence and the return of gratifying activity to the foundry industry.

Following five years of uncertainty and adversity, the meetings and exposition held last week in Detroit indicated beyond question that foundrymen again are prepared—in material resources and in morale—to take full advantage of post-depression opportunities.

The extent of national reserves was reflected in the exposition and in the technical sessions. While the show was not the largest in A.F.A. history, it undoubtedly surpassed all others in variety of equipment displayed, in the improvement apparent in the design and construction of new models, and in the attractiveness of the more elaborate exhibits. Undoubtedly it is one of the outstanding industry shows of the post-depression period. More than 200 exhibitors participated.

JAMES L. WICK JR.
New president of the A.F.A.

Just as the exposition revealed marked advances in equipment and supplies, the nearly 30 technical sessions indicated that the industry has been making rapid progress in research, metallurgical control, and operating technique. With few exceptions, sessions were exceedingly well attended. Registration for the week passed the 5000 mark.

One of the high points of the convention week was the annual banquet, held Thursday evening at the Book-Cadillac hotel. The principal speaker, W. J. Cameron, Ford Motor Co., presented a strong argument for the economy of plenty as contrasted to the new deal philosophy of scarcity.

In developing this theme, Mr. Cameron spoke of the absurdity of attempting to drive a wedge between industry and the public interest and of trying to make the American people think that industrial prosperity and social progress are incompatible. He emphasized the point that progress in industry is the basis upon which social progress can be built. The present administration's campaign of villification against industry, he intimated, is retarding social reform.

Produce More at Lower Prices

In the opinion of Mr. Cameron, production is the key to the solution of most of our national problems. He waved aside the idea that distribution is a vital point, because production comes first. The nation cannot produce enough to meet the potential needs of its people. We should be striving to produce more goods at lower prices. The cycle of greater volume, reduced costs, etc. extends ability to consume. This, he de-

At Dinner of Foundry Equipment Manufacturers' Association

This is only part of the large turnout for the joint stag dinner and smoker Wednesday evening at Hotel Statler of the Foundry Equipment Manufacturers' association, the American Foundrymen's association, and the Detroit chapter of the A.F.A.

HYMAN BORNSTEIN
Elevated to vice president

J. R. ALLAN
Chosen a director

LESTER N. SHANNON
Placed on board of A.F.A.

clares, is the only road to sustained prosperity.

In conclusion Mr. Cameron expressed a most optimistic view of the long-term business trend. He said that the railroads are worrying about truck competition. Under the philosophy of plenty and with emphasis on production, the day will come, he predicted, when railroad operators will beg the motor truck lines to help them move the nation's freight.

Mr. Cameron was introduced by Truman Bradley, Columbia Broadcasting System. Dan M. Avey, retiring president of A.F.A., who presided at the banquet, introduced Frank J. Lanahan, chairman of the A.F.A. board of awards. He in turn presented the Joseph S. Seaman gold medal to Dr. Heinrich Ries and the J. H. Whiting gold medal to David McLain. The details of these awards were reported on page 25 of the April 6, 1936, issue of STEEL.

At the annual business meeting held Thursday afternoon, officers were elected as announced elsewhere in this issue. The convention authorized the president to appoint a committee to follow through on a program of activity outlined in the address of the retiring president, Dan M. Avey, at the opening session on Tuesday. Mr. Avey and David McLain were awarded life memberships in the association.

Frank G. Steinebach, managing editor of *The Foundry*, read greetings from the French Foundrymen's association. Prof. Dr. Aulich, representing the German Foundrymen's association, extended an invitation to American foundrymen to go to Dusseldorf, Germany, to attend the International Congress of Foundrymen in September, 1936.

Protests against the destructive effect of the breakdown in politics in this country were voiced at the opening session. Harvey Campbell, Detroit chamber of commerce, called attention to the trouble being caused by the emphasis being placed upon class distinctions throughout the world.

In his presidential address, Dan M. Avey, editor of *The Foundry*, declared that voiceless and impotent in-

MARSHALL POST
Goes on board of A.F.A.

CARL C. GIBBS
He becomes a director

DAN M. AVEY
Retiring president made a director

dustry faces a crisis which threatens its very existence. In legislative halls and in classrooms of schools and colleges, business is assailed constantly. Politically-minded economists incite destruction under the cloak of social hypocracy.

Mr. Avey urged that the foundry industry examine itself in a critical way to see if it is doing all that is possible to formulate a constructive program. Has the foundry industry any plan to suggest for re-employment, balanced budgets, revival of foreign trade, research, new products or new markets?

In conclusion he declared that the castings industry should be made articulate. It should speak with the voice of honest conviction upon today's problems. It should instill in the public mind respect for the value of its work and its products and the importance of the foundry industry in providing self-respecting employment.

Equipment Dinner Draws 1150

One of the largest assemblages of foundrymen ever gathered at a single event took place Tuesday evening on the occasion of a stag dinner and smoker at Hotel Statler arranged jointly by the American Foundrymen's association, the Foundry Equipment Manufacturers association and the Detroit chapter of A. F. A. Approximately 1150 foundrymen, equipment manufacturers and guests attended this event. Speakers included Herbert S. Simpson, National Engineering Co., Chicago, who presided as toastmaster; Dan M. Avey; R. S. Hammond, president of the Foundry Equipment Manufacturers association and Vaughan Reid, chairman of the Detroit chapter of A. F. A.

Dan M. Avey, editor, *The Foundry*, Cleveland, relinquished the presidency and was succeeded by James L. Wick Jr., president and general manager, Falcon Bronze Co., Youngstown, O. Only 53, Mr. Wick, who is a graduate of Massachusetts Institute of Technology, served with the Youngstown Sheet & Tube Co. and the Crystal Ice & Storage Co., both of Youngstown, until in 1919 he became secretary and resident general manager of the Falcon company. In 1925 he was elected vice president and general manager, and in 1929 was made president and general manager.

Hyman Bornstein, director of the testing and research laboratories of Deere & Co., Moline, Ill., was chosen vice president to succeed Mr. Wick. Like the latter, he has been active in the A.F.A. and on its committees for many years, and at present is general chairman of the gray iron division and chairman of the alloy cast iron committee. Mr. Bornstein has had a distinguished career in the metallurgical field. Prior to his association with Deere & Co. Mr. Bornstein, who is 45, was associated with the city of Chicago, the Union Pacific railroad, and Swift & Co.

Five were elected to the board of directors of the A.F.A. for terms expiring in 1929. These are Mr. Avey, the retiring president; Carl C. Gibbs, president of the National Malleable & Steel Castings Co., Cleveland; Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; James R. Allan, assistant manager of the industrial engineering and construction department, International Harvester Co., Chicago; and Lester N. Shannon, vice president, Stockham Pipe Fittings Co., Birmingham, Ala.

The retiring directors are: E. H. Ballard, General Electric Co., West Lynn, Mass.; George Batty, Drexel Hill, Pa.; T. S. Hammond, Whiting Corp., Harvey Ill.; R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston; and R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

(For papers presented at the convention, and for a description of the equipment show please turn to pages 82-84.)

Rentschler Chosen Gray Iron Chief

DIRECTORS of the Gray Iron Founders' society, Cleveland, meeting in Detroit May 5, elected P. E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O., president. They also chose R. E. Kucher, manager, Olympic Foundry, Seattle, vice president; W. L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland, treasurer; and J. H. Pohlman, vice president, Pohlman Foundry Co., Buffalo, as secretary.

Directors in addition to the above include: H. S. Washburn, Plainville Casting Co., Plainville, Conn.; W. J. Grede, president, Liberty Foundry Inc., Wauwatosa, Wis.; C. R. Culling, vice president, Carondalet Foundry Co., St. Louis; C. B. Magrath, president, North Western Foundry Co., Chicago; P. B. Coombs, president, Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.; A. H. Torrence, treasurer, Indiana Foundry Co., Indiana, Pa.; N. H. Schwenk, president, Cramp Brass & Iron Foundries, Philadelphia; T. I. Curtin, president and treasurer, Waltham Foundry Co., Waltham, Mass.; F. R. Hoadley, vice president, Farrel-Birmingham Co. Inc., Ansonia, Conn.; W. P. Laytham, president, William P. Laytham & Sons Co., Paterson, N. J.; E. C. Graham, manager, Acme Foundry & Machine Co., Blackwell, Okla.; G. J. Golden, superintendent, Golden Foundry Co., Columbus, Ga.; and M. W. Baker, president, Illinois Foundry Co., Springfield, Ill.

Recommendations by W. W. Rose, executive vice president, for bettering the organization were accepted by the more than 75 in attendance.

Mr. Rose proposed that the president of the society immediately appoint a committee to amend the by-laws to suit present needs, a committee to pass upon eligibility of applicants for membership, and another to be known as the finance and budget committee, to establish classifications of dues based on maximum and minimum limits of sales for each classification.

He recommended that efforts of the management be concentrated on the basic program consisting of merchandising, cost accounting, and trade customs and that it be known as the sales promotion program. He announced a modest manual on organization and maintenance of a chapter, including a suggested schedule of monthly meeting topics, is now in course of preparation and made a plea that this should be sent to a restricted number of members in each locality.

At the suggestion of Mr. Seelbach, and upon motion of Mr. Hoadley, members voted unanimously to hold a semiannual meeting this fall, the exact date and place to be announced later.

Selects Jury To Choose Most Beautiful Bridges

American Institute of Steel Construction Inc., New York, has appointed a jury to select the most beautiful bridges of steel built in the past year, the awards to be made in June, and the bridges chosen to be decorated later with a stainless steel plaque.

Group A will include bridges costing $1,000,000 or more; group B, bridges costing $250,000 to $1.000.000; and group C, bridges costing less than $250,000.

The jury of award will consist of Robert D. Kohn and Arthur Loomis Harmon, architects, of New York; Prof. William J. Krefeld of the college of engineering, Columbia university; Howard C. Baird, consulting engineer, of New York; and Kenneth H. Miller, artist, of New York.

Open House at Case May 7

Case School of Applied Science, Cleveland, will hold its annual open house on Friday, May 8, between 1 and 10 p. m. Every building will contain displays and exhibits designed to show the kind of work done daily in routine instruction as well as advanced research.

Hearing on Wood Bill Unlikely

STRUCTURAL steel fabricators last week were studying the Wood bill (STEEL, May 4, page 22) which would virtually nationalize their industry and organize it for labor, but they generally refused to comment as they regard the bill too radical and too extreme for enactment in anything like its present form.

In Washington, Rep. Reuben T. Wood, of Springfield, Mo., the bill's author, declared he would make every effort to develop a hearing by the house committee on interstate and foreign commerce during this session of congress.

But even he was doubtful whether he could accomplish this, considering that both the President and congress favor adjustment as soon as the new tax bill can be passed, possibly early in June.

If hearings can be held the bill can get away to a good start for the next session of congress according to Mr. Wood.

Frank Walsh, counsel for the International Iron Workers, and Jett Lauck, prominent labor counsel of St. Louis, collaborated in writing the bill, Mr. Wood stated, and he believes that even if the Guffey bill is declared unconstitutional it will not affect his bill as it is drawn along different lines. While it is somewhat similar to the Guffey coal bill and the Ellenbogen textile bill, it is still different in many respects, Mr. Wood contends.

Italy's Victory Hits Scrap Exports

New York

CONSUMMATION of Italy's successful military campaign in Ethiopia last week found quick reflection in the scrap market, but little to date in the ore markets.

Italy virtually withdrew from the American scrap market, and a letdown in demand from England was noted almost immediately. With these important factors in the export scrap market in recent months taking such action, it is the opinion of the trade that other leading foreign buyers will move slowly, for the moment, regardless of their requirements, pending more complete price adjustments, which they deem likely under the circumstances.

The ore market, which at best is not nearly so sensitive as scrap, has shown no important manifestations one way or the other. Italy, in fact, at no time has been the active buyer of ore that she has been of scrap.

Some sellers of foreign ores in this country look for no immediate reaction, not only for this reason, but for others. They point out that while Italy has concluded her African campaign, the tenseness which has characterized the leading European capitals in recent months is far from being relieved.

Great Britain, for one, will continue vigorously her preparedness program, it is believed; Germany likewise, and France. Poland will proceed to the extent of her financial ability.

Hence a continuation of a brisk ore market in Europe is likely for some time. As for scrap, England and Poland, to say nothing of Japan, may again become active, once they are satisfied that the market here has become fully adjusted to the present letdown in Italy's requirements. As a matter of fact, some trade leaders here believe that Italy herself may shortly again enter the scrap market here, although probably on a reduced scale.

Conditions in Europe are still decidedly mixed, and the present, it is pointed out, may be nothing more than a "breather".

"World's Largest Lift Span" Hoisted into Triboro Bridge

CONSIDERED by bridge engineers as one of the most spectacular feats ever accomplished, the 2200-ton vertical lift span of the Harlem river crossing of the Triboro bridge, New York, was hoisted into position 55 feet above the river, and level with the roadways, May 3. Reputed to be the largest of its type in the world, the span is 310 feet long and 93 feet wide, with an area of 28,706 square feet.

It was constructed on railroad barges and floated to a position between the two 220-foot towers on either side of the channel. The ends of the span were then bolted to two cross sections lowered from the towers. To the cross sections were already fastened the 96 steel cables, each 2½ inches thick, by which the span is to be suspended. The cables were stretched over large pulleys at the top of the towers, and were attached to two concrete counterweights, 1000 tons each, which will be used in the regular vertical raising of the span for river traffic.

The actual lifting of the span into place was accomplished in 16 minutes. When operating regularly, it will be lifted in two minutes by electric motors from the 55-foot level to 135 feet above the river for ships that require that much clearance. One man will operate the bridge.

Jacob Loewenstein, president, Taylor-Fichter Steel Construction Co. Inc., New York, erecting the bridge, indicated that the span will be lifted soon to a height of 135 feet, where during the next month work on it will be completed. Many prominent engineers and civic officials, including Mayor F. H. La Guardia, witnessed the installation. The Triboro bridge, costing $44,000,000, was financed by the government.

Wide World Photo

Financial

ALLEGHENY STEEL CO., Brackenridge, Pa., reports net earnings of $336,964 in the first quarter, equal after preferred dividends to 45 cents a common share. This compares with net of $324,146, or 44 cents a share in the same quarter of 1935.

Damage to the company's plant during the March flood was estimated at approximately $110,000. None of this expense has been included in the first quarter statement.

MACKINTOSH REORGANIZATION PLAN GIVES HALF CASH

Mackintosh-Hemphill Co., Pittsburgh, a leading manufacturer of rolls and rolling mill equipment, filed a plan of reorganization in the United States district court at Pittsburgh, May 4.

Essentially, the reorganization plan provides a $500 cash payment for each $1000 outstanding first mortgage bond with all coupons attached, plus a new convertible first mortgage bond for $500, June 1, 1936, to mature June 1, 1951, bearing 5 per cent interest. The company has agreed to establish a sinking fund of $5000 monthly, commencing Sept. 1, 1936.

Amount of the new bond issue will be $750,000, of which $595,000 will be issued to the present bondholders. The balance of $155,000 will be available for sale by the company and proceeds will be used for general corporate purposes.

A conversion feature is attached to the new bonds. They will be convertible into common for the first five years at $10 per share, for the next five years at $15, and for the third five years at $20.

In connection with creditors, those in the merchandise classification will be paid in cash, and individual settlement will be made with unsecured creditors. There will be no change in the reorganization affecting preferred and common stock.

Mackintosh-Hemphill Co. reports net profit of $75,460 for 1935. In this connection, the company states that had the Wooster, O., plant, which was sold the United Engineering & Foundry Co. for $550,000 early in 1936, not been owned during the past four years, the 1935 profit would have been larger and losses of 1934, 1933 and 1932 would have been greatly reduced.

STATE TERMS OF MERGER

Terms of the merger of the Allegheny Steel Co., Brackenridge, Pa., and the West Leechburg Steel Co., West Leechburg, Pa., (STEEL, May 4, page 25) have been announced as follows: West Leechburg stockholders will receive 5½ shares of Allegheny common for each share of West Leechburg; Allegheny will issue 136,470 common shares to replace the 24,545 shares of West Leechburg.

How Steel Consumers and Suppliers Fared in First Quarter

All Figures Are Profit Except Where Asterisk Denotes Loss

	First Quarter 1936	First Quarter 1935
Link-Belt Co., Chicago	$307,133	$200,978
A. M. Byers Co., Pittsburgh	*184,234	*197,779
National Acme Co., Cleveland	140,016	33,003
Electric Auto-Lite Co., Toledo, O.	852,515	693,675
Borg-Warner Corp., Chicago	1,575,362	1,383,845
Yale & Towne Mfg. Co., Philadelphia	170,903	*9,676
Murray Corp., Detroit	447,520	527,991
Briggs Mfg. Co., Detroit	2,503,248	3,247,141
Williamsport Wire Rope Co., Williamsport, Pa.	89,745	52,963
Bridgeport Machine Co., Wichita, Kans.	77,878	39,222
Stewart-Warner Corp., Chicago	432,000	496,063
General Refractories Co., Philadelphia	230,583	197,802
Federal Screw Works, Detroit	*9,499	16,760
Evans Products Co., Detroit	255,917	250.292
Fansteel Metallurgical Corp., Chicago	20,243	*839
U. S. Hoffman Machinery Corp., New York	80,645	20,924
Westinghouse Electric & Mfg. Co., E. Pgh., Pa.	3,732,454	2,326,496
Allis-Chalmers Mfg. Co., Milwaukee	754,127	22,242
Westinghouse Air Brake Co., Wilmerding, Pa.	513,613	*174,250
Michigan Steel Tube Products Co., Hamtramck, Mich.	120,677	116,243
Bohn Aluminum & Brass Corp., Detroit	335,129	554,613
Young (L. A.) Spring & Wire Corp., Detroit	427,248	520,932
Midland Steel Products Co., Cleveland	410,725	344,031
Eaton Mfg. Co., Cleveland	583,382	605,272
Caterpillar Tractor Co., Peoria, Ill.	1,936,778	1,084,776
Kelsey-Hayes Wheel Corp., Detroit	325,860	430,848
Clark Equipment Co., Buchanan, Mich.	54,254	23,273
Symington Co., Rochester, N. Y.	33,000	*67,000
Reliance Mfg. Co., Chicago	145,581	35,052
American Steel Foundries, Chicago	461,239	*160,844
Motor Wheel Corp., Lansing, Mich	370,014	258,124

Steel Consumers Oppose Tax Bill

STEEL consumers went into action last week against the proposed administration tax bill (page 37) designed to compel the distribution of corporation earnings in order to prevent the creation of large reserves and to make the distributed earnings taxable as income in the hands of stockholders.

Directors of the American Institute of Steel Construction meeting in New York last week set up a special committee to protest the bill to the senate finance committee. On this special committee are J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.; R. I. Ingalls, Ingalls Iron Works Co., Birmingham, Ala.; and Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.

Because of the nature of the fabricating business, that part of its earnings required to replace losses should not be construed as profits and the fact that such part is withheld should not be considered as adding to surplus, some members of the Institute felt.

They also held that the construction industries should be entirely exempt from the new tax, as is now provided that certain institutions shall be exempt. In such cases the present corporation income taxes will be continued against them. At least expenditures made from earnings which are in the nature of capital investments should not be construed as surplus. Otherwise it is feared that corporations would not be encouraged to make new commitments for construction and additions.

Herman H. Lind, general manager, National Machine Tool Builders association, Cleveland, last week submitted a brief directing attention to the fundamental difference between the capital goods industries, of which the machine tool builders are a part, and the consumer goods industries.

"Key" workmen in machine tool plants are artisans skilled by years of training and experience, Mr. Lind pointed out, and "it is essential that these key men be retained in times of depression so that machine tool builders may be in position to render prompt service on repairs to equipment and installation of new machines when times improve."

Weigh Railroad Buying

President Roosevelt said Friday that as a result of conferences with industrial leaders and others on the unemployment question no final so-

lution has been found. He said the administration is considering building up certain industries having possibilities for re-employment, including railroad equipment and housing. It might be possible to change the capital structure of the railroads to permit them to make equipment purchases.

Meetings

EXHIBITORS in the eighteenth annual National metal show to be held in Cleveland, Oct. 19-23, already have contracted for 85 per cent of the exhibit space available in the underground exhibit hall of Public Auditorium, announces W. H. Eisenman, managing director of the show and national secretary of the American Society for Metals, which sponsors this event each year.

In the three weeks that floor plans have been in the hands of exhibitors, 115 important companies have reserved 55,000 square feet of space. Never in the history of the show has so much space been reserved in so short a time. Reservations are at present 21 per cent ahead of 1928 which had set a high mark for advance commitments.

Steps are being taken to obtain additional space and it appears likely the 1936 show will be the largest in history. According to Mr. Eisenman, practically all of the 115 companies have increased their requirements over a year ago.

More technical societies will take part in the National Metal congress to be held in conjunction with the Metal show than has been the case for several years. Organizations in addition to the American Society for Metals to hold technical sessions include the Wire association; Institute of Metals and Iron and Steel divisions, American Institute of Mining and Metallurgical Engineers; American Welding society; and Machine Shop Practice and Iron and Steel divisions, American Society of Mechanical Engineers.

A.S.M.E. TO MEET IN DALLAS

Four papers of interest to the metalworking industry will be presented before the semiannual meeting of the American Society of Mechanical Engineers to be held at Hotel Adolphus, Dallas, Tex., June 15-20. Three of these papers, scheduled for a machine shop session on Wednesday afternoon, June 17, are as follows: "United States Army Airplane Maintenance System," by John H. Howard; "Use of X-Ray Testing of Welded Vessels," by H. R. Isenburger; and "Spraying of Molten Metal," by L. E. Kunkler. The fourth

(*Please turn to Page* 28)

Marked Gains Are Reported in Iron and Steel Industry Wage Rates in 1935

DUE to increases in wage rates and more normal operating conditions in 1935 as compared with 1933, substantial gains occurred in average weekly earnings in four basic departments of the iron and steel industry, according to a survey by the bureau of labor statistics.

These increases in weekly earnings amounted to 73 per cent in blast furnace departments; 88 per cent in bessemer converters, and 127 per cent in open-hearth furnaces. While comparable data for electric furnaces were not available for 1933 the gain was known to be considerable.

Workers in blast furnaces in 1935 earned an average of 58.7 cents per hour, compared with 44.5 cents in 1933. This increase of 14.2 cents or 31.9 per cent, resulted chiefly from advances in wage rates due to the establishment of code minima, as well as to voluntary action. The factor of production also had some bearing, as a number of companies supplemented the time rates paid by a production bonus.

The average hours worked in blast furnaces increased by 31 per cent, or from 28.7 to 37.6 hours. In 1935 employes in this department received an average of $22.06 for a week's work, whereas in 1933 they earned only $12.77.

Average hourly earnings of wage earners in bessemer converters were 65.8 cents in 1935, an increase of 16.7 cents, or 34 per cent, over the average in 1933.

As in the case of blast furnaces, the upward trend in earnings in this department extended to all classes of workers. In 1933 almost 50 per cent of the employes were paid less than 45 cents per hour, but in 1935 less than 2 per cent earned below that figure.

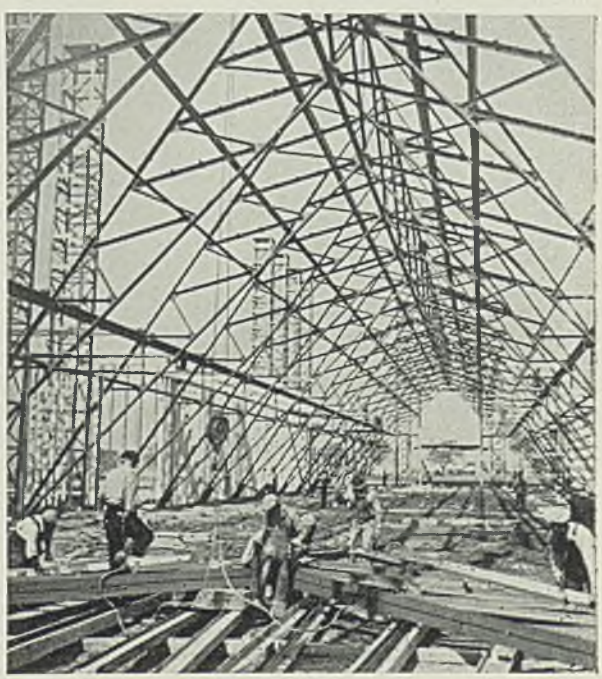
The weekly hours of bessemer converter employes averaged 30.8 in 1935 compared with 22 in 1933. In 1935 the weekly wage averaged $20.26 a week, an increase of $9.57, or 87.8 per cent, over the 1933 average of $10.79. To obtain this extra wage, however employes worked 40 per cent longer than they did in 1933.

Workers in open-hearth furnaces averaged 72.9 cents an hour in 1935, compared with 51.3 cents in 1933, an increase of 21.6 cents, or 42.1 per cent. The rise affected all classes of workers in this department.

In 1935 the work-week averaged 35.5 hours, against 22.2 hours in 1933, an increase of 60 per cent. Weekly earnings averaged $25.84 in 1935. This represented an increase of $14.45, or 126.9 per cent, over the 1933 average of $11.39. This

To House Autos at Expo

THIS is the structural steel framework of the automotive building at the Great Lakes exposition to open in Cleveland, June 27. The frame consists of a series of inverted V-shaped units, assembled on the ground, hoisted into position and tied in with horizontal stringers. General Motors Corp. will have a large exhibit in this building



great rise in earnings was not brought about by increased hourly earnings alone, as employes worked 13.3 hours, or 60 per cent more time per week in 1935 than they did in 1933.

Workers in electric furnaces earned an average of 62.9 cents an hour in 1935. They worked an average of 39.1 hours per week, and their weekly earnings amounted to $24.63. While this average exceeded that for bessemer converters by $4.37 it was $1.21 less than for open hearths.

Production

STEELMAKING dipped 1 point last week to 68½ per cent, reflecting a slight easiness in strip steel rolling, plates, structural, and wire products, and a reduction in sheet and bar requirements. Pittsburgh was down 1 point to 62 per cent, Youngstown 2 points to 76 per cent, Cleveland 4 to 75½ per cent, and Detroit 6 to 94 per cent, while Buffalo gained 3 points to 73 per cent, a peak since 1930. Other districts held unchanged. Indications point to a leveling off in operations, although tonnage from the automotive, railroad, stove and refrigerator manufacturers continues heavy. Further details follow:

Youngstown—Down 2 points last week to 76 per cent, and indications point to the rate holding at this level at this week's opening. New business continues to show surprising stability.

Chicago—Unchanged at 71 per cent, with only minor fluctuations indicated for the next week or two. Blast furnace schedules also are steady, with 24 of 41 units active.

Birmingham—Steady at 69 per cent last week. Operations in this district have virtually been unchanged for three consecutive months, and it is expected that this rate will continue through this month. Fifteen furnaces continue melting.

Colorado—Colorado Fuel & Iron Co., Denver and Pueblo, Colo., was operating at 75 per cent last week, with 12 furnaces active.

Pittsburgh—Off 1 point to 62 per cent last week, as the 2-point decline in the operations of a leading independent accounted chiefly for the district's change. The leading interest closed last week at 63 per cent, and the leading independent at 60 per cent.

Tin plate rolling mills are operating at 90 per cent and sheet mills at 70-75 per cent, but ingot operations have declined due to a slight recession in strip steel rollings, plate, structural and wire products.

Led by Carnegie-Illinois Steel Corp.'s 15 active blast furnaces, there are 34 in aggregate which are in blast. Of the rest, Jones & Laughlin Steel Corp. has 8 on, Bethlehem Steel Co. 5, National Tube Co. 3, with American Steel & Wire Co., Pittsburgh Steel Co., and Pittsburgh Crucible Steel Co., 1 each.

Detroit—Off 6 points to 94 per cent last week. Sixteen out of 17 open-hearth furnaces were melting against 17 two weeks ago.

Wheeling—Steady at 92 per cent last week, for the third successive week. Thirty-four open-hearth furnaces are on active schedule, out of a possible 37 for the district.

Buffalo—Up 3 points to 73 per cent last week, a peak since 1930. Twenty-seven open hearths are now active. Production is expected to hold at this rate during the present week, but may begin to taper off shortly.

Central eastern seaboard — Unchanged at 44 to 45 per cent, and while the trend seems to be slightly on the downward side, new tonnage appears better and should at least provide a sustaining influence.

Cincinnati—Continued at 84 per cent last week, the peak for 1936, with 20 open hearths operating. Seasonal demand for automobiles, stoves and refrigerators, with steady general demand accounting for the high rate. Schedule is likely to be little modified the rest of May.

New England—Held at 78 per cent last week, with indications of a drop of 1 point to 77 per cent this week.

Cleveland-Lorain—Down 4 points to 75½ per cent, due to anticipated reduction in sheet and bar requirements. Republic Steel Corp. reduced the number of its active open hearths from 12 to 9 in midweek. Otis Steel Co. continued with 8; National Tube Co., Lorain, 11. Republic operated 4 blast furnaces; Otis, 2; National Tube, 3.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended May 9	Change	Same week 1935	Same week 1934
Pittsburgh	62	— 1	36	51
Chicago	71	None	52½	64½
Eastern Pa.....	44½	None	28	45
Youngstown...	76	— 2	50	67
Wheeling	92	None	81	79
Cleveland	75½	— 4	51	77
Buffalo	73	+ 3	30	66
Birmingham...	69	None	54½	52
New England	78	None	46	80
Detroit	94	— 6	82	100
Cincinnati	84	None	†	†
Average.....	68½	— 1	44½	62

†Not reported.

CANADIAN STEEL OUTPUT UP

Canadian output of steel ingots and castings in March totaled 101,092 tons, an increase over the 93,365 tons in February, and the 57,840 tons in March, 1935.

Pig iron production at 55,009 tons was practically on a parity with the 55,751 tons produced in February, but was an increase over the 44,727 tons reported in March a year ago. Production included 47,960 tons of basic, and 7049 tons of malleable. Output of ferroalloys amounted to 5455 tons, an increase of nearly 7 per cent over the previous month's total of 5114 tons, and double the March, 1935, production of 2715 tons.

For the first three months, output of steel ingots and castings totaled 173,372 tons, as against 294,682 tons a year ago; pig iron totaled 172,096 tons, compared with 126,402 tons; and ferroalloys production rose from 8222 tons to 14,893 tons.

Meetings

(*Concluded from Page 27*)

paper, to be read at a general session on the afternoon of June 18, is "Improvement of Cast Iron Pipe" by J. V. Moore.

WILL TELL TOOL BUILDERS OF "ABUNDANT LIFE" IN BUSINESS

Dr. Glenn Frank, president of the University of Wisconsin, Madison, Wis., will address members of the National Machine Tool Builders' association at their spring meeting in the Edgewater Beach hotel, Chicago, May 11. Subject of his address will be "Business and the Abundant Life." The meeting will be in session May 11 and 12. H. L. McCarthy, dean, Depaul university college of commerce, Chicago, will speak at a morning session. H. H. Lind, 10525 Carnegie avenue, Cleveland, is general manager of the association.

Soviet Boosts Scrap Need

For its enlarged steel production program the Soviet government in Russia is calling upon the scrap metal trust (Metallom) to supply 4,000,000 metric tons of scrap, 60 per cent more than in 1935, of which 3,500,000 tons will be steel scrap. It is estimated that iron and steel plants will require 8,000,000 tons of scrap this year, of which the industry must supply half.

To Make Pipe at Claire

Western Steel Products Co., formed by a Philadelphia group, will operate the former Claire furnace at Sharpsville, Pa., of the Davison Coke & Iron Co., as a cast iron pipe plant.

Died:

A C. JONES, 45, research engineer, Lebanon Steel Foundry, Lebanon, Pa., in that city, May 6. He was a graduate of the Crane College of Technology, and the early years in the practice of his profession were spent in Chicago. He became associated with Lebanon Steel Foundry as research engineer, and chief metallurgist in October, 1922, a position he held until his death. He was the author of several technical papers, dealing with the subject of the manufacture and application of steel castings, both carbon steel and alloy steel. He was a member of the American Society for Metals and chairman of the Lehigh Valley chapter; member of the American Foundrymen's association and served on the joint committee for sand research; American Society for Testing Materials, serving on two committees, and chairman of one.

♦ ♦ ♦

Martin D. Propst, 38, engineer for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., at his home there, May 1.

♦ ♦ ♦

G. H. Piggot, 59, former president of the Federal Steel Fixture Co., Chicago, in that city, May 1. After the dissolution of this company in 1929, Mr. Piggot became associated with the All Metal Mfg. Co., Chicago.

♦ ♦ ♦

George H. Feltes, 56, president and treasurer of the Standard Electrical Tool Co., Cincinnati, in French Lick Springs, Ind., May 6. He formerly was secretary and treasurer of the United States Electrical Tool Co.

♦ ♦ ♦

Edward Manross Bentley, 77, electric railway pioneer and the first head of the patent department of the General Electric Co., Schenectady, N. Y., at Lawrence, Long Island, May 1.

♦ ♦ ♦

Charles A. Lovett, 72, before his retirement in 1933 head of the receiving department at Moore Handley Hardware Co., wholesale hardware and mill supply firm of Birmingham, Ala., at his home there, May 3.

♦ ♦ ♦

Henry Adams Morss, president, treasurer and director of the Simplex Wire & Cable Co., Boston, in that city, May 6. Mr. Morss also was vice president and director of the Hub Wire Cloth & Wire Co. He was a former treasurer of the Massachusetts Institute of Technology.

♦ ♦ ♦

Solon C. Kelley, 78, retired banker and manufacturer, in Stamford, Conn., May 4. For about 30 years he was associated with Blair & Co., a bank in New York, and later he became treasurer of the Standard Screw Co. He retired about 20 years ago.

♦ ♦ ♦

Irving Allston Palmer, 70, head of the metallurgical department of the Colorado School of Mines, Golden, Colo., in Denver April 29. Professor Palmer had taught at the Colorado School of Mines since 1917.

♦ ♦ ♦

Leonard B. Botfield, 55, president, Botfield Refractories Co., Philadelphia, in that city, May 5. After graduation from Philadelphia College of Pharmacy and Science, he became associated with the Botfield Refractories Co., founded by his father, and later became president. He also was president of Canadian Botfield Refractories Ltd., Toronto, Ont.

♦ ♦ ♦

Robert E. Turnbull, 75, for 23 years associated with the Arcade Mfg. Co., Freeport, Ill., in Hinsdale, Ill., April 27. Mr. Turnbull came to the United States in 1882 from England, and for some years was connected with the McCormick and Deering harvester works. He later entered the employ of the Pridmore Molding Machine Co. From 1913 until his death he represented Arcade in Michigan, northern Ohio, Indiana and Chicago.

April Ingot Rate Best Since 1930

PRODUCTION of steel ingots in April was at the daily rate of 151,625 gross tons, the highest attained since April, 1930, when it stood at 158,057 tons. Total production in April was 3,942,254 gross tons, a gain of 599,635 tons over the 3,342,619 tons produced in March. Each month had 26 working days. Capacity was engaged at 69.09 per cent in April, compared with 58.58 per cent in March, according to figures by the American Iron and Steel institute.

For four months of 1936 total ingot production was 13,295,237 gross tons, at the rate of 128,865 gross tons. In four months of 1935 total production was 11,150,326 gross tons, at the daily rate of 108,255 tons.

In the accompanying table, compiled by the institute, adjustments have been made in calculated tonnages to conform to the broadened representation of steelmakers. Reports now are being received from companies representing 98.03 per cent of total output, the previous representation being 97.9 per cent of the total. The adjustments apply to 1935 and 1936.

Steel Ingot Production

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.03 per cent

	Open Hearth		Bessemer		Total		Calculated daily production, all companies	Number of working
1936	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	(gross tons)	days
Jan.	2,849,557	53.73	196,389	31.54	3,045,946	51.40	112,813	27
Feb.	2,761,973	56.25	202,445	35.11	2,964,418	54.03	118,577	25
Mar.	3,157,579	61.83	185,040	30.86	3,342,619	58.58	128,576	26
1st Quar.	8,769,709	57.24	583,874	32.46	9,352,983	54.64	119,910	78
Apr.	3,637,479	71.23	304,775	50.83	3,942,254	69.09	151,625	26
4 mo.	12,407,178	60.76	888,649	37.08	13,295,237	58.77	128,865	104
1935								
Jan.	2,630,303	49.70	239,858	34.99	2,870,161	48.02	106,302	27
Feb.	2,549,935	54.21	224,336	36.82	2,774,271	52.22	115,595	24
Mar.	2,634,482	51.70	230,810	34.97	2,865,292	49.78	110,204	26
1st Quar.	7,814,720	51.78	695,004	35.56	8,509,724	49.92	110,516	77
Apr.	2,408,686	47.27	231,916	35.14	2,640,602	45.88	101,562	26
4 mo.	10,223,406	50.72	926,920	35.48	11,150,326	48.97	108,255	103
May	2,378,865	44.95	254,796	37.17	2,633,661	44.06	97,543	27
June	2,048,177	41.80	210,487	33.17	2,258,664	40.81	90,347	25
2nd Quar.	6,835,728	44.71	697,199	35.21	7,532,927	43.62	96,576	78
1st 6 mo.	14,650,448	48.22	1,392,203	35.38	16,042,651	46.75	103,501	155
July	2,043,371	40.10	224,456	34.01	2,267,827	30.40	87,224	26
Aug.	2,682,569	50.69	233,361	34.05	2,915,930	48.78	107,997	27
Sept.	2,591,267	52.88	233,737	36.83	2,825,004	51.04	113,000	25
3rd Quar.	7,317,207	47.86	691,554	34.93	8,008,761	46.38	102,676	78
9 mo.	21,967,655	48.10	2,083,757	35.23	24,051,412	46.63	103,225	233
Oct.	2,872,040	54.27	270,719	39.50	3,142,759	52.58	116,398	27
Nov.	2,898,246	56.87	252,163	38.20	3,150,409	54.73	121,170	26
Dec.	2,845,013	58.06	228,392	35.99	3,073,405	55.53	122,936	25
4th Quar.	8,615,299	56.35	751,274	37.94	9,366,573	54.24	120,084	78
Total	30,582,954	50.17	2,835,031	35.91	33,417,985	48.54	107,453	311

Capacity percentages for 1935 are based on open-hearth capacity of 60,954,717 gross tons and bessemer of 7,895,000 gross tons on Dec. 31, 1934; for 1936 on open-hearth capacity of 61,280,509 gross tons and bessemer of 7,195,000 gross tons, as of Dec. 31, 1935.

Men of Industry

L. L. CASKEY has been appointed district sales manager for Republic Steel Corp., Cleveland, in the Philadelphia territory, succeeding J. B. DeWolfe, who has been transferred to the general offices in Cleveland to assist George E. Totten, manager of sales of the tin plate division.

J. W. Braffett, for the past seven years Detroit representative of the Oliver Iron & Steel Corp., has joined the Detroit sales staff of Republic, Upson nut division, located in the Fisher building.

Mr. Braffett, a graduate of the mechanical engineering school of Cornell university, has had a varied career as sales engineer. During the war he was test supervisor of Liberty engines in the bureau of aircraft production, following which he became identified with the Ternstedt Mfg. Co., Detroit, and subsequently the Oliver corporation.

♦ ♦ ♦

Walter White has been appointed general superintendent of the Pittsburgh Rolls Corp., Pittsburgh. He assumed his duties May 1.

♦ ♦ ♦

John W. Hubbard, Pittsburgh, has been elected chairman of the board of the Ralston Steel Car Co., Columbus, O. Mr. Hubbard has been identified with many Pittsburgh industries, including the Campbell Transportation Co., Hubbard & Co., and Fort Pitt Brewing Co.

♦ ♦ ♦

R. P. Morgan, formerly sales engineer of the New England district for the Herman Pneumatic Machine Co., Pittsburgh, is now in Russia in connection with the installation of a large order of molding machines which has been purchased by the USSR government from the Herman company.

♦ ♦ ♦

Prof. Bradley Stoughton, formerly head of the department of metallurgy, Lehigh university, Bethlehem, Pa., has been made Lehigh's first dean of engineering.

As secretary of the American Institute of Mining and Metallurgical Engineers from 1913 to 1921, Professor Stoughton made a host of friendships throughout the engineering world. In 1922, under the administration and support of President Harding, he prepared a report on the 12-hour day in the steel industry, resulting in the adoption of the 8-hour day, and in 1923 was called to Lehigh to occupy the chair in metallurgy.

Prior to his secretaryship, he had

Prof. Bradley Stoughton

been adjunct professor of metallurgy at Columbia university, and while there, in 1908, wrote his "Metallurgy of Iron and Steel." In 1922 he was elected president of the American Electrochemical society.

Simultaneous with the selection of Professor Stoughton as dean is the re-establishment of the Ph.D. degree in metallurgy at Lehigh, after a lapse of 42 years.

♦ ♦ ♦

Benjamin B. Gracier, who has been identified with Caterpillar Tractor Co., Peoria, Ill., and one of its predecessors, the C. L. Best Tractor Co., for nearly 20 years, has been appointed factory manager of the company's road machinery plant. Mr. Gracier's service dates back to 1918, when he joined the Best organization as a machinist. His ability won many promotions, and at the time of his present advancement he was superintendent of tractor assembly and the tractor special attachments department.

Benjamin B. Gracier

♦ ♦ ♦

W. J. Reagan, open-hearth superintendent, Edgewater Steel Co., Oakmont, Pa., has been elected a member of the executive committee, open-hearth committee, of the American Institute of Mining and Metallurgical Engineers.

♦ ♦ ♦

Oliver W. Morton has resigned as purchasing agent for the American Hoist & Derrick Co., St. Paul, after having been associated with the company for the past 36 years.

R. T. Reilly, who has been with the company for the past 34 years, has been named his successor.

♦ ♦ ♦

James E. DeLong, formerly vice president and general manager, has been elected president of the Waukesha Motor Co., Waukesha, Wis. succeeding the late H. L. Horning. Since Mr. Horning's death, Mr. DeLong has been the acting chief executive.

♦ ♦ ♦

H. W. Phelps, formerly president of the American Can Co., New York, has been elected chairman of the board, succeeding the late F. S. Wheeler.

C. E. Green, formerly vice president and comptroller, has been named president.

♦ ♦ ♦

Dr. E. F. Lowry has been appointed director of research and development for the Continental Electric Co., St. Charles, Ill., manufacturer of photo cells, electronic and special vacuum devices. He formerly had been research engineer with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for many years.

♦ ♦ ♦

A. B. Wilber has been appointed manager of the jobbing division and assistant manager of manufacturing for the Aluminum Cooking Utensils Co., New Kensington, Pa., subsidiary of Aluminum Co. of America.

Paul M. Conrad has been made plant electrical engineer at New Kensington for Aluminum Co. of America, to succeed the late D. A. Boyer.

Charles Braglio, for the past seven years with the Pittsburgh sales offices of Auminum company, has been transferred to the sales development division at New Kensington.

♦ ♦ ♦

Lewis B. Lindemuth, consulting metallurgist, 405 Lexington avenue, New York, has returned to the United States after spending more than a year abroad, mostly in con-

nection with work for the Broken Hill Proprietary Co. Ltd., and the Australian Iron & Steel Co., in Australia. He also visited the Tata Iron & Steel Co., and the Bengal Iron Co. and looked over the iron ore and coal fields in India.

Mr. Lindemuth will return to England in May in connection with consulting work for Richard Thomas & Co. Ltd., and John Lysaght Ltd., and in the fall will go to Australia again to continue his work with the Broken Hill company.

♦ ♦ ♦

J. E. De Long, recently vice president of the Waukesha Motor Co., Waukesha, Wis., has been elected president, succeeding the late H. L. Horning. James B. Fisher, formerly chief engineer, has been made vice president.

♦ ♦ ♦

C. W. Meyers has been appointed development engineer of the American Steel & Wire Co., succeeding William G. Hassel, resigned. His headquarters are in the Rockefeller building, Cleveland.

♦ ♦ ♦

W. S. Chase, who for a great many years was general sales manager of the National Acme Co., Cleveland, and who now resides at 106 South Cordova street, Alhambra, Calif., has been appointed sales manager on the West coast for National Acme. He will advise and assist the present agencies of National Acme in the sale of its products in that territory.

♦ ♦ ♦

Emil C. Traner has been named president of the Mechanics Universal Joint division, Rockford, Ill., of Borg-Warner Corp., Chicago, succeeding the late Eric Ekstrom. He will also serve as general manager and treasurer.

Mr. Traner has long been identified with the automotive industry, having served as general manager of the Rockford Drilling Machine Co. since 1916. This concern was acquired by Borg-Warner Corp. in 1929. Since that time he has served as president of that division. Mr. Traner has been a director of the Mechanics Universal Joint division of Borg-Warner Corp. since 1929.

♦ ♦ ♦

Roy G. Roshong has been appointed metallurgist for the Lindberg Steel Treating Co., Chicago. Mr. Roshong is a graduate metallurgical engineer, obtaining his degree at the University of Cincinnati. His former connections include Canton Steel Foundry Co., Canton Drop Forge Co., Canton Sheet Steel Co., Dayton Engineering Laboratories, Newport Rolling Mill Co., Wadsworth Watch-Case Co., United Alloy Steel Co., and Hoover Co.

He is a member of the American

Joseph L. Block

Society for Metals, chairman of the committee on die casting alloys and die steel for the American Society for Testing Materials, among a number of other technical societies.

♦ ♦ ♦

Joseph L. Block has been appointed executive vice president in charge of sales and Albert C. Roeth has been made vice president and general manager of sales for Inland Steel Co., Chicago.

Mr. Block has been associated with the Inland company since 1922. He has been a vice president since 1929, and a director since 1930. For a number of years he has been in charge of the sale of bars and semifinished steel and also has directed the company's advertising activities.

Mr. Roeth has been associated with the company since 1911, and has been a vice president since 1929. He has been in charge of the sale of structural shapes, plates and sheet piling.

♦ ♦ ♦

Lincoln Electric Co., Cleveland, has made the following changes and promotions in its sales personnel.

J. S. McKeighan has been transferred to the sales staff and is stationed at 1712 Catalpa drive, Dayton, O., operating under the Cincinnati district office.

J. B. McCormick has been transferred from the Philadelphia office to the Pacific coast, and is stationed at 3160 Montecito avenue, Fresno, Calif., under the personnel of the Los Angeles office.

Paul W. James has been transferred from the factory to 16½ Crandall street, Binghamton, N. Y., operating under the Syracuse office.

Albert C. Roeth

♦ ♦ ♦

A. C. Fieldner, chief engineer, experiment stations division, United States bureau of mines, Washington, has been nominated for president of the American Society for Testing Materials.

T. G. Delbridge, manager, research and development department, Atlantic Refining Co., Philadelphia, has been named for the post of vice president.

Nominees for the executive committee are: O. U. Cook, inspecting engineer, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; H. F. Gonnerman, manager, research laboratory, Portland Cement association, Chicago; C. S. Reeve, manager, research development, Barrett Co., Leonia, N. J.; F. E. Richart, research professor of engineering materials, University of Illinois, Urbana, Ill.; F. M. Waring, engineer of tests, Pennsylvania railroad, Altoona, Pa.

Election will be by mail ballot between May 20 and June 1, with nomination virtually assuring election. The new officers will be installed at the annual meeting of the society in Atlantic City, N. J., June 29-July 3.

♦ ♦ ♦

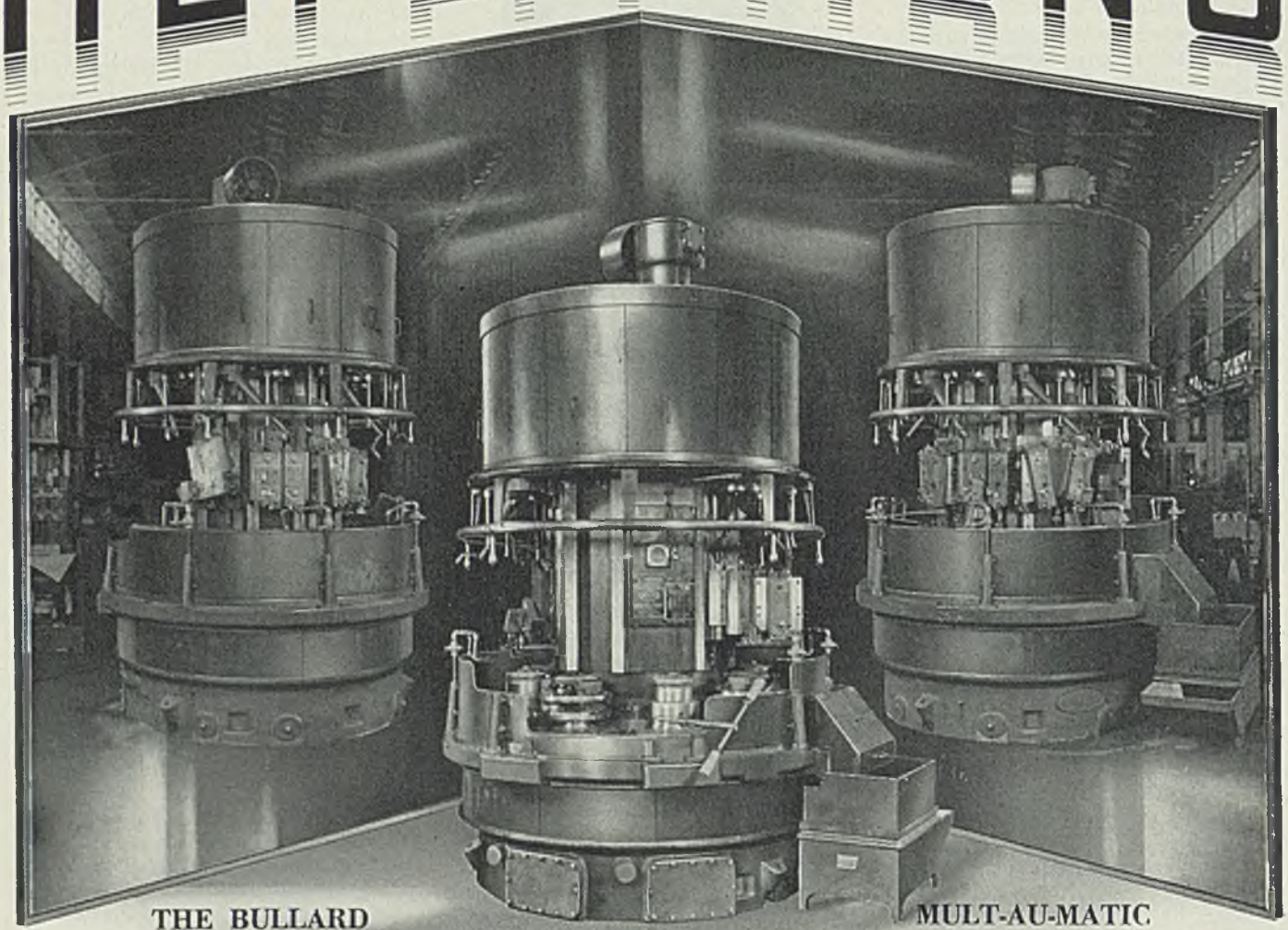
Harry W. Johnson has joined the Lewis Bolt & Nut Co., Minneapolis, as sales manager of its railway specialty department. Previously, for 34 years, he was associated with the Minneapolis & St. Louis railroad. He was superintendent of motive power and rolling stock from 1923 to 1935,

(*Please turn to Page* 36)

Picks Silicosis Committees

Secretary of Labor Frances Perkins last week appointed four committees to wage a campaign against silicosis in foundries, quarries, mines, and other industries where silica dust may be inhaled. One committee will deal with prevention through medical control, another prevention through engineering control, a third will deal with economic, legal and insurance phases, and the fourth with regulatory and administrative phases. These committees are an outgrowth of a national conference held in Washington in April.

REFLECTIONS



THE BULLARD MULT-AU-MATIC

8″ — 8 SPINDLE TYPE D

The Profitable Answer To Your Reflections . . .

Reflections: Mental consideration of some suggested idea usually with reference to belief or disbelief or to some course of action. —*Webster's International.*

Reflection on Past Performance of your present equipment will undoubtedly determine the type of replacement.

Reflection will also advise you that Mult-Au-Matic Performance in competitive plants is a factor in competitive markets.

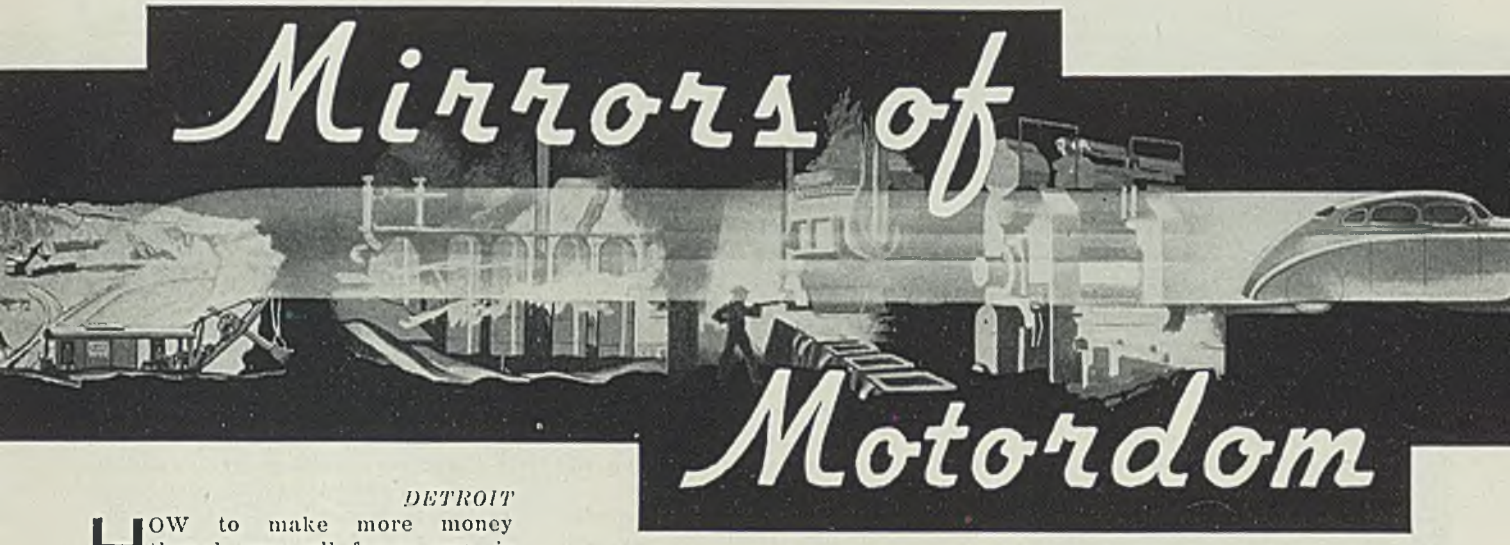
Which Brings us to the Point—
What can Mult-Au-Matics
DO for You?
REFLECT

We suggest that Past and Present Mult-Au-Matic Performance with its Efficiency and Economy provides a means for Lower Manufacturing Costs.

It's merely a matter of letting Bullard Engineering Service submit Estimates on whatever Jobs you have in mind.

For instance—What are your Times on Ring Gears?—or for that matter any other Job? Reflect and then—
Let us give You Mult-Au-Matic production data.

BULLARD **THE BULLARD COMPANY**
Bridgeport Connecticut



DETROIT

HOW to make more money though you sell fewer cars, is the title of a masterpiece that Chrysler turned out in its first-quarter earnings statement.

Incongruous though it seems, Chrysler did just that. Since then the industry's observers have turned to pencil and paper, brushed up on their long-division, and looked for the answer.

For, in the first quarter Chrysler sold about 8000 fewer cars, took in about $1,500,000 less money, yet had $2,300,000 more to pocket than in the first quarter of 1935.

Some might guess that a new bookkeeper had been hired, that a corner or two had been cut on quality, or that there had been important parts omissions per model in 1936 as against 1935.

Actually, none was the case. Meaning no inference reflecting on Chrysler auditing, for there has been no deviation from standard practice there, nor any on purchasing or design, it becomes evident that Chrysler, like many a competitor in motordom, received a higher sales price per car this year.

That the answer should be so simple is astounding. But here is the story—Chrysler's statement being taken as an example for analysis because it is a leading producer and fairly typifies the picture today.

Chrysler Cars Average $618

What Chrysler did in January, February, and March was to sell 239,867 cars to dealers for $148,463,735, or at an average of $618 per car. According to its balance sheet, these cars cost $123 566.911 to make, or an average of $515 per car. The balance of $103 per car of course was not clear, for the item "expenses" plus taxes and interest slashed this item more than in two.

But it left a net of $11,453,439 which is 8 per cent profit on total sales or about $48 to $50 per car clear, exclusive of dividends (which Chrysler elected to pay out at the rate of $4.314,391).

So, in the final analysis the addition to surplus was $7,139,048, or if you want to figure it on a per-car basis, $31 per automobile net after everything that suppliers, labor, the government, and stockholders got their hands on.

Now, take the same quarter of 1935. Then, Chrysler sold 247,631 automobiles to distributors which were billed at $149,949,991, or an average of $606 per car—slightly less than received this year. These same models cost $127,167,398 to manufacture. Again averaging, the average cost per car was $513.

Profit Up $10 a Car

To carry comparisons one step further, each Chrysler unit cost $2 more to make in the first quarter of 1936 than it did in the first quarter of 1935. But, each Chrysler unit was sold for $12 more. The net was therefore $10 per car more. And when you multiply that by some 239,867 cars you have something.

What this all proves is that Chrysler—and the entire automobile industry—are not profiteers but pretty smart merchandisers. To increase prices and not ballyhoo it is not an omission of fact, but it is keen selling if the public still wants your product.

Any automobile manufacturer absolutely cringes and shrinks from publicity connected with raising car prices. The subject is very carefully minimized or quashed—yet behind the scenes it's done.

Consequently, the buying public today is generally not aware that automobile prices are higher this year than they were last. If you ask the man on the street about motor car prices today as against, say 1932, of course he will say there have been increases. But 1936 against 1935?—the impression is generally no.

This error in impression is usually given a healthy boost by automobile advertising. The heavy accent on "low f.o.b. prices," "cheapest car in America to own," etc., all hit those words "cheap" and "low-priced" as often as possible. Little wonder that Mr. Public has been trained to think that an automobile is always a cheap necessity to buy.

But the point is that outside of statisticians who have to dig hard for the facts, no automobile advertising ever carries a line that prices on a model-for-model basis are up so much this year against last.

There was a fanfare, though, in those years of the early thirties when prices of most everything were taking a tumble. Automakers were then right up front in letting the world know they had trimmed off $10, $25, or whatever it was, per car.

So, it's a one-sided story. And speaking of automobile prices, there's another angle to the whole discussion that is cropping out in Detroit again today. It concerns the so-called "cheap" car, a full-sized model that would sell for under $500.

As it is today, Ford, Chevrolet, and Plymouth, all popularly dubbed the "lowest priced automobiles" do not deliver to the buyer and leave him much change out of $600, even if he buys the most abbreviated standard model.

Extras No Small Item

If he buys a deluxe model and goes in, even moderately, for extras such as radio, etc., his bill will top $700. Now, it is argued—and has been for many years—that a vast potential market exists in this country for a standard-size automobile selling delivered under $500.

Whether it does or not is moot, especially in today's state of affairs where, recovering from the depression the public has put on a noticeable buying spree in the $1000 car class.

But, believe it or not, there still are a lot of people who do not own automobiles, and who would if a couple of hundred dollars were lopped off the lowest model today.

Mirrors of Motordom

Probably, that thought more than any other dominates Ford when it revives experiments on a smaller V-8 motor as it has the past month, or Chevrolet which still holds on to plans in its files on the small four-cylinder job it almost introduced two years ago.

But, the automobile people might do better, as one competent observer of the industry points out, to scale down its selling costs and pass the savings along—even if only in part—to the public.

By selling costs are meant the domination of retail sales outlets who derive from 20 to as much as 30 per cent of the new car's sales value for their commission. How needless is an oversupply of sales agencies is indicated by the fact that most new car purchasers show they know what they want before they enter the dealers' room.

In fact, were it possible tomorrow for all motor car makers to abolish all sales agencies with one swoop, this same commentator estimates after some study that total sales would fall off less than 5 per cent.

Autos Bought, Not Sold

This department does not necessarily believe that all motor show rooms should go by the board, but it is a hard fact, not easily disputable, that most automobiles are personally bought, not personally sold. In fact, printed plus radio advertising might do the selling trick exclusively, just as they are credited as the strongest selling mediums today.

Yet, from the factory's viewpoint, the used car trade in subject is a bad boy it doesn't want placed on its own doorstep through the abolishment of sales agencies. In that respect, dealer outlets have been a convenient buffer.

General Motors continues to look on Olds, Buick, and Pontiac with expanding pride. For one thing, national new car registrations so far in 1936 show the $1000 car market has taken the sharpest spurt of any, and these three have, with Dodge, Packard, and a few others, been the prime movers.

Olds reports itself still behind on orders and is working against a schedule of 25,000 cars in May. Last week Olds made a proportionate month's share at 6350 assemblies.

Pontiac continued to make just over 5000 models for the week, which was the first full week on the May lineup tentatively set at 21,000 models. April output at Pontiac was the highest since 1929, and added up to 21,046 jobs.

Two of the four cupolas at Pontiac's reopened foundry are now melting, one on soft iron and the other on semi-steel. In addition, six production lines are on, one each for clutch housings, manifolds, flywheels, cylinder heads for both sixes and eights, and the motor block on the eight.

Pontiac will start a new foundry production line soon for six and eight-cylinder pistons and also one to make the six-cylinder block casting. Retooling is under way and additional equipment is being added.

Buick made 4200 models last week, off slightly from the 4500 of the week before. However, the Buick schedule has been upped by 6000 for May from the original plan to make 18,043 so that 24,000-odd new units will be manufactured.

Hudson, which made 28,734 models in the first quarter and reported the largest profit for any quarter in six years, has advised this department that it has added over 800 new distributors since November, giving a total of 3200 retail outlets. A station wagon model has been added on the 115-inch Terraplane wheelbase, and two new colors have now been made standard on all Hudson lines.

But to Chevrolet goes the record for an April high when production is talked about. This General Motors division made 143,315 cars and trucks last month, a total exceeded only by four 1929 months. Last week the same pace was maintained, at 33,000 assemblies.

Ford at 29,000 last week, bespeaks heavier assemblies later this month. For one indication, the "hiring sign" is still out at Dearborn.

Other manufacturing rates for the week now ended find Plymouth generally unchanged at 14,000, and Dodge with 9000 to its credit and shooting for 40,000 in May. A new foundry air-cleaning installation is now completed at the Dodge plant.

In one major mechanical respect, Packard will have the jump on many of its competitors in 1937.

The wind on advance changes blows strongly in favor of hypoid gears in the rear axle of many automobiles. Packard has had this type of rear-axle assembly since 1926.

But observers comment that the industry's swing to hypoid gears had come about as much from the suggestion of the designing room as it has from the engineering laboratories. In other words, it is a question of exterior appearance as much, if not more, than the points of mechanical merit for hypoids.

Drive Shaft Tunnel To Go

Ever since automobile bodies and frames dropped closer and closer to the road, even though drive shaft road clearance was cut to a bare minimum, the problem of what to do with the tunnel or bump caused by the drive shaft in the automobile's flooring has been a serious one.

Long-legged drivers have howled about as loudly as the third front-seat passenger. Now, hypoid gears in the rear anxle, since they permit placing the pinion below the center line of the ring gear, will result in letting the propeller shaft down several inches.

Packard, through Col. J. G. Vincent, its engineering vice president, has been cleaning the dust off a lot of claims it had for hypoids several years ago. Now that motordom has found it extremely likely that Chrysler will go to hypoid gears for Plymouth and Dodge and General Motors will so favor at least Chevrolet, Packard has had a great selling point suddenly fall in its lap.

This type of rear axle has a larger and stronger set of pinion teeth, and from a performance standpoint gives a continuously quiet operation.

Packard's production last week re-

(*Please turn to Page* 112)

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1934	1935	1936
Jan.	155,666	292,785	367,252
Feb.	230,256	335,667	290,964
Mar.	338,434	429,793	424,571
3 mo.	724,356	1,058,245	1,082,787
Apr.	352,975	477,691	*505,000
May	330,455	364,662	.....
June	306,477	361,248	.....
July	264,933	336,985	.....
Aug.	234,811	239,994	.....
Sept.	170,007	89,804	.....
Oct.	131,991	275,024	.....
Nov.	83,482	398,039	.....
Dec.	153,624	407,804	.....
Year	2,753,111	4,009,496	.....

*Estimated.

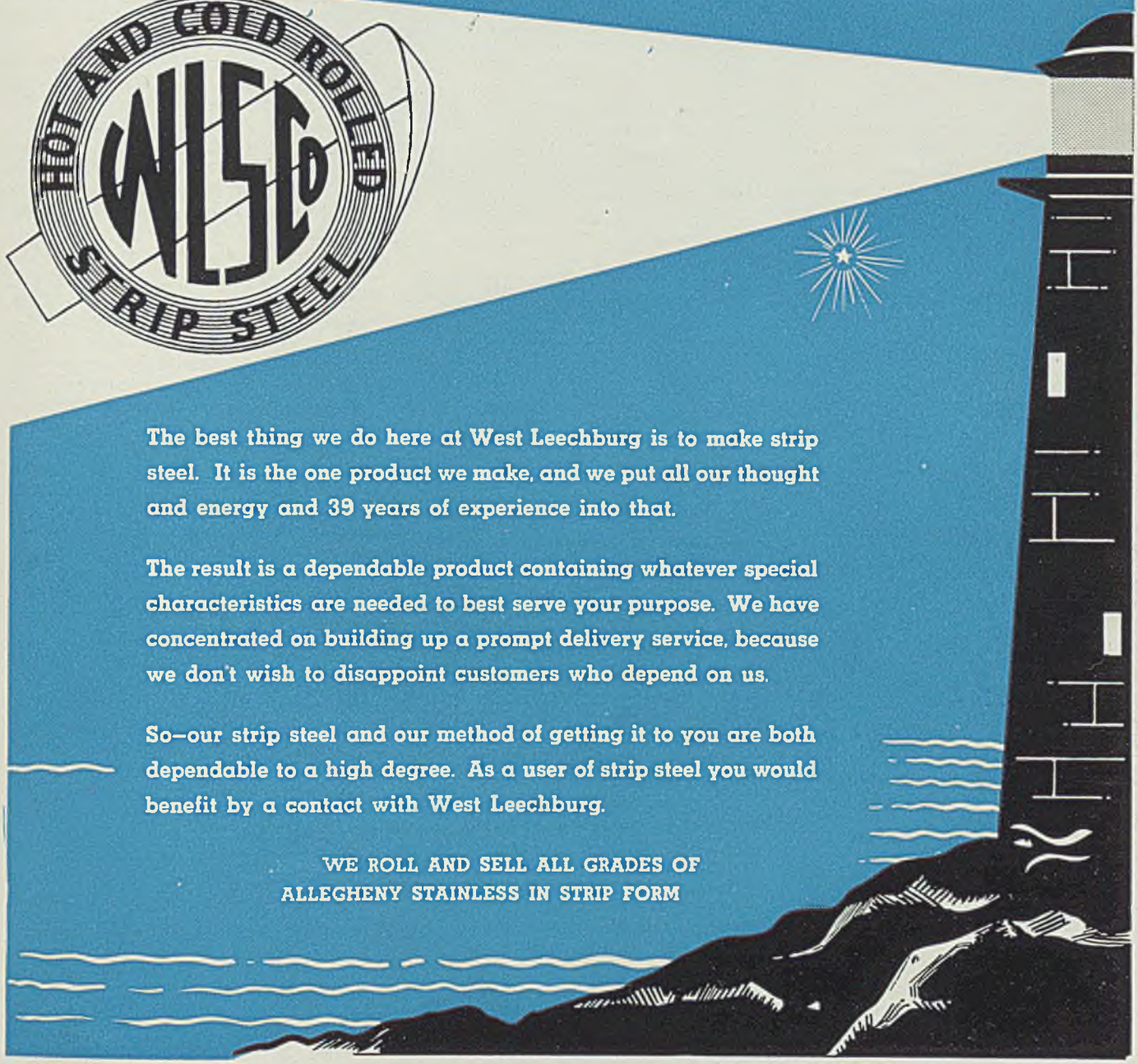
Estimated by *Cram's Reports*

Week ended:

April 11	112,818
April 18	119,834
April 25	120,519
May 2	118,764
May 9	118,786

DEPENDABILITY

HOT AND COLD ROLLED WLSCo STRIP STEEL



The best thing we do here at West Leechburg is to make strip steel. It is the one product we make, and we put all our thought and energy and 39 years of experience into that.

The result is a dependable product containing whatever special characteristics are needed to best serve your purpose. We have concentrated on building up a prompt delivery service, because we don't wish to disappoint customers who depend on us.

So—our strip steel and our method of getting it to you are both dependable to a high degree. As a user of strip steel you would benefit by a contact with West Leechburg.

WE ROLL AND SELL ALL GRADES OF
ALLEGHENY STAINLESS IN STRIP FORM

WEST LEECHBURG STEEL COMPANY

General Offices: UNION BANK BLDG., PITTSBURGH, PA.

Branch Sales Offices

NEW YORK • CHICAGO • DETROIT • CLEVELAND • DAYTON, OHIO • ST LOUIS • TOLEDO [Dean Higgins & Co.] • NEWARK [Edgcomb Steel Corp.] • PHILADELPHIA [Edgcomb Steel Co.] • TORONTO, ONT. [Jessop Steel Co.]
BUFFALO—ROCHESTER—SYRACUSE [Brace-Mueller-Huntley, Inc.]

Warehouse Stocks of Cold Rolled Strip Steel are carried by
JOS. T. RYERSON & SON

Men of Industry

(*Concluded from Page* 31)

and traffic representative for the past year.

♦ ♦ ♦

George A. Ball, G. A. Tomlinson and T. G. Wilkinson have been elected directors of the S. R. Dresser Mfg. Co., Bradford, Pa. The board has been increased from 9 to 11 members.

♦ ♦ ♦

Paul Pigott, president, Pacific Car & Foundry Co., Seattle, and Philip G. Johnson, vice president in charge of production, Kenworth Motor Truck Corp., Seattle, have been added to the directorate of Boeing Airplane Co. and Boeing Aircraft Co., Seattle.

♦ ♦ ♦

Stanley M. Levyn, sales manager for Acme Electric Welder Co., Huntington Park, Calif., manufacturer of spot welders and resistance welding equipment, is now on an extended trip throughout the United States and Canada, calling on distributors and branch houses.

♦ ♦ ♦

G. B. Young, member of the law firm of Belden, Young & Veach, Cleveland, was elected a director of Cliffs Corp., Cleveland, at the annual meeting of shareholders April 28. Mr. Young fills the vacancy created by the resignation from the board of S. L. Mather last March. Other directors were re-elected.

♦ ♦ ♦

Jim Gay, West Coast representative of the Toledo Steel Products Co., Toledo, O., has moved his operating headquarters from Los Angeles to San Francisco. His new address is 528 Larkin street. The new location puts Mr. Gay in a more central position for directing Toledo sales work on the coast. He is assisted by Gardner Smith, who covers southern California and Arizona.

♦ ♦ ♦

Prof. Herman Diederichs, director of the Sibley School of Mechanical Engineering, Cornell university, Ithaca, N. Y., and holder of the John Edson sweet professorship of engineering, has been named dean of the college of engineering at Cornell to succeed Dean Dexter S. Kimball, who will retire on July 1.

Prof. S. Hollister has been elected associate dean of the college of engineering, effective July 1, in addition to his regular duties as director of the college of civil engineering.

♦ ♦ ♦

E. L. Lloyd, representative in the Pittsburgh district the past 15 years for Link-Belt Co., Chicago, and for the past 29 years identified with the latter concern, is now affiliated with Fessler & Co., Pittsburgh, as sales engineer.

♦ ♦ ♦

Frank Burgan, formerly assistant manager of the small tool division of the Ingersoll Milling Machine Co., Rockford, Ill., has been placed in charge of sales of Ingersoll cutters for the company in the states of Indiana and Ohio.

♦ ♦ ♦

H. A. Larsen, formerly manager of structural products division on the West Coast for the Wickwire Spencer Steel Co., New York, has been appointed Pacific coast sales manager for all of the company's products. Mr. Larsen will make his headquarters at the San Francisco office of Wickwire Spencer.

Mr. Larsen, upon graduation from the University of Michigan in 1906,

H. A. Larsen

spent two years in Detroit, gaining experience in structural designing, going to the West Coast in 1908 where he was subsequently engaged in this type of work. In 1915 he became associated with the L. A. Norris Co., San Francisco, agent for Clinton electrically welded fabrics and other products of the Clinton Wire Cloth Co. Two years later he became vice president of L. A. Norris, with whom he was associated until 1922, when the company discontinued that part of its business. In 1922 he joined Wickwire Spencer as manager of structural products in the Pacific coast territory, resigning in 1924 to assume charge of this same territory for the National Steel Fabrics Co., subsidiary of Pittsburgh Steel Co. Mr. Larsen rejoined Wickwire Spencer in 1934.

♦ ♦ ♦

J. C. Argetsinger, general counsel and secretary of the Youngstown Sheet & Tube Co., Youngstown, O., was also elected a vice president of the company at a meeting of directors held April 28. All other officers of the company were re-elected, with the exception of W. C. Reilly, vice president, who retired several weeks ago.

♦ ♦ ♦

James L. Luke has been elected treasurer of Cleveland Cliffs Iron Co., Cleveland, to fill the vacancy caused by the death of Charles G. Heer. Mr. Luke had been assistant vice president of the Cleveland Trust Co.

D. R. Forest, for many years cashier, has been elected assistant treasurer, a newly-created office.

Steele Mitchell, vice president, Adams Express Co., New York, has been elected a director to fill the vacancy created by the death of William P. Belden. Mr. Mitchell represents a large block of Cliffs stock purchased for the Adams Express Co. and other allied interests in New York.

♦ ♦ ♦

R. W. Appleton, Morse Chain Co., Ithaca, N. Y., has been elected president of the Purchasing Agents' Association of Syracuse and Central New York for 1936-1937. He formerly served as first vice president. Other officers elected are: First vice president, F. J. Quinn, Lamson Co., Syracuse; second vice president, C. O. Walter, Rollway Bearing Co., Syracuse; treasurer, J. H. Merritt, Remington Typewriter Co., Syracuse; secretary, V. P. Newell, Precision Castings Co., Syracuse; national director, W. H. Scott, Syracuse Supply Co., Syracuse; directors for two years, C. H. Kissell, Goulds Pumps Inc., Seneca Falls, N. Y., and G. L. McCaffrey, Owen-Dyneto Corp., Syracuse.

♦ ♦ ♦

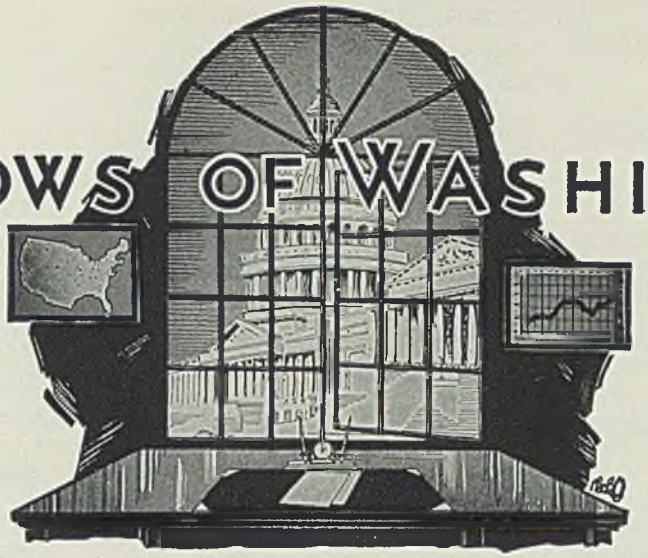
American Steel Warehouse Association Inc., Terminal tower, Cleveland, of which Walter S. Doxsey is executive secretary, announces the election of officers by the following chapters:

Northwest chapter: President, L. B. Douglass, Scully Steel Products Co., St. Paul; vice president, Joseph Paper, Paper, Calmenson & Co., St. Paul; secretary, C. A. Thieme, Scully Steel Products Co., St. Paul.

Southern California chapter: President, E. Jungquist, Percival Steel & Supply Co., Los Angeles; vice presidents, John Robertson, A. M. Castle & Co., Los Angeles, and Donald Priest, Los Angeles Heavy Hardware Co., Los Angeles; secretary-treasurer, L. B. Yeaton, Los Angeles.

Pittsburgh chapter: President, J. M. Hilbish, manager, Pittsburgh plant of Jones & Laughlin Steel Corp.; secretary, T. A. Harper, Edgar T. Ward's Sons Co.; treasurer, William L. Abbott, McKee-Oliver Inc.; national director, R. J. Stayman, general manager of warehouses, Jones & Laughlin Steel Corp.

WINDOWS OF WASHINGTON



WASHINGTON

A THREE-CORNERED fight is in progress in the senate finance committee regarding the new tax bill, and for that reason it is difficult to predict when the committee will have completed its draft of the bill.

The fight referred to is (1) the proposed LaFollette bill, (2) those senators who want to leave the corporation tax as it is today with possibly a slight upward revision, and (3) those members of the committee who want to include processing taxes in the bill.

Originally, President Roosevelt came out strongly for processing taxes, and when he was away fishing on the Atlantic he took enough time away from the sport to warn house leaders to this effect. They paid no attention to his demands, and as the bill passed the lower house no mention was made of processing taxes.

Soft Pedal Processing Taxes

There seemed to be rather a general understanding that when the bill reached the senate that these taxes would be taken care of. However, a story is going the rounds here now that Mr. Roosevelt has cooled toward the processing taxes and has been advised to forget them. That may be one reason why the secretary of the treasury, when he went before the senate committee, rather put the soft pedal on these taxes, although he did ask for something along this line.

This three-cornered fight is going to take some time to work out, and that has to be decided before the committee can go ahead with the writing of the bill.

As this is written, there is every indication that the hearings will have been closed when this paper is read. However, due to conditions already mentioned, it does not seem probable that the finance committee will have its draft of the bill available until next week. If it does, there will be considerable surprise in spite of the fact that leaders on both sides of the capitol are making every effort to jazz things up for an early closing of congress.

Matthew Woll, president of the wage earners protective conference, the tariff group of the A. F. of L., appearing before the finance committee last week urged it to include an amendment in the new tax bill to protect domestic products in large coastal communities in competition with products of foreign nations.

Bill Hits New Enterprise

The amendment would direct the secretary of the treasury to collect an excise tax on the entry into this country on all products dutiable under the tariff act of 1930.

"Enactment of this amendment," said Mr. Woll, "will make possible the sale of American made or American produced goods and commodities at fair prices in our large coastal markets which are now dominated and controlled by foreign goods."

John W. O'Leary, president of MAPI, also appeared before the committee last week contending that the bill as it passed the house is a blow at corporate enterprise.

"New corporations normally evolving out of small businesses," said Mr. O'Leary, "will find it impossible to gain a foothold under the tax measure proposed. New patents will be sold to old corporations, and the field covered by the big companies will grow broader than ever before, which is in direct opposition to the American principle of free competition and the encouragement of individual enterprise.

"Over a period of years it threatens to substitute federal financing and control for American private enterprise as a result of weakening corporations through the financial policies it fosters."

Mr. O'Leary called the committee's attention to the fact that had the proposed tax been in effect in the past, scores of capital goods manufacturers who are weathering the depression on reserves set aside in more prosperous years would have been forced into bankruptcy.

The witness said that the proposed bill will generate uncertainty, deepen and lengthen depressions, foster inefficiency and obsolescence, penalize new corporate enterprise and expansion, multiply taxation on depreciation reserves, penalize uncertain profits, tax capital rather than income of companies reporting losses, and foster unfair competition.

Fred R. Fairchild, Yale professor of economics, who denied that he had anything to do with either the new deal or the Republican brain trust, advised the committee to postpone all tax legislation at this time until government financing has been thoroughly revised and a real balancing of the budget has been undertaken.

TRADE PACT WITH CANADA NEW DEAL'S ACE ACHIEVEMENT

The trade agreement with Canada which became effective last week with the exchange in Ottawa of the instrument of ratification and approval is considered the most important trade agreement yet concluded by the new deal.

Each country is the second largest customer of the other's products, but due to restrictions on both sides, trade has been increasingly handicapped since 1866, when the reciprocity treaty of 1854 was terminated.

In connection with metals and manufactures, it will be recalled that Canada has granted lower duties on a long list of metal products, including steel ingots, bars, plates, beams and joists, as well as castings, pipe, wire, and springs.

Among the finished manufactures on which concessions were obtained are cutlery, bolts and nuts, hinges,

screws, nails and precision tools. Of interest also is the reduction on all iron and steel machinery of a kind not made in Canada.

Canada purchased from the United States industrial machinery valued at $39,600,000 in 1929-1930. This figure declined to $8,200,000 in 1934-1935. These duties have been materially reduced, and of special interest is a blanket reduction of 29 per cent in the duty on all machinery of iron and steel not otherwise provided for, and an additional reduction of 14 per cent of machinery of other types not made in Canada.

BASING POINT CONTROVERSY OUT OF PRICE BILLS

The Robinson price discrimination bill, companion bill to the Patman bill, has passed the senate and is now pending in the house.

The inside story at the capitol these days in connection with possible house action is that leaders have promised backers of the Patman bill that they will give the bill a chance as soon as the appropriation and relief bills are out of the way. That is expected probably the latter part of this week.

It is said that, instead of insisting on the Patman bill, house backers of the Patman bill, to expedite action, are willing to accept the bill as it passed the senate. For that reason, effort will be made to have the senate bill held on the desk of the speaker of the house rather than have it referred to committee. In this way the bill can be brought up quickly.

If this happens, the steel industry will be entirely out of the woods because the bill as it passed the senate made no mention of the basing point problem, although stories were going around last week that Senator Wheeler would make an effort to have his anti-basing point bill hooked on to the Robinson bill as a rider or amendment. However, this was not done.

Even if the Patman bill comes up in the house there is said to be an understanding that the Utterback part of the bill (that applying to the basing point) will be taken out. Mr. Patman has agreed to that, it is said.

FTC PUTS PUNCH BEHIND COLLUSIVE PRICE PROBE

Experts of the federal trade commission, it is reported, have run into some "technical difficulties" in connection with the alleged collusive bidding investigation which the commission is making at the direct request of the President relative to steel bids on some federal projects, complained about originally by Secretary Ickes.

It will be recalled that a few weeks ago the commission's experts stated that some steel companies refused to allow them to go over certain books, but this matter was adjusted without going to court.

It is said here that the chairman of the commission is getting a little restive about the investigation and that he has requested his investigators to go full steam ahead. It is the belief here now that probably by the end of this month the work will have been completed.

Score One for Aluminum

CONNECTICUT has adopted a permanent automobile license plate of aluminum, to have black letters against a natural aluminum finish background and with a space for an insert in the middle and at the bottom of the plate which is interchangeable and will be used to designate the year. The inserts will differ in color from year to year. Col. Michael A. Connor, motor vehicle commissioner, Hartford, Conn., estimates the plates will last 5 to 15 years and save $125,000 annually.

RAW MATERIALS COUNCIL FOR RESTORING FULL TARIFFS

In connection with the work of the newly-organized raw materials national council, the progressive farmers union at a recent convention passed a resolution in which, among other things, it called upon the President to use his influence "to restore all tariff schedules as fixed in the Hawley-Smoot tariff act pending an adequate revision of the entire tariff structure to establish parity between raw materials and manufactured goods and enactment of legislation to protect American producers in full enjoyment of the American market."

The sole purpose for the organization of the new council is to have the trade agreement act either rescinded by congress or declared unconstitutional by the courts. A number of large industries are becoming identified with this new council.

HEAR SURCHARGE ARGUMENT MAY 20; EXTENSION LIKELY

Interstate commerce commission has announced that it will begin hearing final argument on May 20 in connection with the surcharge freight rate case. Decision has to be made on or before June 30, at which time these surcharges become inoperative unless otherwise provided. There seems to be a general feeling here among those who say they know that the freight surcharges will be continued, possibly with some modifications.

With acceptance of the railroads of the country of the reduction in passenger fares, this may be translated into the use of more steel products by the railroads. It is pointed out by the commission that the decreased rates will increase the number of passengers to be carried and inferentially this will mean additional modern equipment and rebuilding of some present equipment.

NRA STUDY OF STEEL PROGRESSES, BUT SLOWLY

Dr. Leon C. Marshall, who has headed up the division of industrial economics of the department of commerce, which is all that remains of the plucked Blue Eagle, has resigned and is now back at his old job as professor at Johns Hopkins university.

Dr. Marshall got thoroughly fed up, it is said here, with government red tape. He is being succeeded by C. R. Chambers, chief statistician of the bureau of foreign and domestic commerce of the department of commerce, who has been Dr. Marshall's assistant since the new division was organized for a brief period until Dec. 31.

A. G. White who has been working on the steel study for this division, is still at it, but he is working on his own time and not on the government's. It is said here that the steel report has been completed all but two chapters, and Mr. White is now working on those. There is still difference of opinion here, among the interested government officials, as to whether the steel report will ever be finished or whether it will ever be made public if it is completed. The report has never yet been submitted to the American Iron and Steel institute, which was promised the opportunity to scan it before it is made public.

Arrange Golf Tournament For Scrap Dealers

Third annual national golf tournament of the scrap iron trade will be held under the auspices of the Institute of Scrap Iron and Steel, it is announced by Benjamin Schwartz, New York, director general of the Institute.

During the next few months, each of the 14 chapters of the Institute will hold its annual play day and golf tournament, and the winners thereof will participate in a national tournament in September, to be held in connection with the mid-year conference of the Institute.

Players in the national tournament will compete for the president's cup, this year to be donated by President Darwin S. Luntz. The chairman of the golf committee of the Institute is A. A. Gerson, Harlem Metal Corp., New York.

Steel Imports in Larger Volume

IMPORTS of steel and iron products into the United States in March were 56,720 gross tons, compared with 43,358 tons in February and with 21,470 tons in March, 1935. For three months of 1936 total imports were 150,567 tons, compared with 73,070 tons in three months of 1935, according to the metals and minerals division of the department of commerce.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1936 Imports	1936 Exports	1935 Imports	1935 Exports
Jan.	50,489	241,564	22,784	262,740
Feb.	43,358	213,802	28,905	228,537
Mar.	56,720	264,337	21,409	323,035
3 mo.	150,567	719,703	73,070	814,312
April	.....	.....	28,866	205,336
May	.....	.....	47,719	286,598
June	.....	.....	33,208	289,687
July	.....	.....	31,894	296,802
Aug.	.....	.....	31,312	247,312
Sept.	.....	.....	53,158	244,419
Oct.	.....	.....	59,569	238,358
Nov.	.....	.....	56,637	205,242
Dec.	.....	.....	53,678	239,268
Total	.....	.....	469,954	3,067,336

Gains in March over February were shown in pig iron, which increased from 14,660 tons to 23,743 tons; ferromanganese from 908 to 2345 tons; pipe from 783 tons to 2126 tons; steel bars from 2625 tons to 3844 tons; barbed wire from 1885 tons to 2032 tons. Pig iron importations for three months of 1936 have been 53,436 gross tons, compared with 15,482 tons in the corresponding period of 1935.

ORIGIN OF MARCH IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Germany	59	9	21
Netherland	15,029	.....	351
Norway	660	.....	1,118
Sov. Russia in Europe	2,551	4,378	.....
Sweden	164	.....	.....
Canada	777	.....	.....
British India	4,503	8,566	.....
Cuba	.....	2,320	.....
Brazil	.....	1,251	.....
Gold Const	.....	6,637	.....
India	.....	279	.....
France	.....	.....	139
Poland	.....	.....	238
United Kingdom	.....	.....	478
Total	23,743	23,440	2,345

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Austria	5	.....	2	.....
Belgium	1,265	3,082	2,062	1,231
France	114	1,150	909	154
Germany	249	216	288	287
Sweden	14	.....	488	.....
United Kingdom	11	27	91	31
Canada	.....	2	.....	.....
Czechoslovakia	.....	.....	3	.....
Total	1,658	4,477	3,843	1,706

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Mar. 1936	Feb. 1936	Jan. thru Mar.'36
Pig iron	23,743	14,660	53,436
Sponge iron	51	463	822
Ferromanganese (1)	2,345	908	5,501
Spiegeleisen	1,295	1,425	4,760
Ferrochrome (2)	.....	1	1
Ferrosilicon (3)	85	41	222
Other ferroalloys (4)	.....	.....	.....
Steel ingots, blooms	42	.....	.....
Billets, solid, hollow (5)	45	55	168
Concrete reinfcmt. bars	86	107	324
Hollow bar, drill steel	134	130	469
Bars, solid or hollow	3,844	2,525	9,424
Iron slabs	.....	.....	.....
Iron bars	77	164	388
Wire rods	1,039	2,192	5,205
Boiler and other plate	.....	2	52
Sheets, skelp and sawpl.	1,658	1,660	5,414
Die blocks or blanks (5)	3	1	8
Tin plate, taggers tin, terne plate	45	10	59
Structural shapes	4,477	3,112	12,268
Sheet piling	.....	20	527
Rails and fastenings	334	255	851
Cast iron pipe, fittings	32	.....	32
Malleable iron pipe ftgs.	7	.....	11
Welded pipe	688	323	1,373
Other pipe	2,126	783	5,005
Hoops, bands for baling	59	.....	59
Other hoops, bands	1,706	1,278	4,883
Barbed wire	2,032	1,885	6,154
Round iron, steel wire	331	425	1,203
Tel. and tel. wire	26	1	27
Flat wire, steel strips	218	234	684
Wire rope, strand	268	173	626
Other wire	143	164	416
Nails, tacks, staples	2,604	2,611	7,392
Bolts, nuts, rivets	15	70	103
Horse and mule shoes	46	28	88
Castings and forgings	124	90	302
Total	49,728	35,796	128,299
Iron and steel scrap	6,992	7,562	22,268
Grand Total	56,720	43,358	150,567

(1) Manganese content.
(2 Chrome content.
(3) Silicon content.
(4) Alloy content
(5) New class. No comparable figures for previous year.

Greek Market to Germans

The position of German exporters of hardware and iron and steel products in the Greek market was appreciably strengthened during 1935, a report to the commerce department from the American commercial attache at Athens shows.

Germany's participation in the Greek import trade of items in this classification during the past year amounted to 68 per cent, compared with less than 44 per cent in 1934.

The dominance of Germany in the Greek market is due to the fact that it is virtually free from the quota and exchange restrictions affecting trade with countries which do not have a compensation agreement with Greece. Because of the present situation, Greece has found it necessary to obtain its iron and steel requirements from that source at prices materially above world levels in an effort to use up as large a portion as possible of the funds blocked with the Reichsbank through German purchases of Greek products, according to the report.

Institute Frames May 28 Program

FORTY-FIFTH general meeting of the American Iron and Steel institute at the Waldorf-Astoria hotel, New York, May 28, will be opened by E. G. Grace, president of the Bethlehem Steel Co., in his capacity of president also of the institute. Others on the morning program are:

W. A. Irvin, president, United States Steel Corp. and vice president of the institute, to speak on "Competition from Imports of Foreign Steel Products"; T. M. Girdler, chairman, Republic Steel Corp. and vice president of the institute, to discuss "Problems Confronting the Industry"; E. T. Weir, chairman, National Steel Corp., to deliver an address entitled "A Sound Commercial Policy for Steel Makers"; Charles R. Hook, president, American Rolling Mill Co., to discuss "Labor Relations in the Steel Industry", and W. S. Tower, executive secretary of the institute, to present a report on Institute Activities.

Dean of Metallurgy Speaks

The afternoon session will be featured by a review of metallurgical progress by Dr. Albert Sauveur, who is the Gordon McKay professor of metallurgy at Harvard university.

Dr. Sauveur, who is frequently called the dean of metallurgists, will informally discuss some of the important metallurgical developments which have taken place during the period of nearly 50 years which he has devoted to the science of metallurgy. In many of these developments Dr. Sauveur has played an important part.

The program for the afternoon session will also include three other papers on metallurgical topics.

"Electric Furnaces and Their Part in Metallurgical Progress," will be discussed by Frank R. Palmer, assistant to the president, Carpenter Steel Co.

L. F. Reinartz, works manager, Middletown division, American Rolling Mill Co., will read a paper on "Recent Advances in Open-Hearth Furnace Design and Operation."

Clyde E. Williams, director of Battelle Memorial institute, Columbus, O., will read a paper entitled "The New Technical and Economic Importance of Iron and Steel Scrap."

General Construction & Engineering Co., McKees Rocks, Pa., is low bidder at $1125 for building two lockkeepers' dwellings at lock No. 1 on the Monongahela river.

1935 Steel Ingot and Casting Output

American Iron and Steel Institute Official Figures Show 30.8 Per Cent Rise from 1934, Largest Total Since 1930, at 60.4 Per Cent of Record of 1929

ANNUAL STEEL PRODUCTION (Ingots and Steel for Castings)

Years	Open Hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1921	15,082,564	507,228	15,589,802	4,015,938	7,613	170,444	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	14,079	515,872	44,913,696
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	45,393,524
1926	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	44,935,185
1928	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	51,544,180
1929	47,232,419	1,120,469	48,352,888	7,122,509	6,645	951,431	56,433,473
1930	34,268,316	780,856	35,049,172	5,035,459	2,253	612,599	40,699,483
1931	22,130,398	379,168	22,509,566	3,023,446	1,547	410,942	25,945,501
1932	11,742,682	164,648	11,907,330	1,532,076	645	241,111	13,681,162
1933	20,057,146	324,526	20,381,672	2,428,791	681	421,203	23,232,347
*1934	23,256,417	274,688	23,531,105	2,162,357	531	361,296	26,055,289
*1935	30,361,237	354,192	30,715,429	2,835,031	642	541,492	34,092,594

ANNUAL STEEL INGOT PRODUCTION

Years	Open Hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1921	14,864,607	290,750	15,155,357	3,977,129	6,877	84,721	19,224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	34,568,418
1923	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	43,485,665
1924	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	36,811,157
1925	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	44,140,738
1926	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	46,936,205
1927	36,750,387	493,653	37,244,040	6,153,703	7,696	371,278	43,776,717
1928	42,818,557	454,883	43,273,440	6,591,745	6,516	453,692	50,325,393
1929	46,644,206	576,393	47,220,599	7,091,680	5,762	532,392	54,850,433
1930	33,898,518	367,181	34,265,699	5,020,588	1,563	307,418	39,595,268
1931	21,986,933	194,388	22,181,321	3,011,394	831	235,376	25,428,922
1932	11,689,495	104,794	11,794,289	1,528,544	241	141,328	13,464,402
1933	19,972,805	195,495	20,168,300	2,425,779	399	299,808	22,894,286
1934	23,235,688	201,073	23,436,761	2,162,357	531	349,095	25,948,744
1935	30,334,442	248,512	30,582,954	2,835,031	642	521,818	33,940,445

PRODUCTION OF DUPLEX STEEL

Years	Gross tons	Years	Gross tons	Years	Gross tons
1921	840,251	1926	2,815,980	1931	945,844
1922	1,651,089	1927	2,184,674	1932	289,263
1923	2,919,286	1928	2,232,197	1933	386,154
1924	2,131,856	1929	2,961,292	1934	591,373
1925	2,797,318	1930	2,045,277	1935	960,020

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1920	1,591,939	68,353	1,660,292	1928	3,045,225	169,684	3,214,909
1921	769,293	10,255	809,548	1929	3,764,287	192,920	3,957,207
1922	1,614,392	59,104	1,673,496	1930	2,317,183	126,128	2,443,311
1923	2,014,269	92,220	2,106,489	1931	1,366,010	89,903	1,455,913
1924	1,940,461	85,948	2,026,409	1932	757,560	41,044	798,604
1925	2,320,390	112,583	2,432,973	1933	1,475,400	71,783	1,547,183
1926	2,317,313	146,101	2,463,414	*1934	1,595,544	16,731	1,612,275
1927	2,385,904	145,844	2,531,748	*1935	2,087,427	32,231	2,119,658

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES

Processes	1932	1933	*1934	*1935
Open hearth steel—basic	616,719	1,169,255	1,278,343	1,633,541
Open hearth steel—acid	27,236	57,097	34,540	73,400
Bessemer steel	13,651	24,519	53	.....
Crucible steel	121	102	103	154
Electric steel	140,877	296,210	299,236	412,563
Total	798,604	1,547,183	1,612,275	2,119,658

*The figures for 1934 and 1935 include only that portion of the steel for castings which was produced in foundries operated by companies producing steel ingots.

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS BY STATES

States	1931	1932	1933	1934	1935
Maine, Mass.	145,601	110,050	175,506	158,559	198,790
R. I., Conn.					
New York	854,366	473,952	646,923	800,338	959,095
New Jersey	69,890	51,585	73,199	86,466	94,097
Pennsylvania	6,342,591	3,269,548	5,059,366	5,619,410	6,521,515
Del., Md., Va.	749,155	416,754	711,862	788,824	977,361
West Virginia	814,135	445,369	779,914	797,039	1,015,051
Ky., Tenn., Ga., Texas	400,258	269,859	366,553	401,305	571,732
Alabama	788,370	367,902	567,819	628,409	728,390
Ohio	4,086,634	2,311,419	3,974,493	4,301,239	5,401,948
Indiana	2,256,869	1,126,275	1,984,423	2,446,052	3,276,717
Illinois	1,391,357	737,803	1,150,087	1,311,243	1,890,251
Mich., Wis., Minn.	622,601	456,964	686,760	923,724	1,467,362
Mo., Okla.	194,473	142,080	149,014	167,112	201,360
Col., Wash.	269,315	146,980	166,180	246,999	283,793
Cal., Canal Zone	190,276	124,548	242,987	292,787	347,090
Total	19,175,894	10,451,088	16,735,086	18,969,506	23,964,552

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS IN 1935

	Iron	Steel	Total
FLAT ROLLED PRODUCTS:			
Plates (sheared and universal)	54	1,455,291	1,455,345
Sheets	.....	5,175,557	5,175,557
Strip	1,086	2,646,503	2,647,589
Hoops	.....	89,852	89,852
Cotton ties and baling bands	.....	24,719	24,719
Black plate	.....	2,060,234	2,060,234
Total	1,140	11,452,156	11,453,296
BARS:			
Merchant	73,096	3,625,961	3,699,057
Concrete reinforcement	7	557,353	557,360
Total Bars	73,103	4,183,314	4,256,417
Structural shapes	395	1,749,345	1,749,740
Sheet piling	.....	130,294	130,294
Rails	.....	711,537	711,537
Long splice bars, tie plate bars, etc.	11,376	256,902	268,278
Skelp	46,369	1,305,710	1,352,079
Blanks or pierced billets for seamless tubes	.....	953,371	953,371
Wire rods	656	2,440,138	2,440,794
Car wheels (rolled steel)	.....	74,745	74,745
Cross ties	.....	10,797	10,797
Rolled forg. blooms, billets and axle blanks	1,261	338,647	339,908
Blooms, billets, slabs and sheet bars for export	.....	39,963	39,963
All other fin. hot rolled products	191	183,142	183,333
Total	60,248	8,194,591	8,254,839
Grand total	134,491	23,830,061	23,964,552

PRODUCTION OF TIN AND TERNE PLATE AND LONG TERNE SHEETS

Years	Tin plate	Iron and steel terne plate and long terne sheets			Grand total
		Terne plate	Long terne sheets	Total	
1921	747,911	37,591	8,772	46,363	794,274
1922	1,208,772	48,973	30,150	79,123	1,287,895
1923	1,414,404	44,795	47,663	92,458	1,506,862
1924	1,328,228	42,217	48,209	90,426	1,418,654
1925	1,544,007	40,654	73,134	113,788	1,657,795
1926	1,674,322	39,922	68,062	107,984	1,782,306
1927	1,583,383	37,043	68,023	105,066	1,688,449
1928	1,714,990	33,578	90,637	124,215	1,839,205
1929	1,816,223	38,842	113,215	152,057	1,968,280
1930	1,660,325	20,585	82,533	103,118	1,763,443
1931	1,392,227	15,581	51,135	66,716	1,458,943
1932	986,217	10,882	35,408	46,290	1,032,507
1933	1,685,826	18,969	64,303	83,272	1,769,098
1934	1,502,918	32,983	67,328	100,311	1,603,229
1935	1,695,159	87,841	103,439	191,280	1,886,439

in Excellent Gain over Previous Year

Flat-Rolled Lines Increase 32.4 Per Cent—Most Steel Products Make About Parallel Growth—Pennsylvania, Ohio, Indiana, Illinois Lead in Tonnage

PRODUCTION OF SEAMLESS, LAP-WELD, BUTT-WELD, AND ELECTRIC-WELD PIPE AND TUBES IN 1935

SEAMLESS PIPE AND TUBES*

	Standard pipe	Line pipe	Oil country goods	Boiler tubes	Mechanical tubes	Miscellaneous	Total
Hot finished †	18,533	103,448	532,887	68,571	41,419	10,341	775,199
Cold drawn	1,525	940	1,424	14,291	83,007	772	101,959
Total	20,058	104,388	534,311	82,862	124,426	11,113	877,158

LAP-WELD AND BUTT-WELD PIPE AND TUBES*

Iron	26,836	564	5,037	3,440	.....	.....	35,879
Steel	725,494	84,816	77,189	13,040	.....	27,987	928,526
Total	752,332	85,380	82,226	16,480	.....	27,987	964,405

ELECTRIC-WELD PIPE AND TUBES*

Iron	.....	.....	.....	‡	.....	150	150
Steel	34,549	6,744	47,817	‡	38,443	63,363	190,916
Total	34,549	6,744	47,817	‡	38,443	63,513	191,066

*Production of black pipe, including stainless steel pipe and black pipe subsequently galvanized, sherardized, or enameled.

†Does not include hot finished tubes subsequently cold drawn.

‡Production included in miscellaneous.

*PRODUCTION OF CONCRETE REINFORCEMENT BARS

Years	Iron	Steel	Total	Rolled from new steel	Rolled from old material
1926	1,649	814,180	815,829	*	*
1927	2,428	813,585	816,013	*	*
1928	462	951,426	951,888	*	*
1929	557	963,043	963,600	*	*
1930	160	849,991	850,151	682,681	167,470
1931	104	643,529	643,633	500,055	143,578
1932	169	385,436	385,605	275,115	110,490
1933	775	369,498	370,273	294,349	75,924
1934	54	486,950	487,004	383,627	103,377
1935	7	557,353	557,360	405,313	152,047

*Data not available.

PRODUCTION OF FLAT ROLLED PRODUCTS BY CLASSES

	1931	1932	1933	1934	1935
PLATES:					
Universal	614,837	309,653	311,747	534,784	439,362
Sheared	1,351,375	520,177	848,635	902,995	1,015,983
Total	1,966,212	829,830	1,160,382	1,437,779	1,455,345
SHEETS:					
Hot rolled	2,461,494	1,471,532	727,442	1,036,244	1,555,034
Hot rol. ann.			2,364,968	2,166,361	3,620,523
Strip	1,620,971	1,185,184	1,830,106	2,196,840	2,647,589
Hoops	56,003	42,697	48,344	48,808	89,852
Cotton ties & baling bands	57,112	37,725	51,081	28,300	24,719
Total	4,195,580	2,737,138	5,021,941	5,476,553	7,937,717
BLACK PLATE:					
For tinning	1,431,293	999,528	1,676,701	1,499,877	1,794,718
All other	180,582	142,418	287,157	235,554	265,516
Total	1,611,875	1,141,946	1,963,858	1,735,431	2,060,234
Grand total	7,773,667	4,708,914	8,146,181	8,649,763	11,453,296

PRODUCTION OF PLATES, SHEETS AND STRIP BY SIZES

	1932	1933	1934	1935
	a	a	a	a
UNIVERSAL PLATES:				
6 ⅝" to 48" wide—¼" & thicker	.....	290,232	476,430	385,326
48 ⅛" & wider—.1875" & thicker	.....	21,515	58,354	54,036
Total	.....	311,747	534,784	439,362
SHEARED PLATES:				
6 ⅝" to 48" wide—¼" & thicker	.....	424,084	436,623	366,680
48 ⅛" & wider—.1875" & thicker	.....	424,551	466,372	649,303
Total	.....	848,635	902,995	1,015,983
BLACK SHEETS:				
Hot rolled—16 ga. & heavier (c)	.....	727,442	1,036,244	1,555,031
Hot rolled ann.—17 ga. & lighter (d)	.....	2,364,968	2,166,361	3,620,523
Total	.....	3,092,410	3,202,605	5,175,557
STRIP (e):				
To and incl. 6" in width	315,429	669,389	672,997	852,856
Over 6" and incl. 24" in width	410,438	b1,160,717	1,523,843	1,794,733
Over 24" in width	459,317	.....	.....	.....
Total	1,185,184	1,830,106	2,196,840	2,647,589

(a) New classification adopted January 1, 1933.

(b) Over 6" to and including 23⅝" from January 1, 1933.

(c) Hot rolled sheets—24" to 48" in width by .249" to .059" in thickness; 48 ⅛" and over in width by .1874" to .059" in thickness.

(d) Hot rolled annealed sheets—3½" and less in width by .024" and less in thickness; 3⅛" to 6" in width by .034" and less in thickness; 6⅛" to 23⅝" in width by .058" and less in thickness; 24" to 48" in width by .058" and less in thickness; 48 ⅛" and over in width by .058" and less in thickness.

(e) Hot rolled strip—flats 3½" and under in width by .249" to .025" in thickness; 3⅛" to 6" in width by .249" to .035" in thickness; 6⅛" to 23⅝" in width by .249" to .059" in thickness.

PRODUCTION OF MERCHANT BARS

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1926	252,437	5,221,399	5,473,836	1931	52,943	2,287,420	2,440,363
1927	187,995	4,682,252	4,870,247	1932	29,057	1,284,839	1,313,896
1928	165,277	6,112,558	6,277,835	1933	40,088	2,244,688	2,284,776
1929	154,690	6,305,206	6,459,896	*1934	91,353	2,711,074	2,802,427
1930	95,234	4,036,739	4,131,973	*1935	73,096	3,625,961	3,699,057

*Includes bolt, nut and rivet, spike and chain, toe calk, horseshoe, finger, staybolt and all other miscellaneous bars which in 1933 and prior years were included in "all other" miscellaneous hot rolled products.

PRODUCTION OF SKELP, AND BLANKS OR PIERCED BILLETS FOR SEAMLESS TUBES

Years	Skelp			Blanks or pierced billets
	Iron	Steel	Total	
1926	189,774	3,574,776	3,764,550	883,598
1927	156,204	3,262,648	3,418,852	889,336
1928	140,318	3,228,655	3,368,973	1,190,658
1929	151,556	3,365,682	3,517,238	1,382,171
1930	114,426	2,567,620	2,682,046	1,248,156
1931	70,777	1,428,503	1,499,280	732,569
1932	31,991	575,608	607,599	370,270
1933	35,957	958,558	994,515	588,998
1934	48,712	1,071,505	1,120,217	824,542
1935	46,369	1,305,710	1,352,079	953,371

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES

Years	Heavy shapes	Light shapes	Total	Years	Heavy shapes	Light shapes	Total
1926	3,330,572	581,091	3,911,663	1931	1,768,374	294,484	2,062,858
1927	3,083,211	659,234	3,742,445	1932	782,570	154,658	937,228
1928	3,408,545	687,598	4,096,143	1933	853,914	255,543	1,109,457
1929	4,055,615	722,405	4,778,020	1934	1,111,133	293,907	1,425,040
1930	3,010,847	501,626	3,512,473	1935	1,303,613	446,127	1,749,740

Steel Industry's 1935 Earnings Best in 5 Years; Bonds Lift Capitalization

TWENTY-THREE leading producers of steel, whose combined ingot capacity of 63,363,588 gross tons represents 92.54 per cent of the entire industry, in 1935 earned $77,269,933 after charges, but prior to funded debt interest and dividends.

This showing, disclosed by the tenth consecutive annual analysis by STEEL and its predecessor *Iron Trade Review*, compares with earnings of $14,108,229 in 1934. The 1935 profit was the highest since 1930. It compares with the all-time high of $371,118,899 in 1929.

After deducting bond interest the showing of these 23 important companies is a net of $45,996,209. In 1934 there was a deficit of $16,065,543. But if the requirement for preferred dividends be taken into consideration, as STEEL believes it should be, there was a deficit of $40,916 for the common stock of these 23 interests in 1935. That is, the net earnings after bond interest fell $40,916 short of meeting the preferred dividend requirement, which takes precedence over the privileges of common stock. On the same basis, the deficit for 1934 was $63,065,168.

Four Billion Dollar Industry Nets 1.64 Per Cent, or Less Than Savings Bank Interest

However, for purposes of comparison and because total earnings before dividends and bond interest are believed to give a more comprehensive picture for the various companies, STEEL's computation is that the total earnings in 1925 of $77,269,933 constituted a return of 1.64 per cent on the $4,690,355,323 invested in the industry. In other words, the steel industry netted 1.64 per cent on its investment last year, compared with 0.36 per cent in 1934, and losses of 0.90 per cent in 1933 and 2.85 per cent in 1932. The best year in the recent history of the steel industry was 1929, when the return was 9.88 per cent.

Incidentally, this capitalization of $4,690,355,323 of the steel industry as of Dec. 31, 1935, represents an increase of $784,000,000 over the close of 1934. This increase in capitalization resulted almost entirely from the issuance of bonds. Almost without exception, common and preferred stocks remained static in balance sheet stated values, but new financing was undertaken by a number of companies—principally the larger ones—during last year. A further increase in 1936 appears assured by the financing plans of such large producers as the Jones & Laughlin Steel Corp. and the Youngstown Sheet & Tube Co. in recent weeks.

Since these 23 producers account for 63,363,588 gross tons of steel ingot capacity, their average earnings per ton of ingot capacity was $1.22 in 1935, compared with a loss of 22 cents per ton in 1934. The Ludlum Steel Co., specializing in alloys, reported an average earning of $15.82 per ton last year, leading all.

Of the producers whose principal output is ordinary carbon steel, the National Steel Corp. led at $5.98 per ton, with the Inland Steel Co. a close second at $5.69 per ton. In regard to per cent of total earnings on capitalization, Inland was first at 10.53 per cent, Otis second at 9.58 per cent, and National third at 8.25 per cent. Ludlum, whose position as previously noted is slightly different, averaged 8.52 per cent on its capitalization.

Investment of Industry Averages $74.02 Per Ton, with "Big Three" Below This Figure

Due primarily to the enlargement of its funded debt, the industry's average capitalization per ton of ingot capacity was $74.02 last year, compared with $62.25 the year preceding. Excluding those companies specializing on alloys and hence not comparable with the carbon steel interests, the lowest capitalization per ton was the Lukens Steel Co. at $12.60, and the highest the National Steel Corp. at $72.41. The United States Steel Corp. was capitalized at $62.41 per ton of ingot capacity, Bethlehem Steel Co. at $63.54 and Republic Steel Corp. at $45.53, to cite the three largest producers.

Total assets of these 23 reporting manufacturers of steel as of last Dec. 31 were $4,042,803,901, and current assets totaled $994,368,004, while their current liabilities were $184,788,697. Compared with the year preceding, this was a slight decrease in total assets, a moderate increase in current assets, and a substantial gain in current liabilities.

For the first time the operations of the Corrigan, McKinney Steel Co. are included in this analysis, inasmuch as this Cleveland interest was absorbed last year by the Republic Steel Corp. and is reflected in the Republic statement. The statistics for the Inland Steel Co. for 1935 include on a proportionate basis the earnings of Joseph T. Ryerson & Son Inc.

STEEL wishes hereby to acknowledge with thanks the co-operation of comptrollers of the companies listed for the data they supplied.

Opposite this page is an insert giving the detailed comparisons for 1935 and 1934, additional copies of which may be had by subscribers on request.

Financial Analysis of Iron and Steel Industry for 1935

Earnings, Capitalization, Assets and Liabilities of 23 Producers Having an Aggregate Annual Ingot Capacity of 63,363,588 Gross Tons

(x) Indicates Loss

NAME OF COMPANY	Year	No. Shares Common Stock Outstanding	Par Value	Common Stock	Preferred Stock	Funded Debt	Surplus	Total Capitalization	Net Earnings Before Dividends	Total Earnings Before Div. and Int. on Bonds	Earnings Per Common Share	Per Cent Total Earnings on Capitalization	Total Earnings Per Ton Ingot Capacity	Rated Ingot Capacity Gross Tons	Capitalization Per Ton Ingot Capacity	Total Assets	Current Assets	Current Liabilities	NAME OF COMPANY
United States Steel Corp.	1935	8,703,252	100	$870,325,200	$360,281,100	$99,240,390	$252,516,714	$1,663,587,937	$1,146,708	$6,106,488	$2.77(x)	0.37%	$0.23	26,657,000	$62.41	$1,822,401,741	$448,011,160	$69,459,623	United States Steel Corp.
	1934	8,703,252	100	870,325,200	360,281,100	101,352,189	528,575,628	1,941,910,771	21,667,780(x)	16,616,728(x)	5.39(x)	0.85(x)	0.61(x)	27,341,900	71.02	2,084,112,287	420,122,302	55,986,556	
Bethlehem Steel Corp.	1935	3,194,314	No	315,342,389	93,388,700	111,492,169	74,487,447	594,710,705	4,291,253	11,509,020	0.70(x)	1.94	1.23	9,360,000	63.54	632,134,440	108,742,597	28,434,409	Bethlehem Steel Corp.
	1934	3,194,858	No	315,396,093	93,388,700	126,429,003	76,370,540	611,584,336	550,571	7,354,393	1.87(x)	1.20	0.78	9,360,000	65.34	639,429,329	120,765,979	18,834,040	
Republic Steel Corp.	1935	4,046,767	No	92,324,312	41,289,750	81,994,648	59,982,460	275,591,170	4,455,735	8,175,454	0.49	2.97	1.35	6,053,000	45.53	297,475,879	73,263,322	10,962,710	Republic Steel Corp.
	1934	2,047,803	No	92,058,968	59,560,800	49,106,700	35,951,522	236,677,990	3,459,428(x)	169,531(x)	3.43(x)	0.07(x)	0.03(x)	5,013,000	47.21	262,487,431	43,257,718	13,750,812	
Jones & Laughlin Steel Corp.	1935	576,320	100	57,632,000	58,113,900	4,857,706	48,477,015	169,680,621	192,408(x)	90,475	7.47(x)	0.05	0.02	3,660,000	46.36	184,965,130	47,519,186	8,519,475	Jones & Laughlin Steel Corp.
	1934	576,320	100	57,632,000	58,713,900	6,356,186	48,547,581	171,249,667	2,611,606(x)	2,268,291(x)	11.69(x)	1.33(x)	0.61(x)	3,660,000	46.79	184,499,473	45,716,998	6,623,469	
Youngstown Sheet & Tube Co.	1935	1,200,000	No	75,256,097	15,000,000	85,337,000	18,405,728	193,998,826	1,641,162	5,877,403	0.68	3.03	1.88	3,120,000	62.18	207,450,396	59,677,893	9,832,109	Youngstown Sheet & Tube Co.
	1934	1,200,000	No	75,256,097	15,000,000	86,148,000	14,924,250	191,328,247	2,298,785(x)	1,704,263	2.60(x)	0.89	0.55	3,120,000	61.32	205,848,899	61,111,987	10,031,398	
National Steel Corp.	1935	2,156,977	25	53,924,425	None	50,000,000	58,284,298	162,208,723	11,136,452	13,393,218	5.16	8.25	5.98	2,240,000	72.41	180,515,399	53,226,523	14,859,433	National Steel Corp.
	1934	2,155,777	25	53,894,425	None	39,299,333	52,714,398	145,908,156	6,050,722	8,020,793	2.80	5.49	3.59	2,232,000	65.37	156,436,119	41,509,117	7,576,624	
American Rolling Mill Co.	1935	1,854,150	25	46,353,759	1,932,400	45,262,559	15,828,048	109,376,766	4,310,129	6,793,163	2.26	6.21	2.79	2,431,720	44.98	122,956,082	42,700,477	11,937,618	American Rolling Mill Co.
	1934	1,710,776	25	42,769 409	1,964,900	39,660,569	14,634,741	99,029,619	966,566	3,238,472	0.49	3.27	1.33	2,431,720	40.72	107,803,776	30,960,200	7,585,016	
Inland Steel Co.	1935	1,440,000	No	47,000,000	None	35,800,000	25,209,307	108,009,307	9,417,818	11,374,875	6.54	10.53	5.69	2,000,000	54.00	118,330,671	36,377,110	6,431,253	Inland Steel Co.
	1934	1,200,000	No	35,000,000	None	39,600,000	20,506,870	95,106,870	3,729,890	5,673,271	3.10	5.96	2.83	2,000,000	47.55	101,312,032	23,007,143	3,391,886	
Wheeling Steel Corp.	1935	388,070	No	19,403,500	38,142,300	29,145,000	19,063,635	105,932,599	3,497,626	4,787,404	3.11	4.52	2.73	1,750,000	60.53	113,021,036	37,391,730	5,077,191	Wheeling Steel Corp.
	1934	387,767	No	19,388,350	38,047,000	25,250,000	16,688,187	99,373,537	529,202	1,914,393	4.53(x)	1.93	1.27	1,500,000	66.25	106,531,203	27,508,559	4,524,670	
Crucible Steel Co. of America	1935	450,000	100	45,000,000	25,000,000	10,000,000	24,813,066	104,813,066	1,268,176	1,918,803	1.08(x)	1.83	2.19	875,000	119.79	109,121,748	18,112,991	3,509,382	Crucible Steel Co of America
	1934	450,000	100	45,000,000	25,000,000	12,750,000	23,277,565	106,027,565	75,157	760,850	3.04(x)	0.72	0.86	875,000	121.17	109,475,610	18,340,734	2,659,270	
Otis Steel Co.	1935	841,002	5	4,205,010	11,503,895	10,827,500	4,214,863	30,751,268	2,228,664	2,947,207	1.69	9.58	3.55	828,000	37.14	35,706,303	8,722,743	2,257,235	Otis Steel Co.
	1934	841,002	5	4,205,010	11,503,895	10,827,500	1,986,199	28,522,604	560,891	1,277,711	0.31(x)	4.48	1.54	828,000	34.44	34,245,127	6,372,528	4,412,541	
Lukens Steel Co. §	1935	317,976	10	3,179,760	None	3,633,400	3,405,973	10,595,478	236,843(x)	51,989(x)	0.74(x)	0.49(x)	0.06(x)	840,000	12.60	12,612,084	3,306,206	2,016,606	§Lukens Steel Co.
	1934	317,976	10	3,179,760	None	3,633,400	3,642,816	10,805,888	42,598	234,021	0.13	2.16	0.28	840,000	12.86	13,044,162	3,351,517	2,238,274	
Pittsburgh Steel Co. ‡	1935	253,500	100	25,350,000	10,475,000	7,221,000	1,912,759	44,958,759	1,675,353(x)	1,092,475(x)	9.50(x)	2.43(x)	1.51(x)	720,000	62.44	70,923,348	11,444,968	1,786,951	‡Pittsburgh Steel Co.
	1934	253,500	100	25,350,000	10,475,000	7,927,000	3,618,785	47,370,785	1,230,044(x)	694,985(x)	7.75(x)	1.47(x)	0.97(x)	720,000	65.80	73,008,352	13,374,831	2,498,115	
Allegheny Steel Co.	1935	611,095	No	3,819,575	3,342,600	None	9,807,029	16,969,204	1,151,454	1,151,454	1.50	6.78	2.42	476,000	35.65	24,152,310	7,334,062	2,462,360	Allegheny Steel Co.
	1934	610,732	No	3,817,075	3,342,600	None	9,812,549	16,972,224	835,928	835,928	0.99	4.93	1.73	482,000	35.21	26,576,894	5,746,556	1,121,404	
Gulf States Steel Co.	1935	197,500	No	16,850,000	2,000,000	4,625,000	3,129,404	26,604,404	146,928	427,096	0.04	1.61	0.89	480,000	55.43	27,741,526	4,609,953	727,656	Gulf States Steel Co.
	1934	197,500	No	16,850,000	2,000,000	4,812,500	3,052,476	26,714,976	27,558(x)	237,944	0.85(x)	0.89	0.49	480,000	55.66	27,714,526	3,957,872	514,678	
Sharon Steel Corp.	1935	375,000	No	9,875,000	None	5,328,000	1,091,412(def.)	14,111,588	1,009,154	1,320,384	2.74	9.35	2.93	450,000	31.36	16,109,164	5,668,443	1,411,352	Sharon Steel Corp.
	1934	375,000	No	1,875,000	None	5,328,000	12,086,199	19,289,199	10,667(x)	301,211	0.03(x)	1.56	0.69	450,000	42.86	21,576,383	4,538,299	1,627,013	
Granite City Steel Co.	1935	254,992	No	6,088,821	None	None	3,649,645	9,738,466	618,358	618,358	2.42	6.35	1.55	400,000	24.35	11,747,400	6,486,443	683,679	Granite City Steel Co.
	1934	254,992	No	6,088,821	None	None	3,286,279	9,375,100	258,761	258,761	1.01	2.76	0.65	400,000	23.44	9,915,766	4,570,637	339,964	
Continental Steel Corp. ‡	1935	175,648	No	6,146,193	2,773,500	1,165,100	1,895,069	11,888,798	481,978	565,091	1.68	4.75	2.02	280,000	42.46	13,172,235	5,495,742	992,510	‡Continental Steel Corp.
	1934	175,648	No	6,146,183	2,773,500	1,229,500	1,614,250	11,763,433	480,153	569,062	1.06	4.83	2.03	280,000	42.01	13,462,281	5,313,436	1,336,573	
Midvale Co.	1935	200,000	No	10,574,621	None	None	1,383,042	11,957,663	496,085	496,085	2.48	4.15	1.75	268,000	44.62	12,941,736	5,703,063	749,457	Midvale Co.
	1934	200,000	No	10,574,621	None	None	1,086,958	11,661,579	632,591	632,591	3.16	5.42	2.36	268,000	43.51	12,260,675	4,789,893	472,041	
Laclede Steel Co.	1935	206,250	20	4,125,000	None	750,000	1,619,971	5,744,971	227,351	254,231	1.10	4.43	1.08	235,368	24.41	7,043,239	2,398,000	401,110	Laclede Steel Co.
	1934	206,250	20	4,125,000	None	650,000	1,516,370	5,641,370	104,012	139,762	0.60	2.47	0.59	235,368	23.97	6,585,043	2,053,700	188,941	
Scullin Steel Co.	1935	30,000	No	150,000	500,000	4,559,500	672,484	5,881,984	382,743(x)	9,663	22.76(x)	0.16	0.07	144,000	40.85	7,486,854	422,781	538,867	Scullin Steel Co.
	1934	30,000	No	150,000	500,000	4,559,500	1,118,524	6,328,024	304,926(x)	23,871(x)	21.64(x)	0.38(x)	0.17(x)	144,000	43.94	7,472,471	383,522	453,273	
Vanadium-Alloys Steel Co. ‡	1935	210,000	No	2,000,000	None	None	4,185,950	6,185,950	357,377	357,377	1.70	5.77	6.22	57,500	107.59	5,965,171	3,471,435	253,476	‡Vanadium-Alloys Steel Co.
	1934	210,000	No	2,000,000	None	None	4,279,041	6,279,041	285,861	285,861	1.36	4.55	4.97	57,500	109.21	5,865,992	3,269,121	360,315	
Ludlum Steel Co.	1935	204,893	1	204,893	4,416,000	None	2,436,177	7,057,070	601,148	601,148	1.53	8.52	15.82	38,000	185.71	8,830,009	4,281,176	1,484,235	Ludlum Steel Co.
	1934	202,155	1	202,155	4,419,000	None	2,096,663	6,717,818	442,348	442,348	0.76	6.58	11.64	38,000	176.78	7,252,891	3,171,936	378,478	
Totals	1935	27,887,706		$1,715,130,555	$668,159,145	$591,238,972	$634,288,672	$4,690,355,323	$45,996,209	$77,269,933	$0.015(x)	1.64%	$1.22	63,363,588	$74.02	$4,042,803,901	$994,368,004	$184,788,697	Totals
	1934	25,861,308		1,691,284,167	686,970,395	561,919,380	881,388,391	3,906,638,799	16,065,543(x) (See footnote)	14,108,229	2.40(x) (See footnote)	0.36	0.22(x)	62,756,488	62.25	4,216,916,722	893,194,585	146,905,351	

‡ Fiscal year ends June 30.
§ Fiscal year ends Oct. 30.

Totals for 1935 and 1934 for the column, "Net Earnings before Dividends", do not take into consideration the requirement (not actual payments) for preferred dividends. After deducting these requirements, the showing for 1935 is a loss of $40,916.47, and for 1934 it is $63,065,168.96. In computing earnings per common share these totals, adjusted for the preferred dividend requirement, are used. Hence the loss of $0.015 per common share in 1935 when there was a profit before the preferred dividend requirement. In other computations, total earnings before bond interest or preferred dividend requirement are the base.

In figuring the earnings per common share for individual companies the same method is followed. For example, in 1935 the net earnings of the United States Steel Corp. after bond interest and other charges amounted to $1,146,708, but after the requirement for the preferred dividend is taken into account—$25,219,677—there exists an actual deficit of $24,072,969, or $2.77 per common share.

Year	Per Cent Earned on Capitalization	Per Cent Loss on Capitalization
1925	5.61	....
1926	6.86	....
1927	5.22	....
1928	6.55	....
1929	9.88	....
1930	4.54	....
1931	0.40	....
1932	....	2.85
1933	....	0.90
1934	0.36	....
1935	1.64	....

‡ Fiscal year ends June 30.
§ Fiscal year ends Oct. 30.

Editorial

Washington Is Adept at Retarding Social Progress

WHENEVER anyone criticizes some of the foolish things being done in Washington, the high-powered administration propaganda machine usually replies with a withering blast against Tories, money lenders and big business to the effect that these interests place so-called material values ahead of human wants.

President Roosevelt has used this type of rebuttal so often that he has given the impression to the American public that he is willing that the new deal be judged solely on the success of its social reforms. In other words, he thinks that the "more abundant life" will more than offset all of the ghastly mistakes of his administration.

This might be true if the "more abundant life" could be realized by the methods the President is employing. Unfortunately, however, most of the alleged social reforms of the new deal cannot possibly succeed. In fact, many of them are being conducted along lines which actually will set back social progress a decade, or possibly longer.

"Something for Nothing" Unfits Recipients For Work When Employment Need Returns

Two reasons for the certain failure of the Roosevelt social program are obvious, yet the administration seems determined to ignore them consistently. One is that the whole philosophy of the social reforms is based upon the fallacy of giving something for nothing. The other is that the new dealers are assuming that social reform can be accomplished only by curbing or punishing business and industry.

As to the first point—giving something for nothing—no taxpayer should object to relief which prevents human suffering. Everybody agrees that in an emergency it is necessary for those who are able to help those who are in distress. But in this depression, the situation was such that if the administration was as sincere about social progress as it pretends, it would have taken steps to prepare those who were on relief for the jobs that would be forthcoming in the recovery period.

This publication, along with many other commentators, has urged for several years a plan for training and conditioning jobless persons so that they would be worth more to society when the acute period of the depression was over. Some elaborate attempts along this line were launched in Washington, but for the most part they were found to be more visionary than practical.

As a result, we now have actual shortages of labor in many lines and in numerous communities at the same time that millions are reported to be jobless. Beyond its failure to help prepare the idle for work, the administration is even more at fault in having created the feeling among those on relief that the "world owes them a living."

This leads right into the second point, which is that Washington is trying to make the public think that industry is blocking social reform. By damning business and industry at every turn, by ridiculing the executives of corporations and by exhibiting a vindictive attitude toward anything that has even a remote connection with industry, the Roosevelt administration has encouraged the public—including the jobless and those on relief—to look upon industry in an unfavorable light. By hamstringing industry, the new dealers actually are choking off any chance they may have for achieving any real measure of social reform.

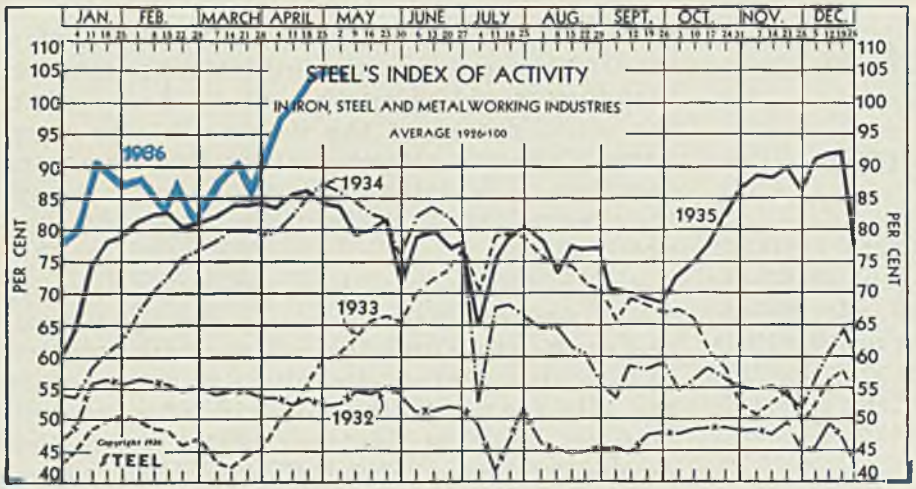
Government Needs To Realize Business Health Is Necessary Foundation to Social Security

Progress will start when the federal government realizes that business prosperity and the "more abundant life" go hand in hand. It will be rapid when the people's servants in Washington try to co-ordinate government activities in behalf of social progress with the practical interest which industry always has exhibited in the subject.

Progressive industrialists are anxious to promote real social progress. In spite of the unfriendly attitude of Washington, they are doing much to train individuals for useful work, to stabilize employment and to promote social security.

Industry cannot do more until Washington exhibits a more sincere interest in the practical side of social progress. Reckless expenditure does not make for a "more abundant life." It simply postpones the day when it will be possible, and sooner or later the proposed principal beneficiaries will realize this, and woe then to those leaders who have led them astray.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 0.5 points to 103.1 in the week ending May 2:*

Week ending	1936	1935	1934	1933
Feb. 22	81.8	80.5	75.5	46.0
Feb. 29	83.4	81.1	76.8	47.4
Mar. 7	87.7	82.0	78.6	43.4
Mar. 14	89.7	84.0	79.9	42.7
Mar. 21	86.0	84.0	79.7	44.6
Mar. 28	91.2	84.3	79.3	45.2
Apr. 4	96.8	83.4	79.6	49.1
Apr. 11	99.6	85.4	82.2	52.6
Apr. 18	103.1	86.3	85.0	55.8
Apr. 25	103.6†	84.9	87.5	59.5
May 2	103.1*	84.6	86.0	60.3

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

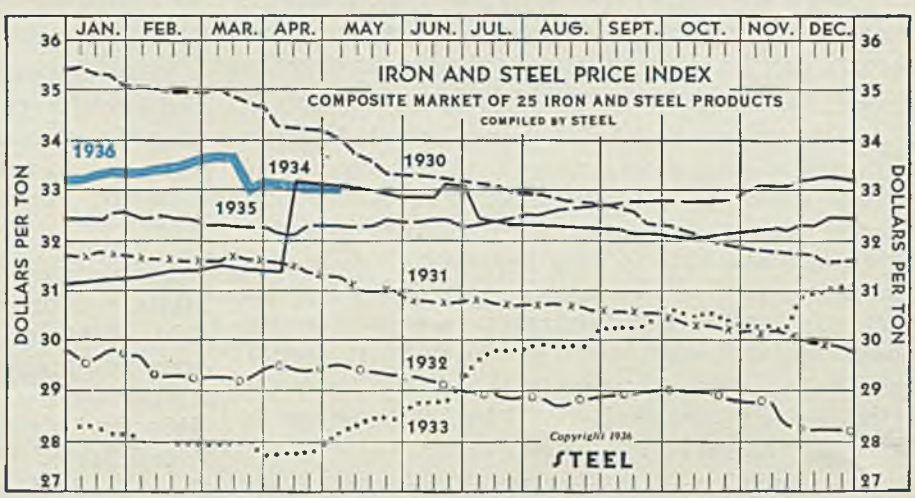
Steadiness Marks Current Activity in Industry

FIRST-QUARTER earnings statements covering a wide range of manufacturing industries seem to indicate that many of the companies engaged in building capital goods, including heavy machinery and equipment, showed more impressive gains in profits than some of the corporations in consumer goods fields. This does not necessarily mean that the capital goods industries have attained a satisfactory rate of operations. In many cases, volume still is disappointing. The point, however, is that the heavy industries have improved considerably, and this means that industrial activity generally is more evenly distributed than it was a year ago.

Current activity in the metalworking industries is holding steady. While subsequent events may show that the spring peak was touched late in April or early in May, there are no signs of a marked recession in the immediate future. Steelworks operations have been clinging close to the 70 per cent mark for three weeks. Automobile output is displaying a fair degree of stability at 118,000 to 120,000 cars weekly. Electric power output is holding up well, in spite of the fact that a gradual easing off would be normal for the season. Carloadings continue to edge up slightly.

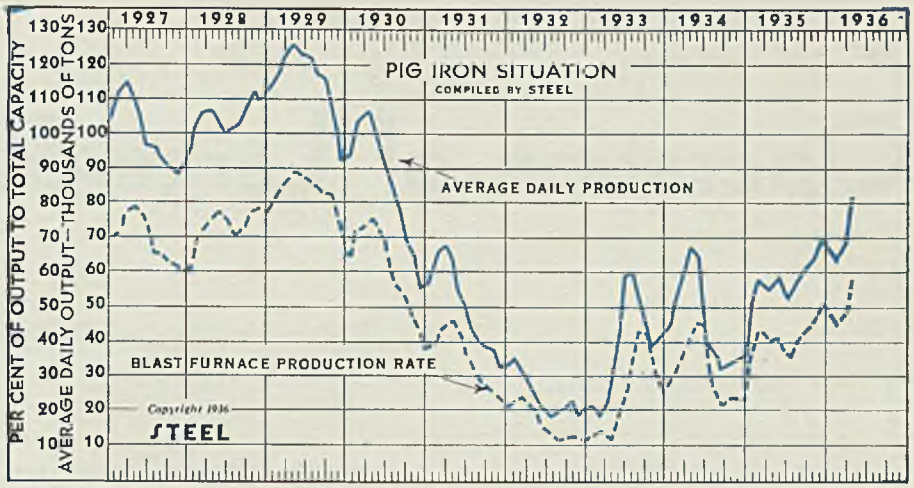
The steadiness of these factors is reflected in STEEL's index of activity, which stands at 103.1 for the week ending May 2, as compared with 103.6 in the previous week.

	1936	1935	1934
May 2	$33.00	$32.30	$33.03
April 25	33.08	32.30	33.09
April 18	33.09	33.31	33.12
April 11	33.11	32.27	33.15
April 4	33.13	32.30	31.33
March 28	33.13	32.33	31.34
March 21	33.05	32.38	31.42
March 7	33.60	32.39	31.43
Feb. 29	33.59	32.42	31.36
Feb. 22	33.54	32.50	31.34
Feb. 15	33.45	32.54	31.33
Feb. 8	33.44	32.56	31.30
Feb. 1	33.40	32.56	31.21



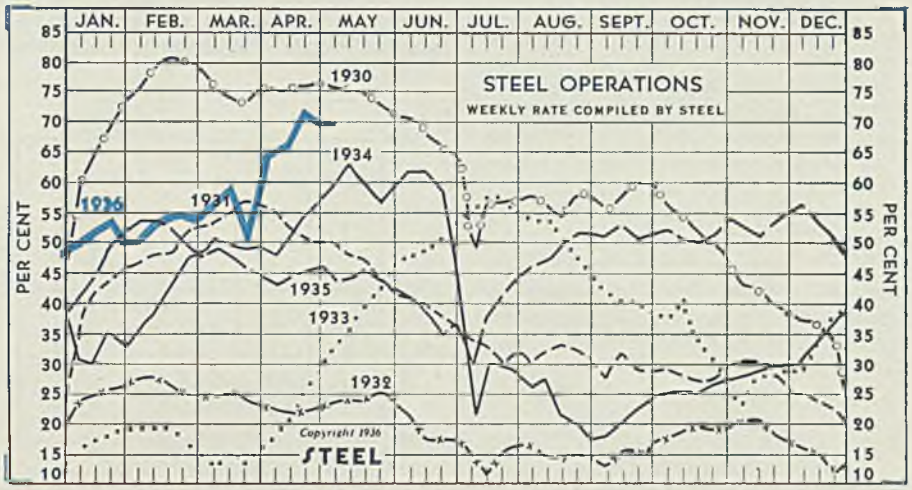
April Iron Production Highest Since 1930

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1936	1935	1936	1935
Jan.	65,461	47,692	48.2	34.2
Feb.	63,411	57,675	46.6	41.4
Mar.	66,004	57,120	48.5	41.0
Apr.	80,403	55,719	59.1	40.0
May	.....	55,986	.....	40.2
June	.....	51,949	.....	37.2
July	.....	49,043	.....	35.2
Aug.	.....	56,767	.....	40.7
Sept.	.....	59,009	.....	42.5
Oct.	.....	63,818	.....	45.8
Nov.	.....	68,876	.....	49.5
Dec.	.....	68,242	.....	49.0



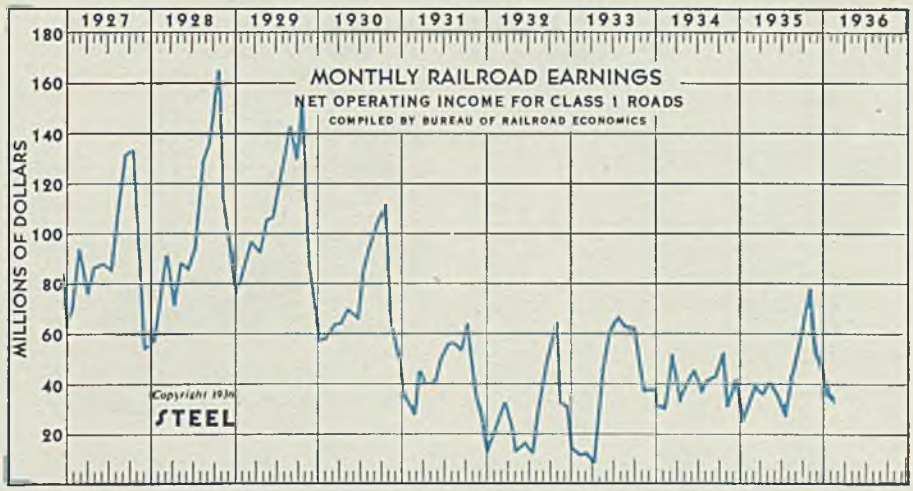
Steel Operations Firm At 69.5 Per Cent

	1936	1935	1934
May 2	69.5	44	60
April 25	69.5	46	57
April 18	70.5	46	55
April 11	66.5	45	51
April 4	63.5	44	48
March 28	58.5	45	49
March 21	50	46	49
March 14	57.5	48	50
March 7	55.5	50	51
Feb. 29	54.5	48	48
Feb. 22	54.5	50	47
Feb. 15	54.5	53	43
Feb. 8	53	54.5	39
Feb. 1	50	54.5	36



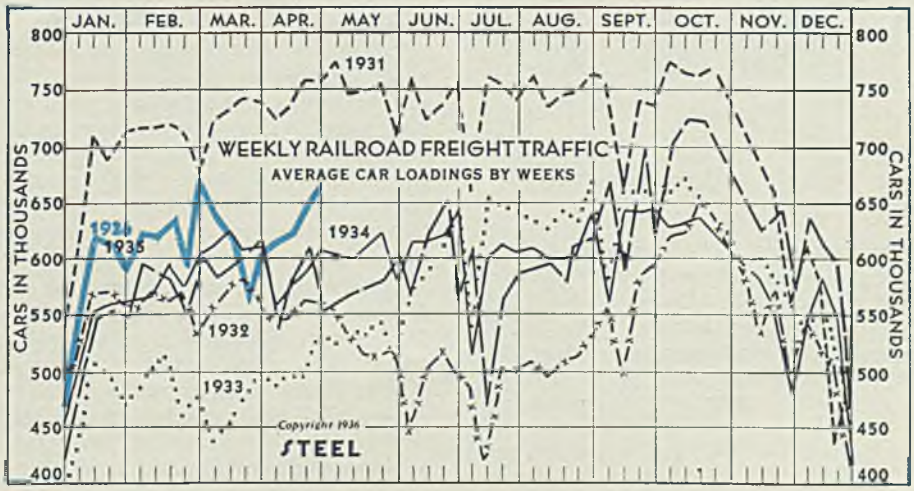
Class 1 Railroads Earn 2.33 Per Cent in First Two Months

	1936	1935	1934
Jan.	$35,764,748	$21,348,557	$31,058,275
Feb.	33,594,718	25,719,919	29,420,772
March	.....	37,850,965	52,217,083
April	.....	34,625,786	32,433,939
May	.....	39,505,069	39,699,194
June	.....	34,024,691	42,037,757
July	.....	26,851,397	35,441,265
Aug.	.....	42,074,108	40,564,071
Sept.	.....	57,359,339	41,713,425
Oct.	.....	75,425,092	49,336,307
Nov.	.....	54,234,305	32,540,502
Dec.	.....	46,040,165	38,738,295



Weekly Car Loadings Hold Well Above 650,000 Mark

	1936	1935	1934
April 25	666,181	558,936	609,704
April 18	642,657	611,141	591,705
April 11	622,138	586,568	579,981
April 4	613,867	545,456	559,070
March 28	600,487	616,520	610,190
March 21	566,808	607,178	610,036
March 14	616,862	597,431	627,549
March 7	634,828	587,190	614,120
Feb. 29	673,123	604,331	605,717
Feb. 22	586,712	553,165	574,908
Feb. 15	631,347	581,669	600,268
Feb. 8	622,097	591,327	573,898
Feb. 1	621,339	596,961	565,401
Jan. 25	584,691	555,528	563,100
Jan. 18	611,408	562,900	560,400



Operation of Large-Size Coreless

BY FRIEDRICH BADENHEUER*
Essen, Germany

TESTS recently conducted on two coreless induction furnaces rated at 750 and 4000 kilograms, respectively, at the plant of Fried. Krupp A.-G., Essen, Germany, demonstrate the importance of this type furnace in steelmaking practice. Both furnaces produce a considerable amount of soft, high-alloy steels.

The 750-kilogram furnace has been in operation since 1931; it has a generator with an output of 300 kilowatts in which case an overload up to 330 kilowatts is permissible for a short time. The frequency is 450 cycles. The generator, built in totally enclosed construction, is separately ventilated; the cooling air is introduced through concrete ducts. The

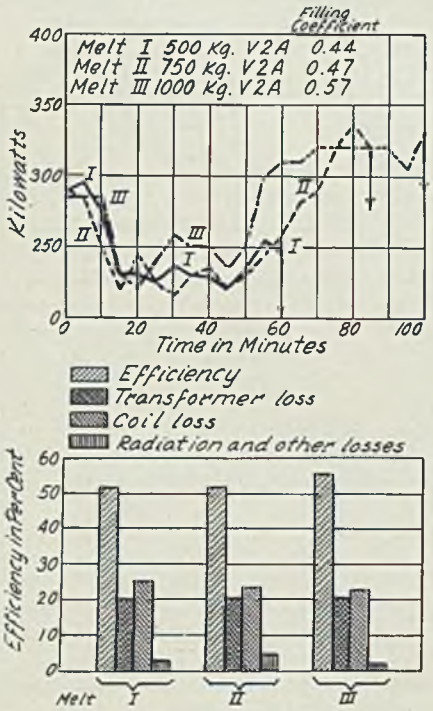


Fig. 1—Effect of charge on input and allocation of current losses

fan furnishes 15,000 cubic meters of air per hour. The output of the driving motor is 350 kilowatts with 1500 revolutions per minute. The efficiency of the condenser battery is 3255 kilovolt-amperes with a voltage of 2700 volts. Half of the condensers are connected permanently while the others can be switched on or off by way of break switches. For the protection of the condensers, an excess

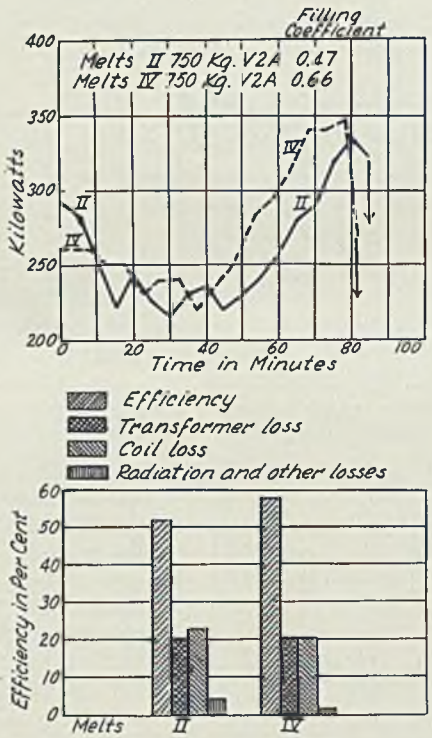


Fig. 2—Effect of condition of scrap on meltdown curve and efficiency

voltage relay has been installed.

The crucible used has an inside diameter of 540 millimeters; a useful depth of 625 millimeters and a wall thickness of 80 millimeters. To enable tapping the furnace content into hand ladles, the pouring lip is arranged about 700 millimeters above the mill floor. The furnace frame rests in two pivot pins; the tilting is done my means of a 3-ton Demag-drag.

Values measured or calculated in the course of the experiments follow: The current consumed until the meltdown; time of melting down; transformer losses; coil losses; condenser losses. The energy taken from the network by the transformer was read off from a kilowatt-hour meter; like-

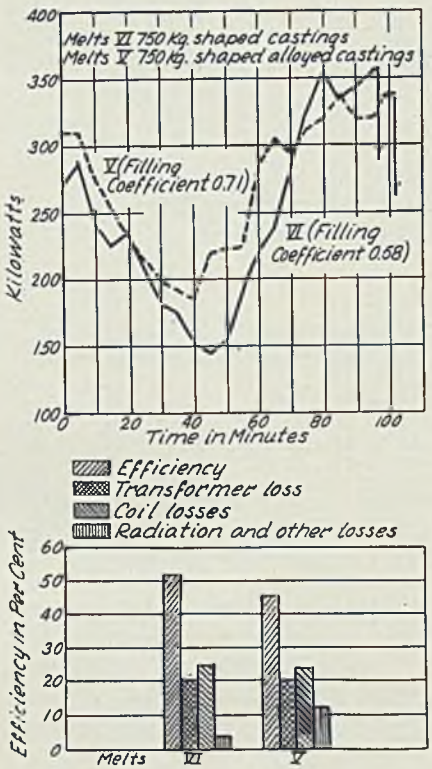


Fig. 3—Effect of quality of scrap on efficiency and input curves in production of medium alloyed cast steel

wise the prevailing generator load, at intervals of 5 minutes. The determination of the I^2R-losses (loss due to heating by current) in the furnace coil and of the heat leaving through the crucible wall was done by measuring the quantity and and the in- and outgoing temperatures of the cooling water.

The condenser losses determined in suitable manner, are somewhat inaccurate because of the thermal inertia of the condensers. In consideration of the falsification of the measuring results due to the gaseous vapors hovering over the bath, the bath temperatures ascertained by the aid of optical pyrometers were increased by 50 degrees Cent. Other losses such as radiation through the crucible opening; those due to heat transferred by pieces of scrap to the outside air; discharging furnace gases; and heating of furnace frame by eddy currents, were difficult to be determined by available instruments. For this reason, these losses have

*Translated from *Stahl und Eisen*, vol. 55, pp. 821-825.

Induction Furnaces

been summarized in one final term the largest part of them being radiation losses.

Fig. 1 shows the influence of the size of the charge on the input during the course of the meltdown. The trend of the load curve of the generator is typical for the several heats and the operation of the furnace; for judging the current consumption, however, the proportion of the various losses is primarily important. All figures relate only to the time of melting-down; the efficiency values, to the energy taken from the network doing this time.

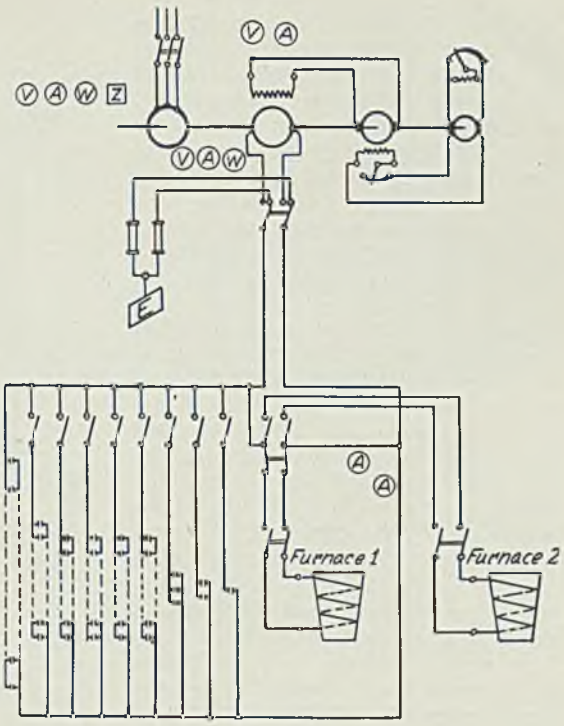


Fig. 4 — Diagram of connection of 4-ton coreless induction furnace

Term Is Explained

To characterize the quality of the scrap, the term "filling coefficient" proved to be useful; by this term, is meant the ratio of the weight of the quantity of scrap charged at the beginning of the melt to the weight of the block filling the entire crucible up to the upper edge of the coil without any interstices whatever. The "filling coefficient" is only a rough characteristic of the quality of the scrap; that is, fillings which, in view of their condition, readily adust themselves in the direction of the flux of the lines of force, will give more unfavorable results than filings which are less able to yield to this tendency.

With Heats I to III, having a weight of charge of 500, 750, and 1000 kilograms, attention was paid to the necessity of having scrap as similar as possible with regard to size of piece and baling. The output of the generator at the beginning of the melts which is about the same size, proves that conditions were obtained which electrically, were rather similar. The rise of the energy curves after liquefaction of the bath is typical of the several melts. As may be seen from Fig. 1, all melts were sufficiently liquid after 45 minutes to enable continuous after-charging.

In view of the fact that in Melt I, due to the low weight of the charge, the bath reached only to half of the height of the crucible, a large portion of the lines of force ran through the air. For this reason, not even the input attained at the beginning of the melt, was reached in the later stages. In the case of Melt II, the input steadily increased after 45 minutes due to continuous after-charging, and a high input was reached. After the bath was completely liquid, which was the case after about 80 minutes, some fluxes were added which became liquid within five additional minutes. The rise in the input shown by the 1000 kilograms, Melt III, was still more favorable, since due to the subsequent charging of considerable quantities of scrap, favorable electrical conditions were insured for a comparatively long time. The total periods of melting-down, according to Fig. 1, were 60, 85, and 100 minutes, corresponding to a melting efficiency of 500, 530, and 600 kilograms per hour.

The size of the input prevailing, on the average, during the meltdown, substantially determines the total efficiency which on the heat balance sheets (Table I, Fig. 1) increases from 51.5 over 52 to 55 per cent. The transformer losses remain the same in all three melts, 20 per cent; whereas the coil losses decrease, from 24.8 to 23 and to 22.4 per cent. The other item on the balance sheet comprises the residual losses which, as stated before, must be regarded as losses essentially due to radiation. Their values depend to an appreciable extent, on the thickness of the skull over the bath. With Melt II, these losses are comparatively large. The less favorable efficiency of Melt II, as against Melt III, is in part attributable to the comparatively high proportion of the radiation losses.

The effect of the quality of the scrap on the course of the meltdown curve and the efficiency is illustrated in Fig. 2 (see also Table I). The charge of Melt II consisted of normal, scrap from current production

Table I

Allocation of Current Losses

Charge	Filling coefficient	Current consumed until meltdown	Meltdown time Min.	Efficiency %	Transformer losses kw-hr./t	%	Coil losses kw-hr./t	%	Condenser losses kw-hr./t	%	Radiation and other losses kw-hr./t	%	Total losses kw-hr./t	%	Melt number
Normal accruing scrap	0.44	660	60	51.5	132.0	20	163.6	24.8	6.9	1.04	17.6	2.66	320.1	48.5	I
	0.47	607	85	52.0	121.4	20	138.0	23.0	3.5	0.52	22.1	4.48	292.0	48.0	II
	0.51	585	100	55.0	117.0	20	131.3	22.4	4.83	0.83	9.87	1.77	263.0	45.0	III
Good scrap	0.66	587	81	58.0	117.4	20	117.7	20.0	2.7	0.46	9.2	1.54	247.0	42.0	IV
Normal accruing scrap	0.58	742	102	45.1	148.4	20	72	23.2	4.6	0.63	82	11.07	407	54.9	V
Good scrap	0.77	660	97	51.5	132	20	161.8	24.5	3.35	0.51	22.85	3.45	320	48.5	VI

and baled in normal manner (filling coefficient 0.47), whereas comparison Melt IV was made from carefully baled scrap (filling coefficient 0.66). Just as with Melts I to III, in this case, also, a soft, high-alloy scrap was used. Although part of the waste of Melt IV was rather fine (thus taking up considerable space), as may be seen from the generator output which was comparatively low at the beginning of the melt, the increase in output set in at a rather early stage after the bath was liquid, or after about 38 minutes. The drop of the generator output shortly before completing the meltdown was due to the formation of an arch below which the bath was overheated; while at the same time, the input decreased. The effect of a better quality of the charge is responsible for part of the increase in the efficiency from 52 to 58 per cent, due to the drop of the coil losses from 23 to 20 per cent; and also to lower radiation losses which were 3 per cent less in view of the better covering of the bath in Heat IV.

Coil Losses Are Small

The effect of the condition of the scrap, in the present case, for cast steel with medium alloying percentages, is once more noticeable in Fig. 3 in two melts with a filling coefficient of 0.58 and 0.77. In this case, also, a small change in the coil losses can be observed. The improvement of the efficiency, however, in this case, also, is in part due to a reduction of the losses by radiation which are rather high only with Melt V which had a thin skull. A comparison of the efficiency curves, according to Figs. 2 and 3, shows that their trend is affected by the magnetic properties of the scrap; this effect is considerable. In view of the higher permeability of the charge of the melts, according to Fig. 3, the input curves show a marked dip.

The experiments of which here only a few are described, show that the condition of the scrap and its magnetic properties are able to exert a strong influence on the course of the energy curves and thus, on the economy of the process. This influence, to a certain extent, also is evident from the average values of ordinary routine melts; the current consumption figures given in Table II relate to the total duration of melting. The low carbon, highly alloyed melts show a current consumption higher by 4 or 3 per cent respectively, according to Table II, as against the melts for cast steel, in spite of the less favorable filling coefficient.

As a matter of course, the duration of the period of charging, also, exerts a considerable influence on the total output so that the efficiency figures given in the literature are hardly comparable, as in almost all

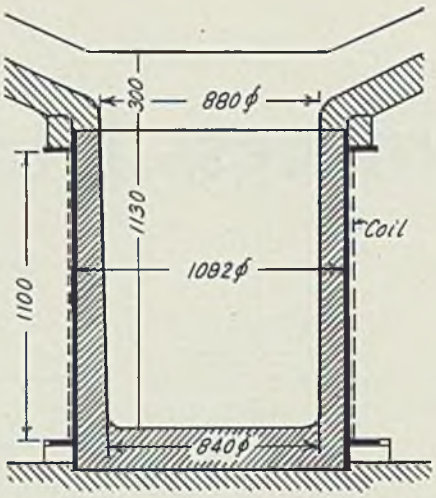


Fig. 5—Crucible of coreless 4-ton induction furnace

cases, detailed data on the condition of the charge are missing. With regard to their order of magnitude, the values of Table II are in good agreement with those obtained at the Bochum plants[1,2] for which with 500 and 1000-kilogram charges, a current consumption of 800 and 850 kilowatt hours per ton is specified.

Serving the 4-ton furnace[3], is a transformer motor which has a continuous output of 1600 kilowatts with

Table II

Total Current Consumed in Ordinary Heats

Material	Average Current Consumed with cold crucible wk-hr./t	with hot crucible kw-hr./t
Cast steel	823	717
V2A	792	696

1500 revolutions per minute. The machine is direct coupled with a single-phase generator which possesses a continuous output of 1400 kilowatts with cos ϕ = 1600 cycles, 2700 volts. Motor and generator are enclosed completely and separately ventilated. According to information furnished by AEG (German General Electric Co.), the transformer aggregate has as efficiency of 86.5 per cent, or, after deduction of the losses in the shunt regulator, of 83 per cent.

The fan output is 750 cubic meters of filtered air per minute. The furnace is fed by way of a high-frequency oil switch. As may be seen from the diagram of connections, (Fig. 4) there is arranged parallel to the coil, the condenser battery having a total output of about 16,300 kilovolt amperes to supply the necessary wattless current. The voltage of the condensers, 50 per cent of which are connected permanently, is 2700 volts. The balance can be switched off and on, in eight groups, by way of break switches. At the same time, the break switch of each condenser group is provided with an auxiliary contact which weakens the excitation of the generator before switching on or off, by way of an auxiliary relay; in this manner impact-like loads on the condensers are avoided. To eliminate voltages beyond the permissible maximum, from the condensers, an excess load relay has been installed which weakens the excitation of the generators when responding. They can be switched on only, after the shunt regulator has been brought back to the former position.

Switchboard Installed Nearby

The operation and control is effected from a four-field switchboard which is located near the furnace. It carries a meter for the transformer and the driving motor, the voltmeter and ammeter for the generator and exciter, the wattmeter for the generator and the ammeters for the furnaces and condensers. The levers for the condenser break switches, the hand wheels for the shunt regulators, the coil transformer and the generator oil switch also are arranged on the switchboard.

Dimensions of the crucible are shown in Fig. 5. Although it is possible to exchange the container destined for a solid charge of 4 tons for one of 7 to 8 tons of molten iron, such an exchange has not been made, as yet.

Available space conditions influenced the arrangement of the various parts of the plant. It appeared to be desirable, to set up the machines and condensers in the basement of the neighboring building to simplify the scrap supply. For this reason, the top edge of the furnaces was arranged at the level of the mill floor. The attendance of the furnaces, especially the handling of the heavy pieces of scrap, was thus considerably facilitated. The method of suspension and the tilting mechanism have been found entirely satisfactory. All parts of the furnace, thus are protected from the action of sparks and slag splashes, during the tap.

The furnace has been in operation since August 1933; since the beginning of 1934, it has been working in two, and mostly in three shifts with no breakdowns whatsoever. Thus, the

[1]Report presented at session of subcommittee for Electric Steel Melting Practice, on Nov. 30, 1934, in Bochum.

[2]Cf. F. Poelzguter, *Stahl und Eisen*, vol. 51, 1931, p. 517;

[3]Aeg Mitteilungen, vol. 30, 1934, pp. 33-36;

furnace has proved its suitability for practical conditions. Fig. 6a shows the time consumed by the charging. On the average, the respective periods are 35 minutes. This comparatively long time is explained by the fact that the furnace substantially works up scrap which is fine and takes up much space. Accordingly, the meltdown time, 1¾ to 2½ hours, is also comparatively long, according to Fig. 6b. Both of these factors have a pronounced influence on the current consumption during the meltdown which, according to Fig. 7, amounts to 600 to 700 kilowatt hours per ton.

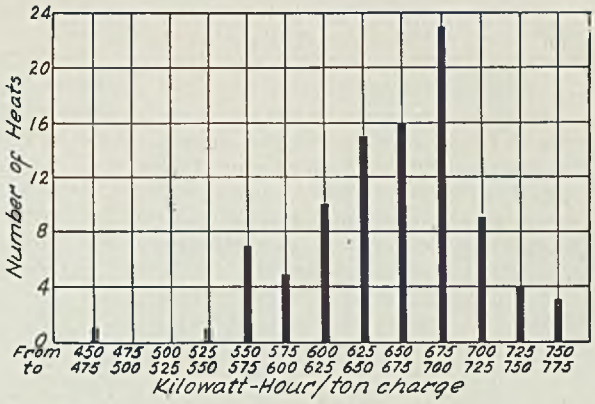


Fig. 7—Current consumed in melting down in 4-ton furnace

The current consumed in the meltdown, does not appear to be lower than with the 750-kilogram furnace, at first glance. The excellent values of Table III show, however, that we actually can expect a lowering of the current consumption by 5 to 10 per cent compared with the 750-kilogram furnace. The values given in this table for soft, high-alloy steel and carbon steel of varying hardness, as related to the meltdown time, is especially favorable; they show once more that the economy of operation is influenced greatly by the condition of the scrap. A suitable preliminary treatment of the scrap by comminution and baling, under these circumstances, often may improve the economy of the process; however, the advisability of such treatment would have to be decided upon in each individual case.

As far as the manufacture of steel with comparatively high-carbon content is concerned, the deoxidation processes take place to a large extent under the conditions such as prevail in acid open hearth furnaces.[4] [5] The course of the deoxidation may be characterized to the effect that spontaneous deoxidation occurs chiefly under the influence of the furnace materials. As long as slag, not saturated with silica, is in contact with the metal, the hearth shows a tendency to dissolve which may occur in part by direct action of the slag, and in part by the action of the metal on the hearth. The ferrous oxide dissolved in the metal thus is taken up by the silica of the hearth; and in view of the passage of ferrous oxide from the metal phase into the slag phase, the reduction of silica now may proceed: the passage of the ferrous oxide from the metal is indicated by the simultaneous increase of the silicon content. Several reports have been published[4] on the significance of the spontaneous deoxidation and its relationship to the freedom from slag with special reference to tool steels.

Conditions are less favorable for the manufacture of soft steels, especially with regard to the freedom from nonmetallic inclusions[6].

The deoxidation of low-carbon steels must substantially take place by way of diffusion.[7] [8] In this case, the coreless induction furnace offers the advantage that there are no difficulties whatever in exchanging slags slow to react with more reactive ones. By the use of new slags, therefore, it is possible to remove ferrous oxide from the metal until the distribution equilibrium is obtained. A repetition of this step leads to further lowering of the ferrous oxide content which may be continued at libitum. As pointed out by F. Korber,[8] however, it must be borne in mind that during the melting down of the scrap, at first, a slag rich in oxide is formed which rises with the rising level of the molten metal and which infiltrates the entire crucible. If now the ferrous

Table III

Current Consumption During Meltdown Period

Material	Charge kg	Filling coefficient	Current consumption, kw-hr.	Melting time, minutes	Remarks
V 2 A	4000	0.79	530	87	
V 2 A	4144	0.72	547	82	
V 2 A	4000	0.73	530	100	
V 2 A	4000	0.85	462	77	
V 2 A	4000	0.495	534	105	
Steel 0.70 C	4200	0.835	558	82	
Steel 0.70 C	4200	0.86	579	88	
Steel 0.45 C	4000	0.826	587.5	95	Crucible cold
Steel 0.45 C	4000	0.805	552.5	89	
Steel 0.45 C	4100	0.89	551	90	Crucible cold
Steel 0.45 C	4000	0.87	555	83	Crucible cold
Steel 0.45 C	4500	0.89	624	106	
Steel 0.45 C	4000	0.77	587.5	92	Crucible cold
Steel 0.45 C	4000	0.805	565	90	Crucible cold

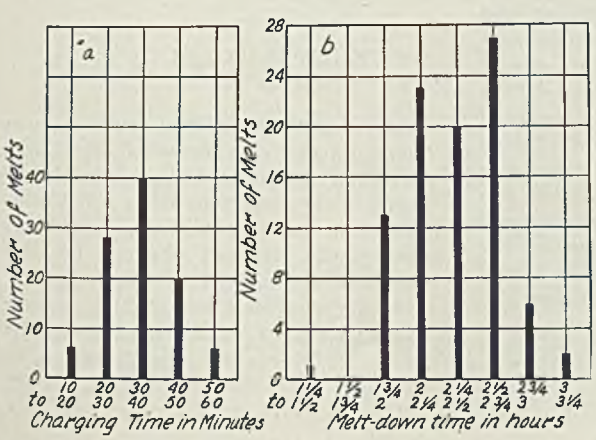


Fig. 6a (Left) — Charging time in minutes. Fig. 6b (Right) —Meltdown time in hours. Furnace of 4-ton capacity

[4]Archiv Eisenhuettenwesen, vol. 8, 1934-5, pp. 1-8;

[5]H. Schenck, "Introduction to Physical Chemistry of Ferrous Metallurgical Process" vol. 2, published by Julius Springer in Berlin, 1934;

[6]Cf. also *Stahl und Eisen*, vol. 50, 1930, p. 628; contribution to discussion by F. Trurit.

[7]Mitt. Kais. Wilh. Inst. Eisenforschung Duesseldorf, vol. 9, 1927, pp. 319-37;

[8]*Stahl und Eisen*, vol. 46, 1926; p. 1643.

oxide content of the metal is lowered, there is, on the other side, a tendency of the crucible to give off ferrous oxide to the metal.

Similar processes take place in the basic electric furnace where during the deoxidation by "white slags" a reduction of the oxides of the hearth occurs which may make itself felt in undesirable manner particularly toward the conclusion of the heat, with increasing temperature of the hearth. On principle, as explained in detail by H. Schenck,[5] when deoxidizing with a glassy slag, it is necessary to liberate oxides as far as possible; otherwise, we cannot speak of a deoxidized steel. This process requires time which depends on the degree of oxidation experienced by the metal during the meltdown and on the quality of the scrap.

As far as the deoxidation is carried out in this manner, the condition of the crucible wall is of importance; it does not appear to be impossible that the differences in the results obtained in the production of steel in the coreless induction furnace are in part attributable to the fact that no attention was given to the metallurgical condition of the crucible wall.

Influenced by Slag Change

According to our own experience, one or several changes of the slag, especially in the production of high-chromium, low-carbon steels, exert a favorable influence on the purity of the material. In the melting of such steels, the action of the carbon on the oxides is greatly reduced, because of the low-carbon content and by the formation of stable carbides. This is true in the presence of chromium whose pronounced affinity for carbon is well known.

A low temperature of the slags and a resultant low dissolving power increase the difficulties which arise in the manufacture of steel low in slag inclusions by diffusion deoxidation. Increased furnace size makes it easier to obtain hot and reactive slags. The part played by the motion of the bath in the separation of suspended deoxidation products is, in part, open to dispute. According to our experiments made at the 4000-kilogram furnace, a result just as favorable as a change of the slag is obtained when the metal is left standing in the furnace with the current shut off. Accordingly, a far-reaching lowering of the frequency may have effects which are undesirable from the metallurgical standpoint.

The advantage of the acid-lined coreless induction furnace over the low-frequency furnace is to a considerable extent due to the fact that adequate crucibles can be maintained at low cost, especially when two crucibles are available, such as for the furnace of 4-ton capacity just discussed.

Deoxidation by change of the slag can be realized more readily in the coreless induction furnace than in a one-trough furnace.

The coreless induction furnace has in common with the low-frequency furnace that any absorption of carbon during the melting is avoided.

As all steels made on acid lining, the steel melted in the coreless induction furnace shows an excellent pourability which is of importance in the manufacture of high-alloy, especially chromium steels; the same cannot be said of steel made in a basic-lined low frequency furnace. Compared with the latter type, there is also the advantage that operation in two or three shifts is possible with the coreless induction furnace.

Reports on Corrosion of 2000 Additional Specimens of Iron and Steel Pipe

A REPORT on rates of corrosion and pitting of 2000 specimens of ferrous pipe material, buried in representative soils throughout the country and removed during 1934, has just been completed and will soon be published in the *Journal of Research* of the national bureau of standards, Washington.

This work was started in 1922 when the bureau undertook to determine whether and to what extent soils were responsible for the deterioration of underground pipe. To accomplish this, about 7000 specimens of commonly used pipe materials were buried. It soon became evident that same soils were corrosive, and in an attempt to find a remedy for underground corrosion, specimens of other materials and of protective coatings were added until the total number amounted to approximately 31,500 specimens. Of these about 22,000 have been removed and examined.

Soil Conditions Vary

In commenting on this investigation, K. H. Logan, in charge of the work, stated that soil conditions even within a limited area are so varied that the result of a single or a very few observations of corrosion is of little value. In order to determine the corrosiveness of a soil or the life of a pipe a large number of observations must be made. For some reason the depth of the deepest pit on an area of pipe surface exposed to a single soil condition will increase if the area is increased; that is, we may expect to find a deeper pit on 100 feet of pipe than on 10 feet of pipe in the same soil. Therefore, pitting data are not comparable unless the observations are for equal areas exposed for the same time to the same soil. In most soils the rate of corrosion decreases with time but for some soils the penetration is nearly proportional to the period of exposure.

The average value of the maximum pit after 12 years of soil action is slightly less for wrought iron than for the other commonly used pipe materials, according to Mr. Logan, who stated that the standard error of the average is such that the apparent differences in the materials may be accidental or within the limits of errors of observation. The average values for penetration for both pure iron and for open-hearth steel (to which 0.2 per cent of copper has been added) are rather definitely higher than for the more commonly used types of pipe materials.

In some soils, especially those containing so-called alkali, cast iron corrodes more rapidly than steel but the corrosion products appear to have more strength as pipe material. The several varieties of cast iron, with the exception of one containing 15 per cent nickel, corrode at approximately the same rates, it was stated.

The addition of a small percentage of chromium to steel has been found to reduce the loss of weight, but it has little effect on the maximum pit depth. In soils containing chlorides the corrosion may be concentrated and accelerated. Limited data suggest that the addition of nickel with or without chromium tends to reduce both loss of weight and pit depths.

WHEEL STANDARDS REAFFIRMED

Division of simplified practice, national bureau of standards, Washington, has announced that simplified practice recommendation Rii5-30, full disk buffing wheels, has been reaffirmed, without charge, by the standing committee of the industry. This recommendation, which establishes a series of 11 standard outside diameters for 20-ply full disk buffing wheels, became effective January 2, 1930.

Painting by Frederick J. Waugh, reproduced through courtesy of Pennsylvania Academy of Fine Arts

THE *Final* INSPECTOR ★

CONDITIONING a ship for its contests with the sea calls for workmanship of a higher order than that needed to pass the most rigorous human inspection. The work will be checked by the most searching inspector of all—Old Neptune himself.

Similarly, the ultimate test must be kept in view in making the steels that take the shocks and stresses in countless responsible tasks—in automobiles, in railway track and equipment, in oil refinery and chemical plant equipment, in mines and in structures of all kinds. Somewhere, sometime, these steels will be subjected to service demands more relentless, more revealing than any tests, however critical, given them before they leave the mill.

It is toward passing this ultimate test that every effort is directed in making Bethlehem steel products. The men responsible for their quality are always looking beyond specifications to the severest combination of adverse conditions that may be encountered in service.

Bethlehem Steel

BETHLEHEM STEEL

COMPANY

LEADING PRODUCTS OF BETHLEHEM

Bars and Special Sections
Carbon Steel Bars, Bessemer and Open Hearth in all grades and analyses; tube rounds for seamless piercing, special and automotive sections of every description. Iron Bars—chain, engine bolt and staybolt quality; muck bar. Rerolled Rail Steel; bedstead angles and plain bars.

Semi-Finished Steel
Carbon billets, blooms and slabs, rerolling and forging quality; sheet bars and skelp.

Fabrication and Erection of Buildings, Bridges and Other Steel Structures

Steel Plate Work and Construction
Tanks, towers, gas plant equipment, oil-refinery and chemical-plant equipment. Barges and hulls.

Alloy Steels
Open-hearth and electric-furnace alloy steels for all purposes. Blooms and billets. Bars, hot-rolled, cold-drawn; black-as-rolled, centerless-ground, normalized, annealed or heat-treated. Special Sections, MAYARI nickel-chromium steels; MAYARI engine bolt and staybolt steels; Silico-manganese spring steel; SUPERTEMP, for superior physical properties at high temperatures.

Bolts and Nuts—Rivets—Spikes
Machine, Carriage, Lag and Specialty Bolts, Plain and Galvanized, Carbon and Alloy; DARDELET self-locking Thread Bolts and Nuts; Hot-Forged, Cold-Punched and Semi-Finished Nuts; Iron and Steel Rivets, Fitting-up Bolts; Track Bolts, Drive Spikes, and Screw Spikes; Plain and Upset Rods, Turnbuckles, Boat and Wharf Spikes, Pipe and Tank Bands—Silo Rods.

Pig Iron
Basic, Bessemer, foundry, low phosphorous, malleable, malleable Bessemer; STANDARD MAYARI and SILVERY MAYARI alloy iron.

Ferro-Manganese

Forgings
Carbon and alloy; hammered and hydraulically pressed; drop and upsetter; seamless vessels for oil refineries; high-pressure seamless boiler drums and chemical vessels.

Castings
Carbon and alloy steel (open-hearth and electric), manganese steel, iron, brass and bronze, rough as cast or machined; abrasion-resisting castings. Centrifugal cast bronze sleeves and liners; ingot moulds.

Hydraulic Machinery

Wheels and Axles
Wrought-steel wheels and axles for freight and passenger cars and engine, tender and trailer trucks; for electric cars; for mine locomotives and mine cars; for cinder, ore and other industrial cars; crane wheels.

Rolled Steel Blanks
For gears, pinions and flywheels. Tire moulds and mould rings, shaft couplings, brake wheels and drums, pipe flanges, pistons and other circular forgings.

Tin Plate
Coke tin plate; black plates; galvanizing, enameling and lithographing stock.

Tool Steels
High-speed tool steels; carbon and alloy tool steels; cobalt magnet steel; hot-work tool steels; die steels; valve steels; rivet set and pneumatic chisel steels; special tool steels; nitralloy; tool steel billets of all grades. Rock and mine drill steels, hollow and solid.

Stainless Steels
BETHADUR and BETHALON, covering practically every requirement for stainless steels.

Tools
Rivet sets, punches and dies; chisel blanks and chisels; hot and cold friction saws; steel stamps (letters and figures for hot and cold work); slitting shears, shear blades; special high-speed tool holder bits; special tools.

Wire and Wire Products
Plain, bolt, screw, chain, extra-soft rivet and hard bright nail wire; bright processed, lime-bright and black-annealed, normalized, heading wire; BETHANIZED TELEPHONE WIRE; galvanized wire; high-carbon and low-carbon wire rods; BETHANIZED (special zinc-coated) WIRE; clothes-line wire; soft processed wire; box, stapling and binding wire; spring wire; barbed wire; SILVER STAR BALE TIES. BETHANIZED FIELD and POULTRY FENCE. BETHANIZED LAWN FENCE. Nails, staples.

Building Specialties
Bethlehem open-web steel joists, steel studs, steel door frames, metal lath. Insulating wool.

Steel Fence Posts and Gates
Posts and gates for farm, garden, lawn and poultry fencing; snow fence posts; highway sign posts.

Structural Shapes
Bethlehem wide-flange beams and H-column sections; rolled joists and stanchions; standard beams, channels and angles; car and shipbuilding shapes.

Concrete Reinforcement Products
Steel reinforcing bars, spirals, and concrete accessories.

Steel for Highway Construction
Bar mats, expansion joints, contraction joints (road strip), steel highway guards.

Steel H-Piling

Steel Sheet Piling
Bethlehem steel sheet piling for temporary work, as in cofferdams, and permanent work, as in retaining walls, cut-off walls, and jetties.

Steel Plates
Universal and sheared plates, for all purposes; slabs.

Flanged Products
Tank heads, boiler heads, dome sheets, manheads, yokes, bolts and saddles; miscellaneous flanged plate work.

Oil-Burning Equipment
BETHLEHEM-DAHL mechanical-atomizing oil-burning system for stationary and marine service.

Trackwork

for Steam, Electric, Mine and Industrial Railways
Frogs, switches, Bethlehem and NEW CENTURY SWITCH STANDS; crossings, steel ties, gage rods, rail braces, BETHCO rail anchors; silico-manganese and manganese special trackwork; hook-flange guard rails, compromise joints.

Steel Freight and Passenger Cars

Mine Cars

Railway Turntables

Rails and Accessories
Standard tee, girder, girder-guard and high-tee rails; light rails; splice bars, rail clips, tie plates.

Steel Pipe
Butt-welded and lap-welded pipe, standard and line, black and galvanized; copper-bearing pipe. Welded steel pipe for water-distribution systems.

Boiler Tubes
Genuine old-fashioned knobbled charcoal-iron tubes; double-pass steel tubes. Double-pass copper-bearing steel tubes.

Steel Sheets
Hot-rolled, hot-rolled annealed, cold-rolled, heavy cold-rolled sheets; furniture, heavy furniture, automobile sheets; porcelain enameling sheets; tack plate; galvanized, flat and formed sheets; painted formed sheets; special-finish sheets. Sheets of BETH-CU-LOY (copper-bearing steel).

Steel Strip
Cold-rolled strip, hot-rolled strip, lamp stock, crown-fender stock.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

Equipment for Wide Strip Pickling System Rubber Lined

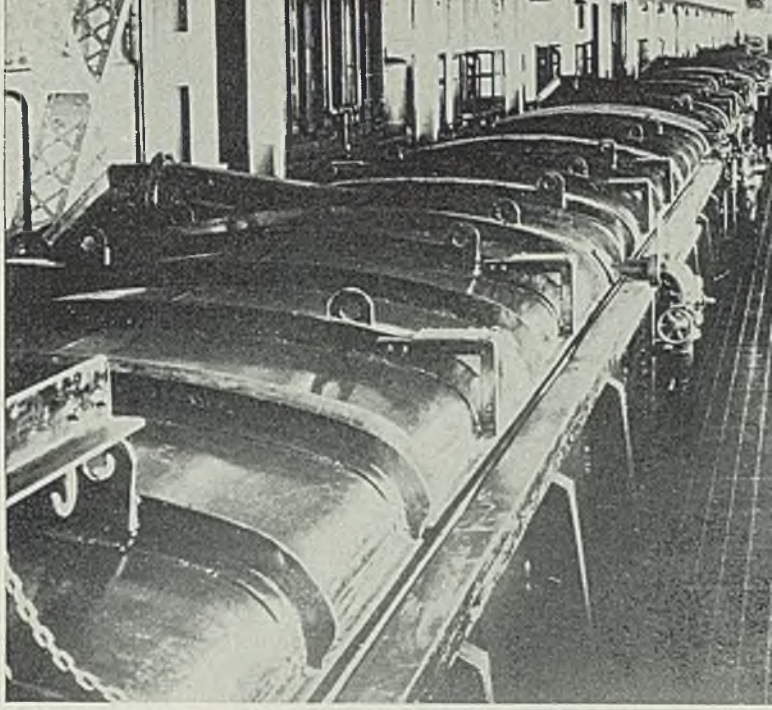


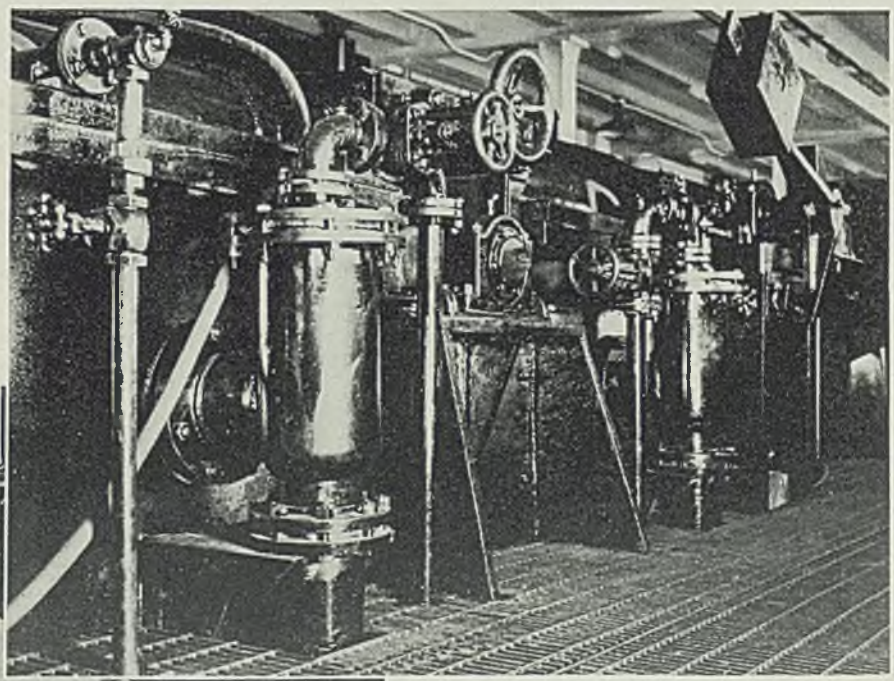
Fig. 1—One of the two 240-foot lines of tanks for continuous pickling of wide strip steel. Note absence of fumes

A STRIKING example of a modern pickling room is to be found in the new Rouge plant of the Ford Motor Co. at Dearborn, Mich. This company is noted for high standards of efficiency and cleanliness, and to design and install pickling equipment which would meet these requirements in every respect was a noteworthy engineering achievement.

This installation, made by the Wean Engineering Co. Inc., Warren, O., consists of two continuous wide strip pickling lines, both of which are capable of handling strip up to a maximum width of 78 inches. A similar pickling installation at the 72-inch strip mill of Inland Steel Co., Chicago, was described in STEEL, Sept. 10, 1934.

Each line comprises four 60-foot acid tanks of welded steel construction, one line being shown in Fig. 1. These tanks are lined with ¼-inch Triflex rubber lining, a product of the B. F. Goodrich Co., Akron, O. This rubber lining is covered with an 8-inch inner lining of acidproof brick jointed with a special sulphur-base cement. Both the rubber lining and the brick sheathing are provided with expansion joints at suitable intervals to prevent buckling or cracking action due to contraction and expansion. The inside finished depth of each tank is approximately 4 feet and the bottom slopes 4 inches in the 60-foot length to a sump in one end which affords complete drainage when necessary.

Emptying of tanks is accomplished by means of lead syphons, shown in Fig. 2, designed to act as an automatic overflow and liquid level control. The syphons empty into a steel sewer line shown in Fig. 3, lined with ⅜-inch triflex rubber. This sewer, which is fume and liquid tight, is a flanged trough with rounded bottom and bolted-on cover. It



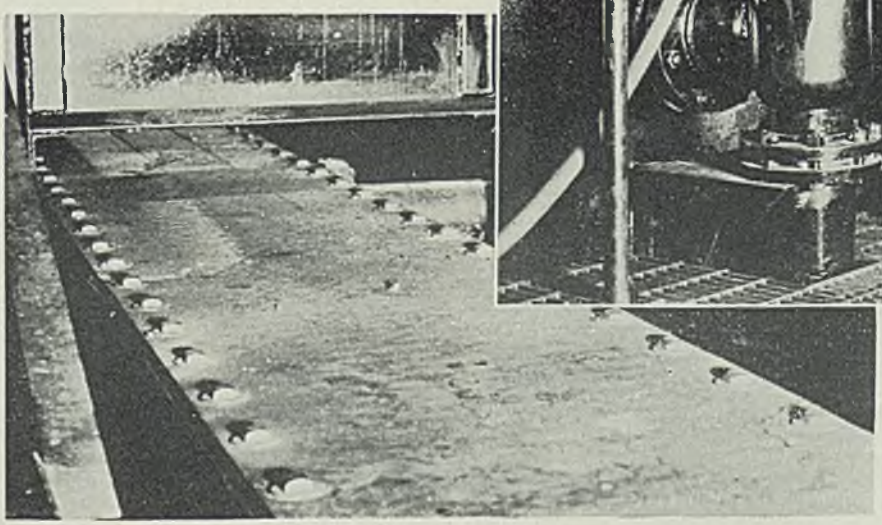


FIG. 2 (above)—Lead syphons on the tanks act as automatic control of overflow and liquid level. Fig. 3 (left)—Rubber-lined steel sewer, into which the syphons empty

FIG. 4 (below)—Condenser tanks in which counter-current washing and cooling of fumes removes all acid

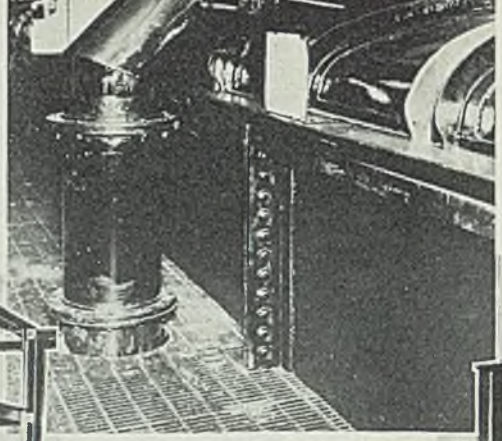


FIG. 6 (below)—Exhausters are direct connected to each condenser tank and to a stack leading out through the roof

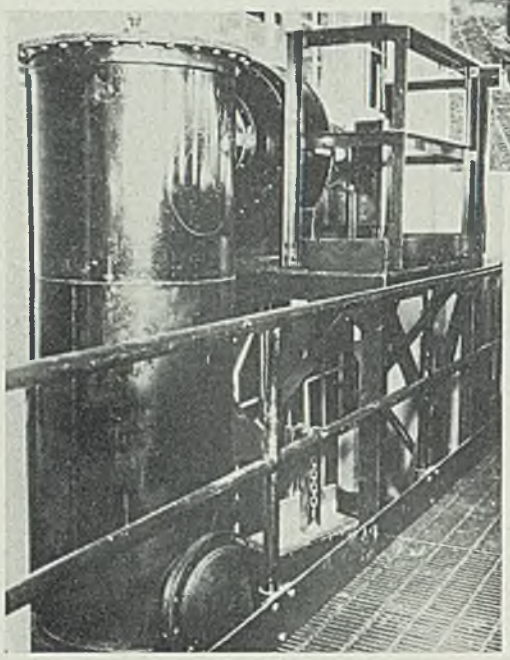
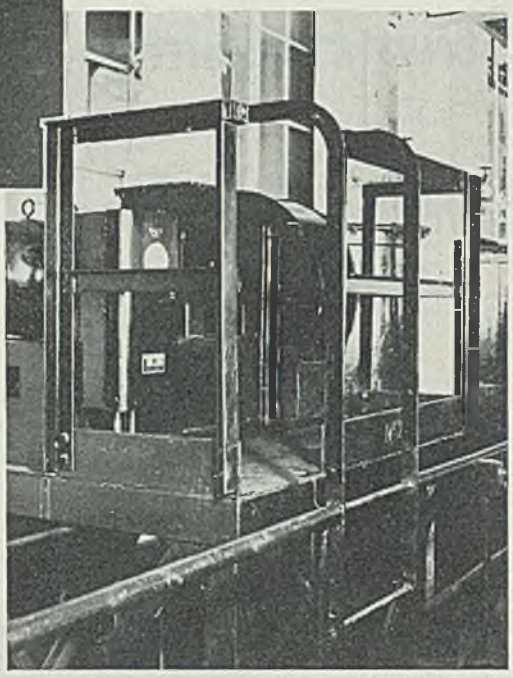


FIG. 5 (above)—A 16-inch duct of flanged steel pipe, rubber lined, carries off acid fumes from the center of each tank to a water spray tank



takes the discharge from acid tanks in both lines, drainage from drip pans between tanks, spray water from condenser tanks and overflow from hot and cold rinse tanks.

The strip is supported between tanks by steel carrier rolls covered with a 1-inch layer rubber. The hold-down rolls in the water tanks are of similar construction (see Fig. 8).

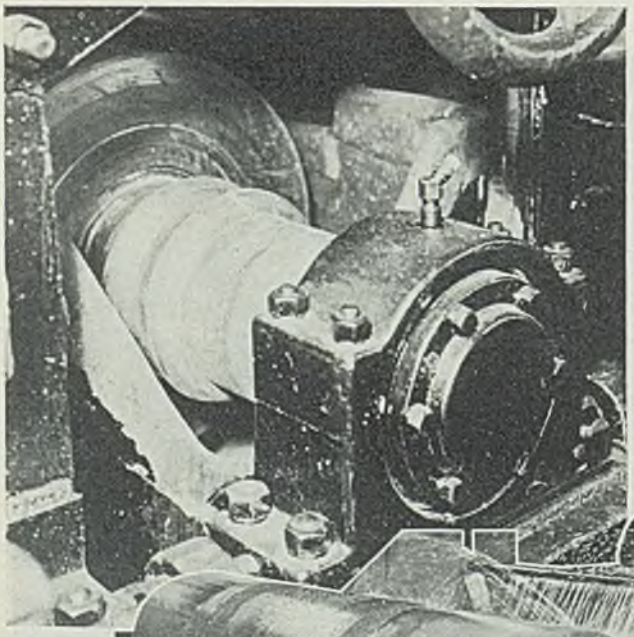
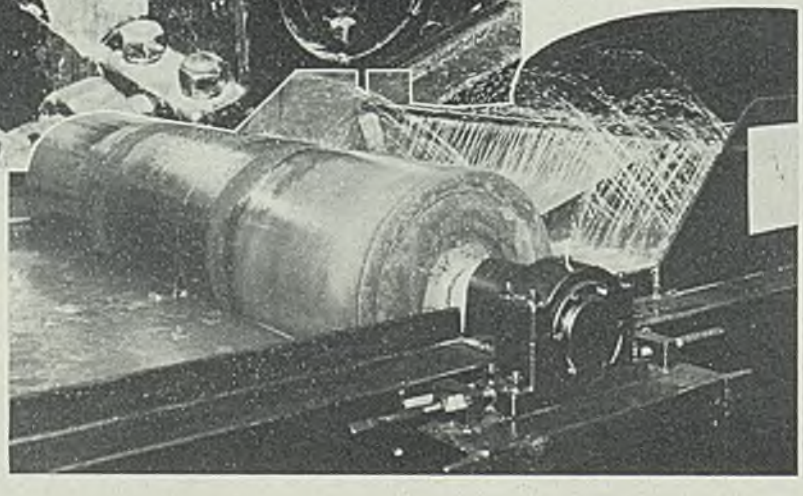


FIG. 7 (left)—Beneath each carrier roll is a rubber-lined steel drip pan which drains into the sewer. Fig. 8 (below) — Hold-down rolls in the water tanks are of steel coated with 1 inch of rubber



Under each carrier roll is a steel drip pan, shown in Fig. 7, lined with ⅜-inch rubber, which drains into the sewer. Connection between drip pan and sewer is made with a special flanged rubber acid hose.

All acid tanks are provided with sectional, flanged steel covers lined with ¼-inch of rubber. From the center section of each tank cover a 16-inch duct, shown in Fig. 5, carries the acid fumes into a water spray tank. These exhaust ducts are made of flanged steel pipe with ¼-inch rubber lining and are provided with adjustable dampers to regulate the volume of air drawn off each tank.

In the condenser tanks, shown in Fig. 4, a counter-current washing and cooling of the fumes is accomplished by water sprays and the air leaves the condenser practically free from acid. Each condenser is equipped with a trap at bottom which drains into the sewer. Condensers, traps and pipe connections to sewer are all rubber-lined.

A size 40 Buffalo Forge Co. mill exhauster, shown in Fig. 6, is connected directly to each condenser tank. Housings of these exhausters are lined with 3/16-inch rubber and the impellers with ⅛-inch hard rubber. To the outlet of each exhauster is connected a vertical stack leading out through the roof of the building housing the equipment.

Furnished in 28 gauge and heavier, widths 24 to 90 inches inclusive; in coils or cut lengths depending upon gauge and size.

Cold Reduced Sheets

SHEETS
TRADE MARK
YOUNGSTOWN
STRIP

In Coils or Cut Lengths

Users of sheets rolled on Youngstown's new continuous cold mill report new high records in their press production, due to the uniformly superior quality of the sheets delivered to them. Three facts explain this result....the most completely modern manufacturing facilities....constant metallurgical control....and painstakingly thorough inspection.

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Manufacturers of Carbon and Alloy Steels
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607

YOUNGSTOWN

Progress in Steelmaking

Resistance Flash Welder Increases Production of Broad Strip Mill

A RESISTANCE flash welder recently developed for a broad strip mill joins the strip into a continuous piece that can be pickled and processed without the interruptions which cause variations in size and finish under existing conditions. It is claimed that the largest sheets normally produced can be welded by this equipment as fast as they can be put through the pickling vats.

According to the procedure used with this equipment, the strip to be pickled is decoiled and passed into a looping pit which holds enough stock to allow about one minute for welding the ends together. As soon as the coil is unreeled, the rear end is squared off in an upcut shear. The front end of another coil is trimmed off in the same way and fed into the resistance welder.

The trimmed ends then are lined up by gages and, at the touch of a control button, are clamped in place while the current goes on and off. When the weld is completed, the strip moves along until the joint is in position in a trimmer. Here the burr is removed from the top and under side by a pull shear before the sheet passes into the looping pit. All this is done before the slack stored in the looping pit is used up.

Stock Is Recoiled

After the strip leaves the pickling line, it goes to the inspection tables. It then is oiled and recoiled into such lengths as desired for subsequent operations. The next operation is cold rolling, during which the stock is reduced to gage and receives additional finishing. At no time does the flash welded joint interfere with these operations. Once the burr is removed the strip passes readily between the rolls and eventually becomes indiscernable. It is claimed that the molecular structure of the steel is not adversely effected and that the weld has the full strength of the material so that there is no danger of breaking in the looping pit or during the finishing operations.

So far, the chief benefits of the machines now in operation have been increased production and elimination of waste during the pickling operations. The fact that it is not necessary to eliminate and discard the connecting sections before passing the sheets through the cold rolls has been responsible for much of the saving.

◆ ◆ ◆

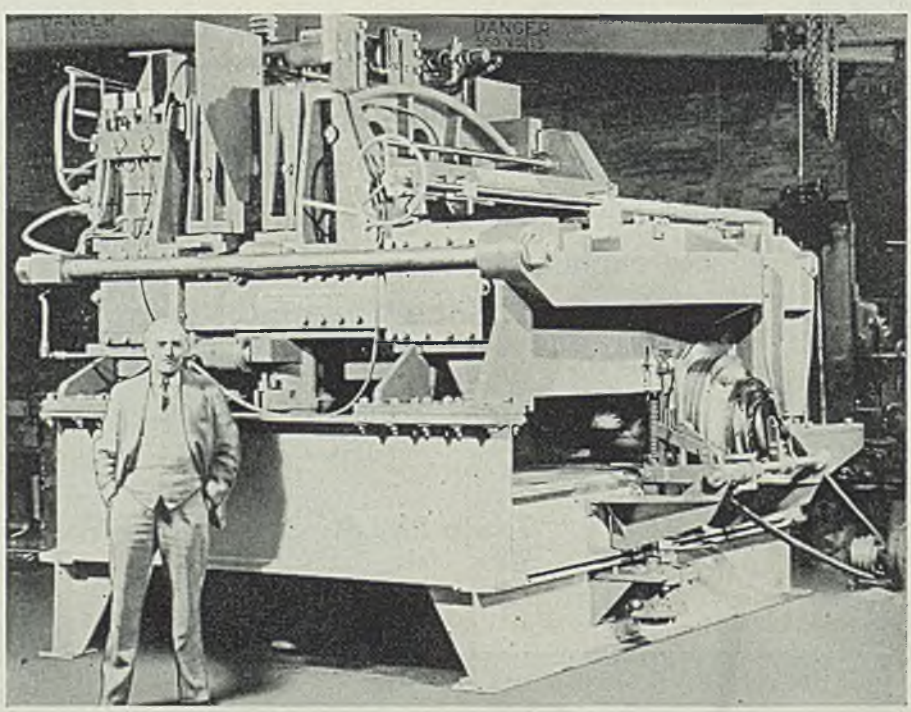
New Paint Will Be Marketed

Synthetic resin, developed abroad, will be manufactured in this country for use as one of the ingredients of a petroleum resisting paint. The coating is for application to oil storage tanks, refinery equipment, oil-immersed electric transformers, interior of tank wagons, railroad tank cars, gasoline drums and various other units which contact petroleum and its derivatives.

◆ ◆ ◆

Detects Presence of Steel

A simple method is employed by an Eastern plant for determining whether nuts, bolts, rivets, screws, etc. used in the fabrication of stainless steel vessels are steel or of a corrosive resisting alloy. No dismantling of equipment or chemical analysis is involved in detecting the presence of steel which would be harmful to the vessels. Plaster of paris made in a thick slurry is applied to a depth of ¼ to ½-inch to the part suspected of being made of steel. If the part being tested is of steel it will stain the plaster of paris yellow; if of brass, nickel, or stainless steel alloy the coating will remain white.

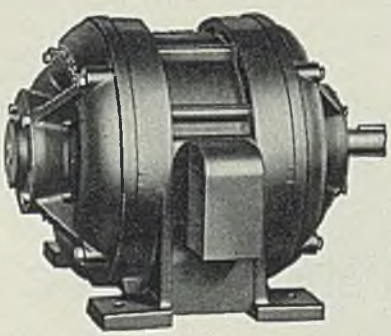


Control side of the resistance welder as it was set up on shop floor prior to shipment to the steel mill

WHEN EVERYTHING IS EQUAL

. . on the Surface!

EVERY DAY we are faced with this problem . . . when are things that look the same . . . *not* the same. «» Here are some motors . . . dimensions and electrical characteristics identical—prices about the same . . . so what? «» *This is what* . . . the cost of a motor can't be answered by quoting price. It can only be computed in terms of maintenance costs, operative efficiency . . . and durability. «» On the surface, motors look much the same, but examine them carefully and compare Allis-Chalmers Motors with any other motors built. You will find that they are the sturdiest motors on the market—*bar none.* Note their cast steel frames and the studied use of steel throughout them. Note their heavy cast iron housings, bearing enclosures and shafts; ample insulation of the best quality, with a big margin for mechanical durability. Then you will understand why they can handle overloads, shocks and strains and do it *day in and day out, year after year.* That mechanical and electrical strength means the reduction of maintenance costs to the minimum and a life beyond that of less sturdily constructed motors. That is why, today, Allis-Chalmers Motors excel and are the most profitable motor buy on the market.



The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 h. p. up—also motors for special application

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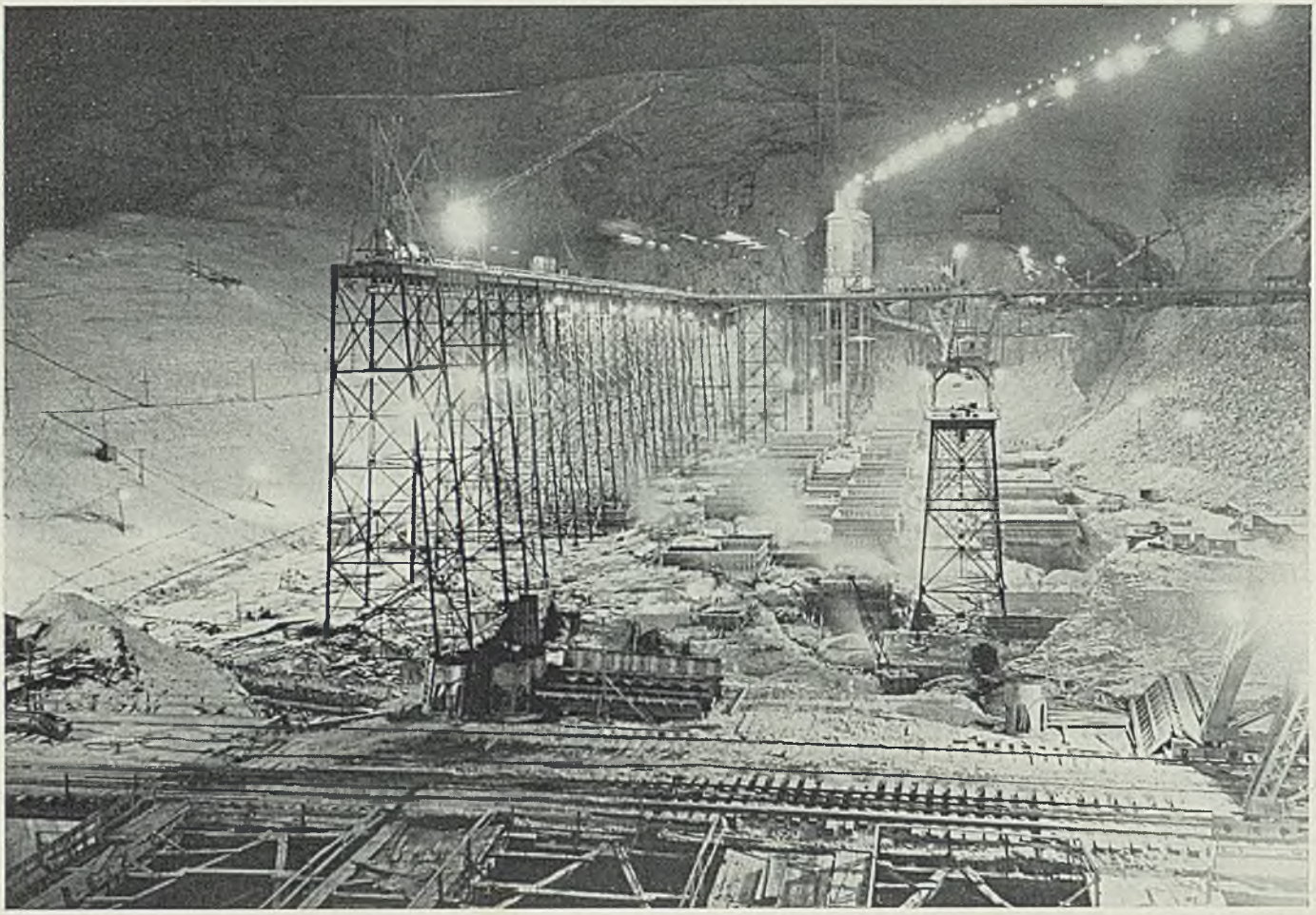


METHOD of pouring the concrete blocks is shown in this striking night illustration. Note how forms are built around some of the columns of the trestle which eventually will be entirely imbedded in concrete

Steel Trestles To Be Imbedded in Concrete at Grand Coulee Dam

TWO steel trestles are being employed at Grand Coulee dam, Grand Coulee, Wash., as a means for placing concrete. As the work progresses, they eventually will span the river, only to disappear—buried in the huge monolith. As the present contract of the Mason, Walsh, Atkinson, Kier Co. calls for 4,500,000 cubic yards of concrete, at some stages poured at the rate of 12,000 cubic yards a day, it was necessary to adopt a plan that would permit handling the concrete literally in train loads of buckets, rather than in individual buckets on a cableway.

The accompanying illustration shows the first section of this pair of trestles, covering only about half of the distance across the west cofferdam area. Pouring of the concrete in blocks is now well advanced in that area. The high trestle is on the up-stream side and the low one nearer the toe of the dam. Trains of cars operate on the decks, carrying four 4-yard buckets of concrete to the car. They are run from the mixing plant to positions over the particular blocks being poured at the time. The buckets are lifted off the cars by cranes and lowered to the forms below. For this purpose there are now in operation two 11-ton gantry type, hammerhead cranes on the upstream trestle and one on the lower. In addition, there is one whirley, full-revolving gantry-type crane on each trestle, each of 11 tons capacity at full boom. Eventually, there will be four of each in operation.

Even from the standpoint of a bridge across the river, and forgetting the unusual purpose for which they are employed, these trestles are notable. The upstream one will have an ultimate length of 3088 feet, exclusive of approaches. The lower one will be 3000 feet long. A total of 9500 tons of steel will be required. Three thousand tons have already been used on the present construction of 933 feet.

The construction is in the form of towers at 200-foot intervals with bents interspersed. The highest bent on the upstream side is 195 feet above

bed rock, and on the downstream side, 120 feet. The structure is designed for the regular wind loads according to the standards of railroad construction, but there is considerably less batter in the design of the bents, it being only ¾-inch to the foot. Also, the unit stresses were increased over railroad standards by 15 to 20 per cent, in view of the short life of the structure.

The tower columns are of 14-inch wide flange sections, while those of the bents are 36-inch. Where the span is no greater than 40 feet, the floor system is carried on six 36-inch wide-flange beams, those under the gantry cranes being of silicon steel. In the case of 60-foot spans, two plate girders are used, along with four of the 36-inch silicon steel beams. All steel was fabricated by the American Bridge Co. and was rolled at the Gary, Ind., plant of the Carnegie-Illinois Steel Corp.

Deck Left Movable

The heights above mentioned are sufficient to enable the contractor to complete work to the contract height, leaving the deck clear. The deck is put on with turn bolts so that it may be re-erected later at a higher elevation if desired by the succeeding contractor. The low trestle, however, will eventually be flooded when diversion takes place through the west side area, and the present contractor will remove this deck and use it in the construction on the other side of the river.

All columns of the structures rest on bed rock. As the concrete placing progresses upward, all parts of the trestle will be buried in the mass. The concrete being poured in blocks, of maximum dimensions 50 by 50 feet, no part of the structure is permitted to cross block lines. This added somewhat to the intricacy of the design, and accounts in part for the column lines more nearly approaching the vertical.

Contractor Supplies Men

It is notable, also, that the contractor employed his own force in erecting the steel work, and they soon formed a competent bridge crew, working at unaccustomed heights and in some stiff wind which swept through the gorge.

Grand Coulee dam is being built for the bureau of reclamation and under the supervision of its engineers. F. A. Banks is construction engineer in charge for the bureau, J. H. Miner is office engineer and A. E. Darland field engineer. For the Mason, Walsh, Atkinson, Kier Co., H. L. Myer is general manager, H. M. Slocum is general superintendent, C. D. Riddle chief engineer and Donald Nelson structural engineer.

Blast Furnace Efficiency 80 Per Cent, Studies Show

Efficiencies of over 80 per cent, based on consumption of coke, are being obtained in modern American blast furnaces, according to certain research studies made by the research laboratories of the United States Steel Corp. at Kearny, N. J., and mentioned by Dr. John Johnston, director of research for the Steel corporation, in an address before members of the Cleveland chapter of the American Society for Metals, May 4.

Speaking on the subject, "Trends in Metallurgical Research," Dr. Johnston cited that the above studies may change appreciably the conception of the blast furnace as an inefficient iron ore reduction method, and may alter the picture considerably as far as some of the projected direct-reduction or low-temperature reduction methods are concerned.

Dr. Johnston foresaw increasing opportunities for research men and metallurgists in the future and indicated that present researchers are coming into better accord on subjects over which much contention has existed.

Steel Improves Appearance Of Home Heating Units

Conversion of residence basements into beauty spots is opening new avenues of business for manufacturers of air conditioning equipment and for sheet metal men, Tom Byrd, development department, American Rolling Mill Co., Middletown, O., told a group recently at Michigan State college, Lansing, Mich.

Current practice of furnishing recreation rooms in basements is causing home owners to demand attractive heating and ventilating equipment, he said.

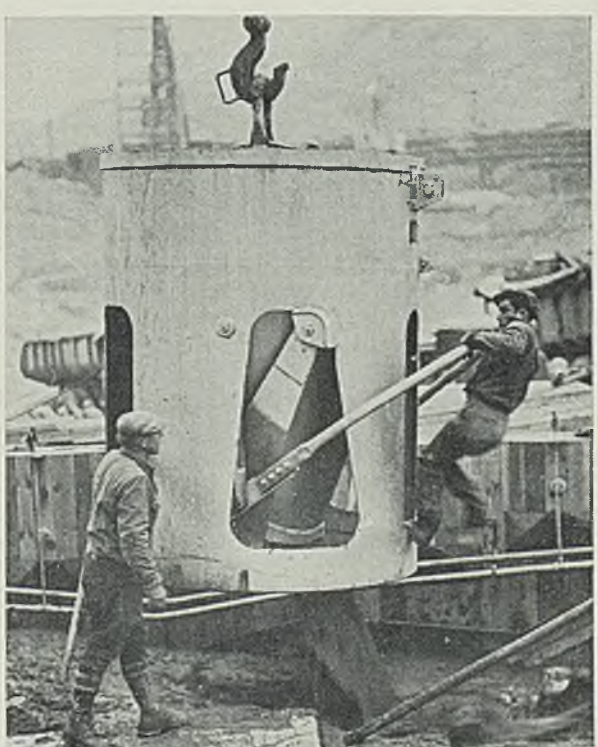
Mr. Byrd cited the new applications of smooth, shiny cold rolled steel sheets for furnace casings, and the growing use of polished stainless steel for trimming exterior portions. The result, he said, is a furnace that is greatly improved in appearance and suitable in any type of residence.

He also commented favorably upon the use of stainless steel in furnace construction, where scaling and severe corrosion at exceptionally high degrees of heat are encountered. Stainless withstands temperatures 600 to 800 degrees higher than those permitted with mild steel, he emphasized.

Develops New Cutting Oil

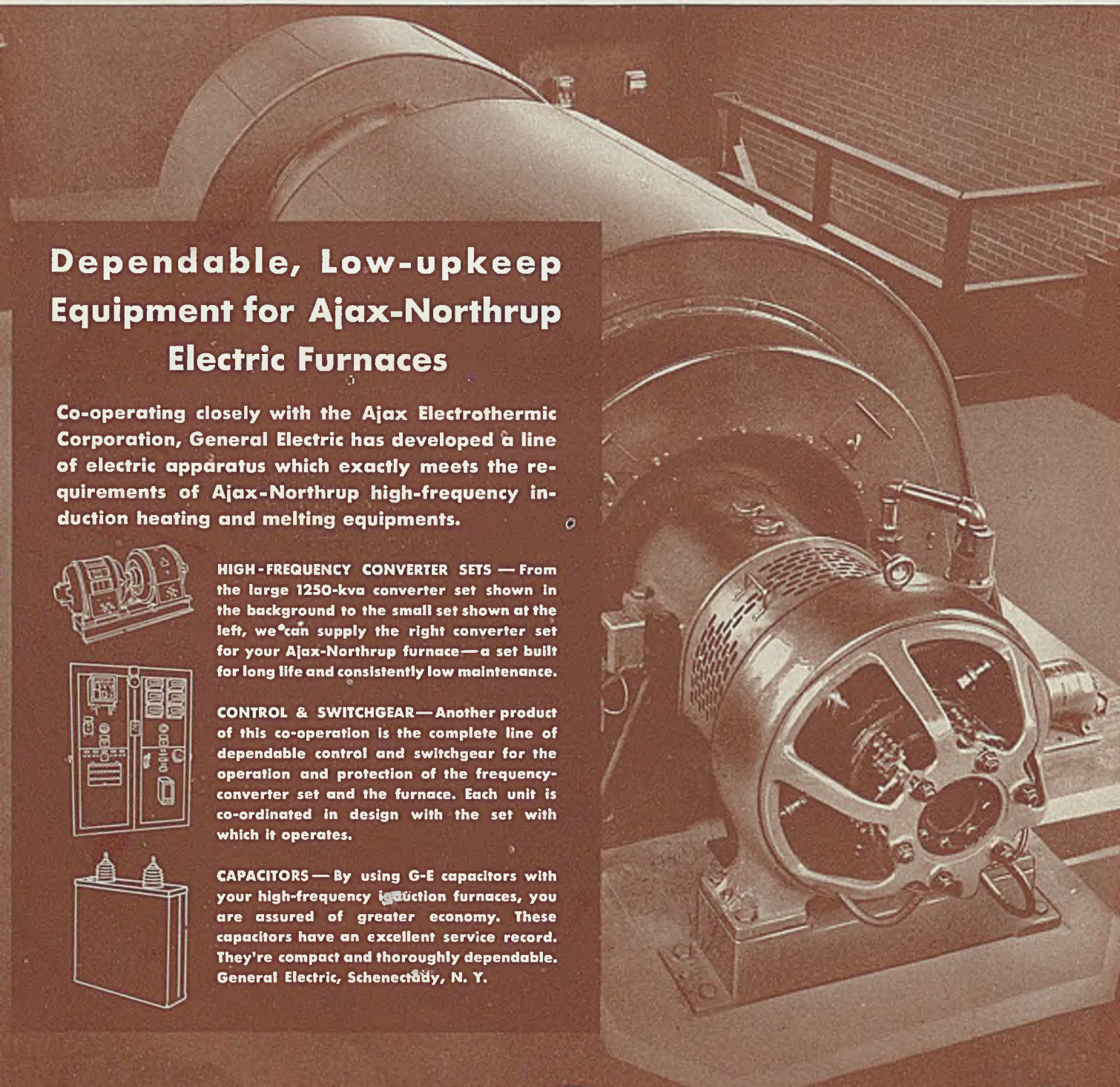
Socony-Vacuum Oil Co. Inc., 26 Broadway, New York, has developed a true soluble cutting oil containing active sulphur. Superiority is claimed for this new product in the machining of a wide range of ferrous and nonferrous metals. Known as S/V Solvac Oil S, the new product is described in pending patent applications.

It is said to have high cooling ability, thus making it especially applicable with high cutting speeds. It also has greater pressure-resisting characteristics, making its use desirable for use in cutting the new alloys which are featured by unusual strength, toughness and hardness.



DUMPING a 4-cubic yard bucket of concrete as it is held in position by one of the large cranes on the trestle

THE HIGH-FREQUENCY ELECTRIC EQUIPMENT USED WITH AJAX-NORTHRUP PLAYS AN IMPORTANT PART IN DEVELOPING NEW AND IMPROVED PRODUCTS



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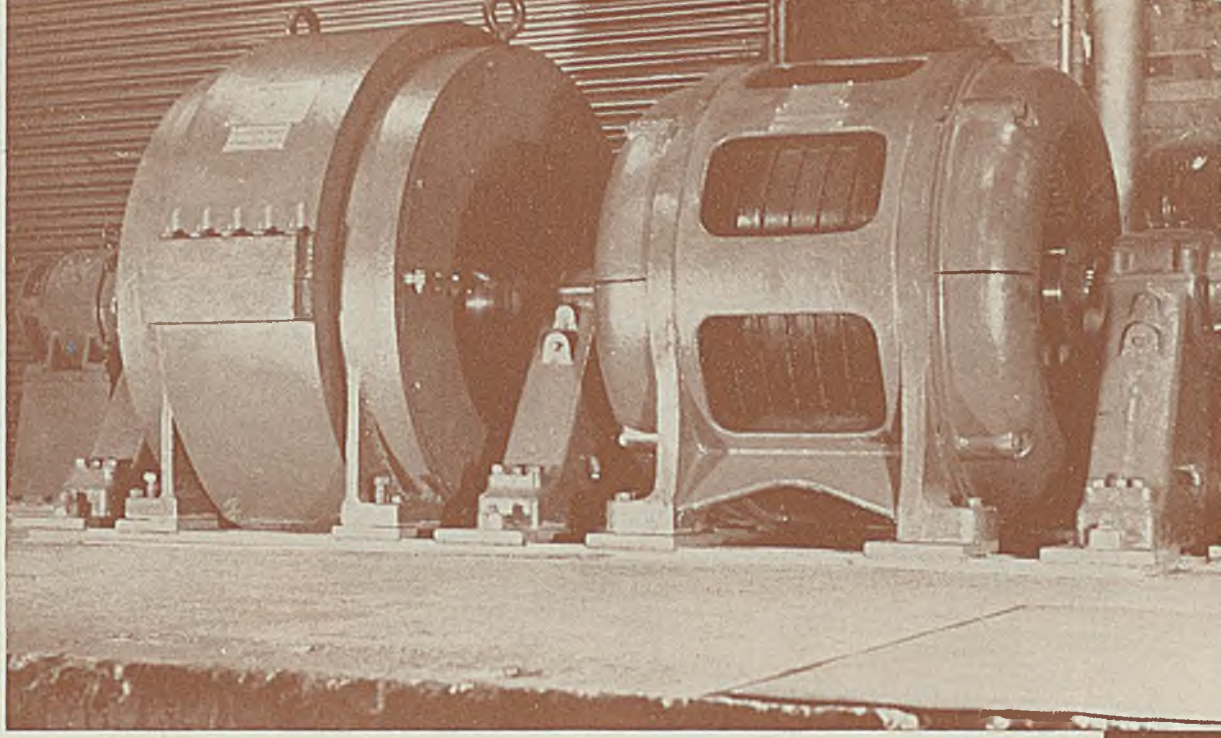

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Westinghouse

REPRESENTATIVES of six chapters of the American Society for Metals assembled on steps of the Mineral Industries building at Pennsylvania State college during the recent meeting at State College, Pa.

Metallurgists Report on Current Research Studies at Regional Meeting

A PROGRAM of six high-grade technical papers dealing with austenitic grain size in steel, austenitic stainless alloys, invisible rays in modern engineering, grinding cracks in hardened tool steels, and welding, proved stimulating to more than 150 members of the Lehigh Valley, Southern Tier, Philadelphia, Pittsburgh, York and Penn State chapters of the American Society for Metals attending the second biennial interchapter meeting at Pennsylvania State college, State College, Pa., May 1-2.

The school of mineral industries of the college co-operated in the program, which consisted of a technical session Friday afternoon, an informal dinner and entertainment in the evening, and a second technical session on Saturday morning. The initial technical session was opened with welcomes from Prof. D. F. McFarland, head, department of metallurgy, and Dean Edward Steidle, school of mineral industries. R. S. Archer, metallurgist, Republic Steel Corp., Chicago, and national president, American Society for Metals, presided.

Presenting the first paper on "Austenitic Grain Size; Estimation and Significance," Edgar C. Bain, assistant to vice president, United States Steel Corp., New York, and national vice president, American Society for Metals, stated that certain properties and behaviors of heat treated steel are not predictable from ordinary chemical analysis. It has been fcund that these subtle differences among similar steels relate to the transformation characteristics, largely controlled by the austenitic grain size established in heating prior to quenching or cooling.

Fine grains of austenite, upon transforming, yield tougher heat treated structures than do the coarser grains; the tendency to crack is less, and the critical quenching speed for hardening is higher for the same composition having the finer austenite grains.

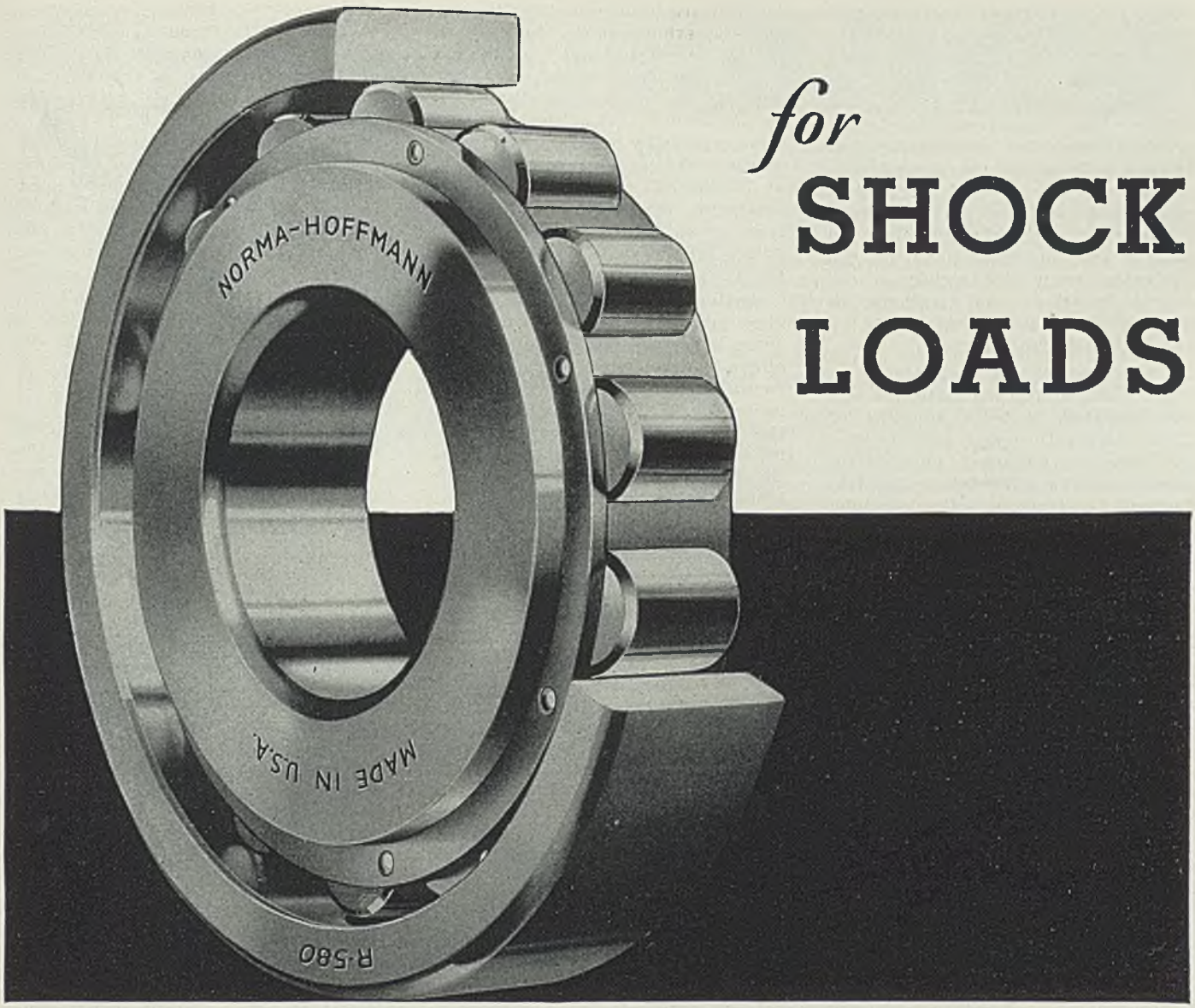
As austenite forms from ferrite and carbide upon heating, it assumes the customary form of all solid metals, that of polyhedral grains. So long as carbide particles remain they do not grow large, and they are kept small also by certain refractory nonmetallic dispersions, said Mr. Bain. At higher temperature, such grains coarsen with attendant changes in properties of resultant transformation products.

Grain size is not determined directly in the austenite at the elevated temperature at which it exists, but instead upon the structure resulting from its decomposition. This is made possible by the fact that the grain boundaries constitute the loci of first action; pro-eutectoid ferrite, pro-euctectoid carbide, or the first formation of fine pearlite begins in the grain boundaries.

Accordingly, continued Mr. Bain, a polished and etched specimen will reveal the grains by virtue of the contrast in appearance between network and grain bodies. Furthermore, suitably etched martensite faithfully reveals the size of the parent austenite grains from which it formed by a difference in darkening of the several orientations.

The speaker defined the units for reporting grain size and set forth the details of technique for grain size determination in various steels with a classification of their effects and significance. The relation between the texture of the fracture of hardened steel and prior austenite grain size was given in a chart.

VARIANTS influencing the austenitic grain size as determined by standard methods was the subject of a paper presented by R. Schempp and C. L. Shapiro, metallurgist and assistant metallurgist, respectively, Halcomb Steel Co., Syracuse, N. Y. Data presented in this paper pointed out and defined some of the variants which may influence the austenitic grain size rating on steels as eval-



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uated by the more common and generally known methods for the determination of the austenite grain size in ferrous materials.

Results of the authors' studies, which were carried out chiefly on straight carbon tool steels, show that factors such as prior structural conditions and hot or cold mechanical deformation will materially influence grain growth, thereby affecting the results and interpretations of the austenite grain size rating as obtained by the usual methods of grain size testing and especially by the McQuaid-Ehn test.

Grain growth as encountered in the heating of ferrous materials was demonstrated to be a function of time, temperature and particle size. Mr. Schempp employed photomicrographs to show a few interesting features of the transformation of alpha to gamma iron in high-carbon tool steels.

Discussing the papers of Mr. Bain and Mr. Schempp, C. H. Herty Jr., research department, Bethlehem Steel Co., Bethlehem, Pa., emphasized the point that grain size should be considered as that grain size desired or required in the steel when it is used and not some grain size specified by an arbitrary test. Hardenability of a steel, he said, is dependent upon the grain surface of the steel.

Dr. R. F. Mehl, head, department of metallurgy, Carnegie Institute of Technology, Pittsburgh, stated that exact reasons for certain metallurgical phenomena are not known. One of the problems for which the answer is not known is why grains grow under certain conditions.

Referring to the paper by Mr. Schempp, Dr. C. R. Austin, associate professor of metallurgy, Pennsylvania State college, commented that metallurgists should go slow in accepting tests at room temperature and etching at elevated temperatures to explain austenitic grain size. He further urged a clarification of nomenclature and suggested the use of the term "mixed" grain size for "complex" grain size.

METALLURGISTS should know whether the properties of the material to be used will meet the specifications without difficulty, said Dr. V. N. Krivobok, professor of metallurgy, Carnegie institute of Technology, Pittsburgh, and associate director of research, Allegheny Steel Co., Brackenridge, Pa., in presenting a paper, "Austenitic Stainless Alloys; Their Properties and Characteristics." R. A. Lincoln, member of research laboratories, Allegheny Steel Co., collaborated in the preparation of this paper.

Properties of the material can be varied greatly by altering the concentration of the alloying elements, asserted the speaker. In alloys of the 18-8 chrome-nickel type, the constituents, at equilibrium, have been determined, but not by their relative amounts. The literature contains practically nothing on this type of work and no data on the relation of mechanical properties upon concentration can be found. It has been shown that nickel acts as a stabilizer for the austenitic character of the alloys.

Austenitic alloys which are fairly easy to decompose will have properties differing from those austenitic alloys in equilibrium, because of the formation of different phase, continued Dr. Krivobok. In this regard, the manner of decomposition is of no consequence. By adusting the ratio of alloying elements, certain combination of physical properties could be obtained which could not be found in the alloy of another composition. The physical properties of these types of alloys bear no definite relation to their surface hardness.

Tests Are Correlated

In the experimental procedure, the author pointed out, all the specimens were made in the same manner to insure complete uniformity, the only difference being in the alloy content and in the amount of carbon present. After a series of working and annealing operations, the specimens were obtained in the soft condition. In this condition, the variable in determining the characteristics of the alloy is eliminated, and it is possible to duplicate this condition so as to get the same properties. Each of the various types of specimens were tested and the results obtained were correlated as to the effect of the concentration of the various alloying elements on the physical properties of the material.

W. H. Eisenman, national secretary, American Society for Metals, Cleveland, presided at the dinner meeting attended by 200. Speakers on this occasion were President Archer; Dean Steidle; and Adrian O. Morse, executive secretary and assistant to the president in charge of resident instruction, Pennsylvania State college. Present and past national officers and officers of local chapters of the American Society for Metals were introduced.

ALMOST interesting paper on "Invisible Rays in Modern Engineering" by Dr. Gilbert E. Doan, associate professor of metallurgy, Lehigh university, Bethlehem, Pa., opened the second technical session on Saturday morning. Jerome Strauss, vice president in charge of research and development, Vanadium Corp. of America, Bridgeville, Pa., and vice chairman of the Pittsburgh chapter of the society, presided as chairman of this meeting.

After a brief survey of the known electromagnetic rays of the spectrum and of their probable nature, Dr. Doan mentioned new uses of a dozen or so of these rays in modern engineering and with the use of slides illustrated some of the more spectacular applications. Use of gamma rays and X-rays in the inspection and study of metals was dwelt upon at some length. Thie chief purpose of this paper was to assemble and correlate information which often is scattered and abstract in the lay mind.

Uses of Rays Widespread

At the outset, the speaker pointed out that visible rays making up the visible spectrum constitute only one relatively small section of the electromagnetic spectrum. Cosmic rays and gamma rays are the babies of the wave family and are at the extreme end of the range—the long electric waves are at the opposite end. All rays travel at the same speed, namely, the speed of light.

Beginning with the waves of longest length or lowest frequency, and moving toward those of shortest length or highest frequency, Dr. Doan named the various types of waves and stated their principal uses as known today.

Long electric rays are used for induction melting of metals and prospecting for ores. Hertzian or radio waves are utilized in the guidance of airplanes and in creating artificial fever for treatment of disease. Infra red rays are made use of in the infra red sextant for directing the course of ships; in long distance photography; and photography in darkness.

Visible rays making up the visible spectrum are used in connection with photoelectric cells for which hundreds of applications have been found in controlling the opening of doors, operating conveyors, heating of metals and the like. Ultraviolet rays have been applied to microscopy, to detecting of forgeries, and to biology.

X-rays are used in the modification of plant life, treatment of disease, and testing for the soundness of objects. Gamma rays are a type of X-rays, but are more penetrating, are more portable, are less scattering and cause less fogging than X-rays. X-rays are used extensively in determining the crystal structure of metals, and Dr. Doan explained briefly the mechanics of the method.

A TIMELY paper on "Grinding Stresses and Grinding Cracks in Hardened and Ground Oil-Hardening Tool Steels and some Observations on the Nature of Ground Surfaces," was presented by J. G. Morrison,

(*Please turn to Page* 79)

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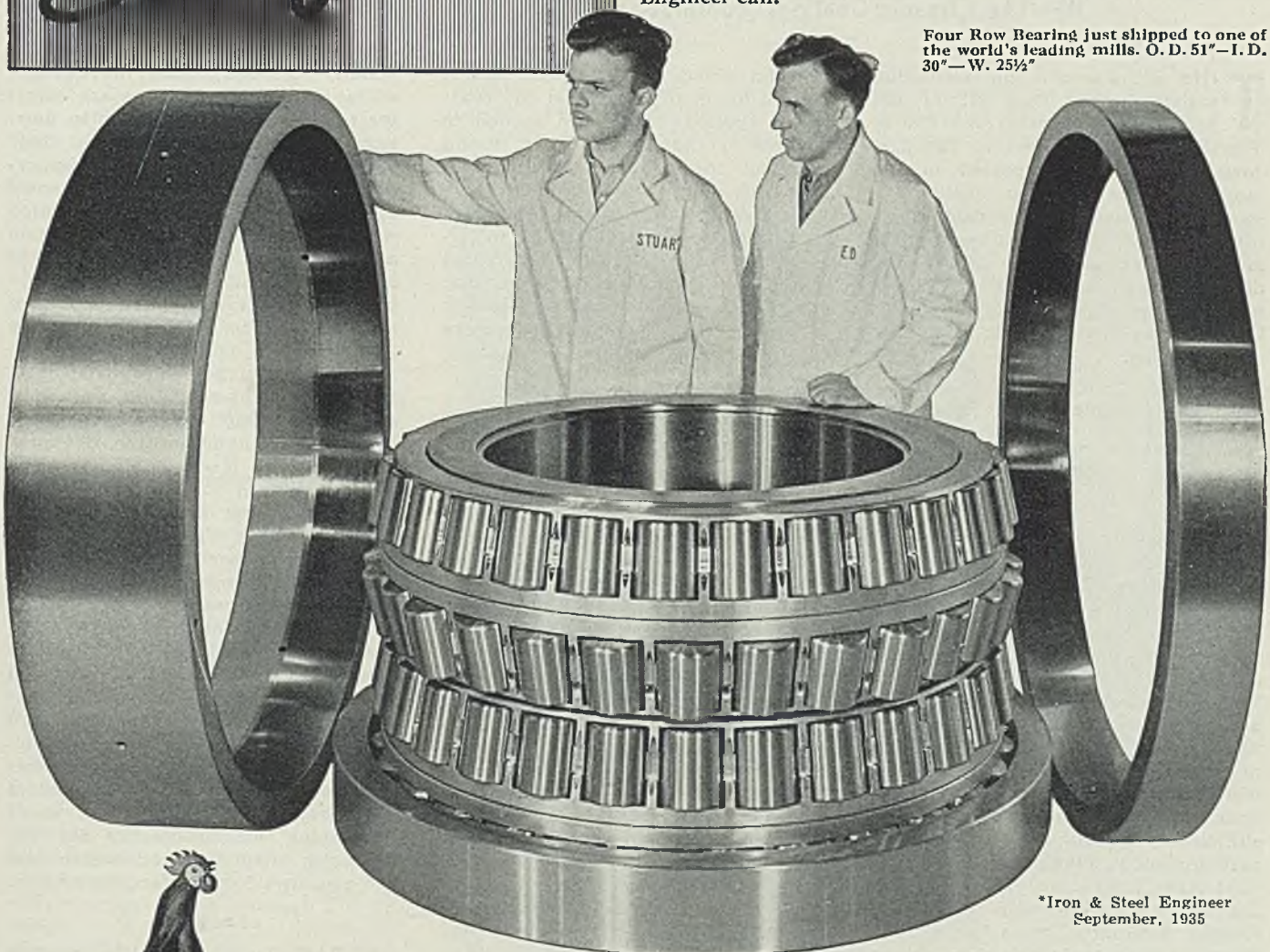

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Surface Treatment and Finishing

Selection, Application and Use of Finishes for Metals

III—The Organic Coatings (continued)

THIS is the second and concluding installment of Part III of the *Selection, Application and Use of Finishes for Metals series.* The first installment, which appeared in the April 27 issue of STEEL, included a general discussion of the field of application of organic finishes and a more detailed discussion of the use of paint and varnish. This installment covers the use of enamels, lacquers, lacquer enamels and novelty coatings.

Enamels

THE advantages of synthetic resins become much more apparent when enamels (pigmented varnishes) are considered, as they are widely used to finish machine parts, parts which are handled or other parts which must be protected and at the same time be provided with hard finishes to resist abrasion, alcohol, perspiration, gasoline, and other conditions in the field.

Synthetic resin white enamels are now available which can be baked at 250 degrees Fahr. for two hours to produce porcelain-like white finishes which are not only hard and wear resistant but at the same time are sufficiently resistant to grease and perspiration to make their use practical on refrigerators. The degree of hardness obtainable with these light colored synthetic enamels in conjunction with their color and gloss retention properties are examples of the advantages obtainable with synthetic resins. In general, the alkyd type resins are employed where color retention is of importance while the phenolic types are used where moisture resistance is of primary concern.

In the finishing of automobiles, the low baking synthetic enamels are being used to advantage by some manufacturers. In this case, the thermal plasticity of certain resins is used to advantage. After the coating is applied, baked and sanded to remove specks, it has been found possible to remove the sanding scratches by rebaking for a short period during which the secondary flow of the coating not only obliterates the sanding marks but also leaves such a glossy surface that the final polishing operation, usually necessary when lacquer finishes are employed is not required.

Synthetics Improve Enamels

In general, the synthetic enamels have better adherence than the enamels using natural resins and can therefore be used over smoother surfaces with safety. The necessity for roughing treatments such as sand or grit blasting, sand papering and scratch brushing is considerably lessened when synthetic enamels are used. On the other hand the enamels containing synthetic resins are much more susceptible to the presence of oil or greasy contaminants on the surface to be finished than enamels in which natural resins are used. The natural resin enamels are miscible with small amounts of machine oil or slushing grease and their adherence is only slightly affected thereby while the synthetic enamels now available lose adherence and show oil spots to an objectionable extent with only a faint trace of contaminating oily residue on the surface being finished.

The synthetic enamels are competitive in drying time with nitrocellulose lacquers for finishing factory produced articles. While the lacquers dry in minutes, an hour or so of drying is usually required before safe handling. The synthetics can be force dried at relatively low temperatures (150 to 225 degrees Fahr.) for 15 minutes or more and the finished parts can be handled immediately after cooling. It should be noted that these temperatures are low enough to permit inexpensive oven construction such as uninsulated sheet metal walls with unit type heaters.

In addition to drying, the matter of thickness of coat and flowing properties are worthy of consideration. The synthetic enamels can be applied heavier and fewer coats are usually necessary than in the case of lacquers. The lacquers are inferior to the synthetic enamels in flowing out properties and in their ability to mask base metal imperfections. One defect of currently available synthetic enamels which will probably decrease in magnitude as their development proceeds, is that they tend to wrinkle if too heavy coats are applied and are more subject to "orange peel" than lacquers.

An interesting comparison of a lacquer finishing system versus a synthetic enamel system was made by a large manufacturer of high-grade sheet steel cabinets. The lacquer system in use consisted of one coat of iron oxide primer baked at 300 degrees Fahr. for one hour followed by two coats of lacquer. This system was compared with two coats of synthetic enamel baked under various conditions. The durability tests which consisted of periodic determination of physical properties with age as well as corrosion test showed that the two coat synthetic system was appreciably better. The cost analysis showed that the synthetic system was cheaper even though a vapor degreasing was necessary for the synthetic enamel system which was not required for the lacquer system.

Lacquers

CLEAR lacquer, which consists usually of nitrocellulose, resins, plasticizers and thinners, finds its largest use these days in the protection from tarnish of metals and metallic coatings subject to indoor exposure. The lacquers differ in drying characteristics from the organic finishing materials already discussed in that there is virtually no oxidation or polymerization involved. The drying or hardening is essentially by evaporation and since rapidly evapo-

rating solvents are usually used, the drying of lacquers is a matter of minutes as compared with hours or days for varnishes, enamels and paints.

In a lacquer, the nitrocellulose solution corresponds to the drying oil in a paint in that it is a film forming material which is suitable for pigmentation. The films formed with nitrocellulose alone are very strong but have little adherence when applied to metals and it is usually customary therefore to mix resins with the nitrocellulose to improve adherence. In addition the shrinkage rate of straight nitrocellulose is high which would cause cracking or peeling soon after drying, so compatible soft materials (plasticizers) are added to increase the flexibility of the film and combat the cracking tendency. The development of synthetic resins has provided the plasticizing resins which combine both long time plasticization and promotion of adherence.

The development of synthetic resins has made possible a wider range of properties in lacquer films than was feasible with the natural resins. In the early days of lacquer, it was necessary to use several times as much nitrocellulose as resin but some of the synthetic resins are so much more compatible with the nitrated cotton that the proportions can now be reversed to gain the advantages of lower flammability of dried films, greater thickness per coat, better color stability, improved moisture resistance, and more flexible and better adhering lacquers.

Solvents Carefully Selected

The mixture of materials which constitutes a lacquer requires a mixture of solvents for proper solution. The individual lacquer constituents often require different solvents and these must be carefully selected with respect to their evaporation rates in order that all the constituents remain in proper solution as the film dries.

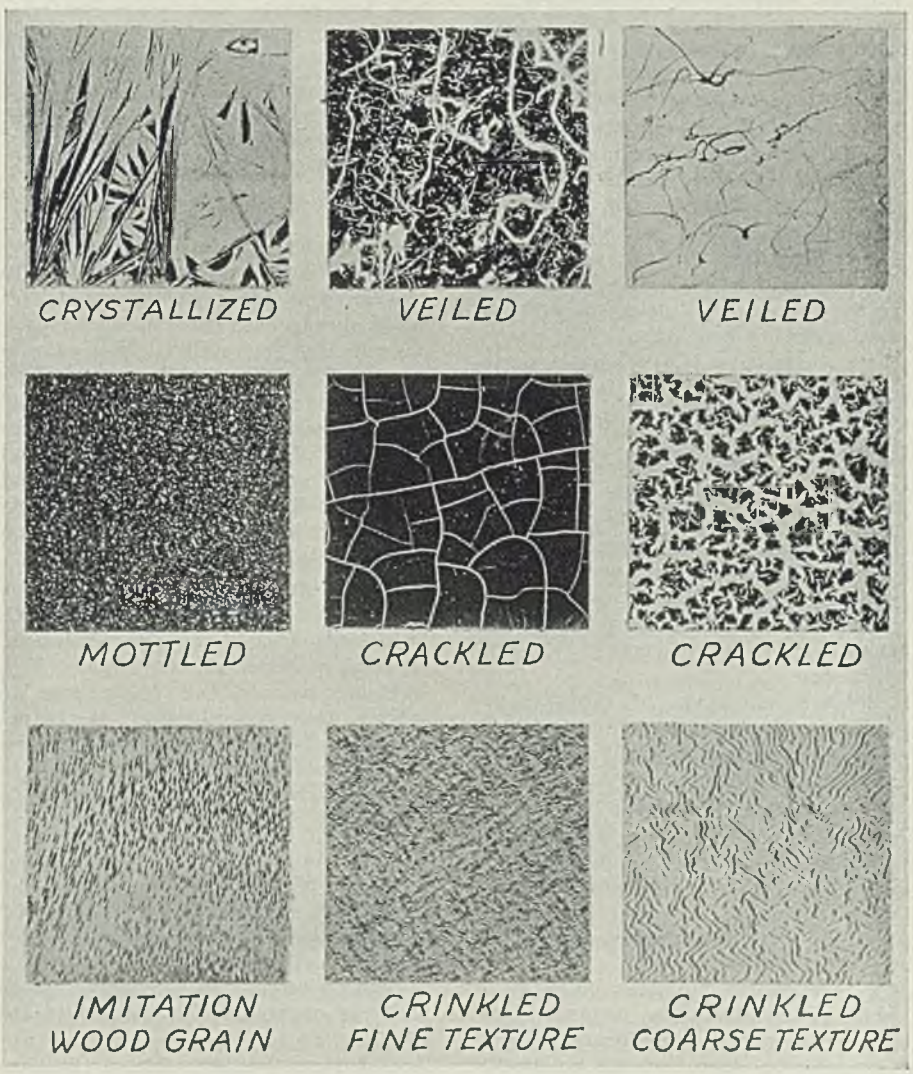
In addition to the solvents, it is customary to employ diluents which are miscible with the various solutions but which function not as solvents but as low-cost liquids to control consistency. If the evaporation rate of a lacquer thinner is too fast, the part being finished will be cooled to a temperature below the dew point at times and small amounts of water may be condensed on the lacquered surface. If this occurs before the film is dry (as will happen when the relative humidity is high) the nitrocellulose will be thrown out of solution and we have the milky haze commonly known as "blushing." Blushing can be eliminated by the addition of higher boiling solvents to slow down the rate of evaporation. This may be done either in the original formation of the lacquer, or by the use of modified thinners in periods of high humidity, the modified thinners being somewhat richer in higher boiling solvents.

Lacquer Enamels

PIGMENTED lacquers are widely used for finishing automobiles and various household articles but have never been popular for structural use. Until the advent of synthetic enamels, the lacquer enamels were the first organic finishing materials to have good color retention in light shades. In fact the current popularity of light and bright colors in finishes was made possible by the lacquer enamels.

From an application standpoint, the outstanding property of lacquers is their rapid drying time. This varies from less than a minute to 10 or 15 minutes depending on the thinners used. The rapid drying results in relatively dustfree films and appreciable savings in sanding and polishing where a perfect surface is desired. Furthermore, lacquer films are easily removed and repaired as the drying is principally by evaporation and the dry film is readily soluble again in the proper solvents. Due to their rapid setting characteristics, the lacquer enamels do not have good filling properties. When a perfect surface is wanted, as on automobiles or refrigerators, it is customary to use surfacers, which are sanded smooth before applying the final color coats. Lacquer surfacers are highly pigmented lacquers which are crumbly or brittle so they can be sanded with a minimum of effort. While the surface perfection required often makes the use of surfacers necessary, their use should be minimized or completely avoided if possible since a brittle interemediate coat detracts considerably from the durability of a finish. Many finish failures can be traced to the generous employment of a brittle surfacer sandwiched between an adequately flexible primer and topcoat.

The development of practical lacquer enamels was an important factor in making the mass production of inexpensive automobiles possible. In the days before lacquer, the elapsed



Novelty finishes provide various surface textures as well as color combinations which are useful for many purposes

time interval in the finishing of an automobile body was measured in weeks as compared with hours by present methods. At current production rates, the additional expense involved in the tremendous floor space and in the huge inventories necessary in connection with the enameling of bodies would not only hamper manufacturing considerably but would at the same time appreciably increase the cost of the product.

The original lacquer enamels were either brittle or became brittle after a relatively short life. This defect has been overcome to such an extent that lacquers are now available for finishing prefinished stock which can be formed or embossed after finishing without showing film breaks or noticeable loss in adhesion. Due to their hardness of film and high film strength, lacquers can be buffed and are therefore widely used for nameplates and decorative faceplates.

Miscellaneous Finishes

THE most widely known resin solutions probably are shellac and asphalt. The primary use of shellac is for finishing wood but it finds appreciable use on metals for coating transformer laminations where its insulating properties are of value.

The asphalt and bituminous paints are usually simple solutions of these materials in solvents although asphalts are widely used in bright black high baking japans in which case they function as resins. The asphalt solutions are useful as corrosion protective primers and as acid-resisting coatings.

The asphalt and bituminous materials are also applied hot in many cases to protect underground structures from corrosion. In such cases coatings as thick as ½-inch are used at times with embedded fabrics to restrain the coating from flowing due to heat or earth pressure. The electrical insulating properties of the asphalts and bitumens as well as their impermeability to water, make them particularly useful for such purposes.

Water emulsions of asphalts are available for use as protective coatings and are particularly suited for application to wet structures and concrete. These emulsions are interesting in that they will not re-emulsify after drying, when again brought into contact with water.

Novelty Coatings

IN ADDITION to the wide color range available in organic coatings, the novelty finishes provide a variety of surface textures which are not only pleasant to the eye but also useful in other ways. Several typical examples of the effects which may be obtained are shown in the accompanying illustration. The novelty finishes fall naturally into two classes, those produced by special application methods and those in which novelty is dependent on formulation.

The first class of novelty finishes includes spotted or shaded finishes, veiled finishes, mottled finishes, flock finishes and imitation reproductions of wood grain, marble, and the like.

By the use of an artist's air brush, it is possible to shade finishes with contrasting or harmonizing colors. It is possible by this means to produce an excellent simulation of verdigree bronze, old brass and other metals, using lacquers or enamels.

Veiled finishes are produced by spraying a stringy material over a suitable base coat. The patterns are usually random and are therefore useful in masking base metal imperfections.

Mottled finishes (color mottles) are also produced by manipulation of spraying conditions. In this case, a pressure feed spray gun is used and the feed pressure is adjusted to supply the nozzle with more material than it can atomize. The mottling material is therefore expelled from the gun in small drops, the size of which can be easily and closely controlled by adjustment of the feed and atomizing pressures.

Base Metal Defects Masked

Flock finishes are produced by spraying cotton or rayon flock onto the tacky surface of a previously applied slow setting and sticky enamel. (Synthetic enamels are usually used). The result is a suede surface of a good order of durability and quite suitable for such items as lamp bases in place of felt. In addition to flock, such materials as ground cork, sand or minute glass beads have been used with novel and pleasing results.

Wood grain or marble patterns can be produced by working from printing plates of the desired design. Typical systems usually consist of a suitable primer and color coat to which the reproduction is transferred by means of a gelatin roller. Clear coats are then applied to protect the pattern as well as to give the finish the desired depth of appearance.

In the second class of novelty finishes are the wrinkle finishes, the crystal finishes and the crackle finishes.

The wrinkle finishes are baked finishes obtainable in all colors including white, whose surface wrinkles during baking. These finishes present a pleasing appearance and at the same time are of sufficiently rough texture to mask minor base metal defects. They are particularly suitable for finishing castings where all except the most superficial of grinding can be eliminated and still permit the production of a good-looking finished article. Various degrees of wrinkle and gloss can be obtained.

There are several types of crystallizing finishes available. One type is a baking finish which crystallizes if baked in a fouled atmosphere such as can be obtained in a gas fired oven. Such materials can be obtained in a wide range of dark colors. The second type of crystallizing finsh is lacquer, usually clear, whose crystal formation is the result of precipitation during drying of the crystallizing element. Quite a range of crystal structures can be obtained in this type of material. The air drying crystallizing finishes are not as durable as the baked wrinkled or crystallized finishes.

The crackle finishes are used to simulate leather. Such finishes pull themselves apart during drying so as to show the undercoat through the cracks. By suitable color combinations pleasant effects can be obtained. Clear topcoats are usually employed to improve the durability of such coatings.

Summary

It can be seen from the above that the organic finishes provide a wide range of appearance, application conditions, physical properties and corrosion resistance. They are much more independent of base materials than the metallic coatings and much larger in number. It should be kept in mind that the organic finishing art is a very active one which changes so rapidly that frequent surveys should be made to take full advantage of current developments.

Part IV of this series, which will deal with the surface conversion finishes, will start in an early issue of STEEL.

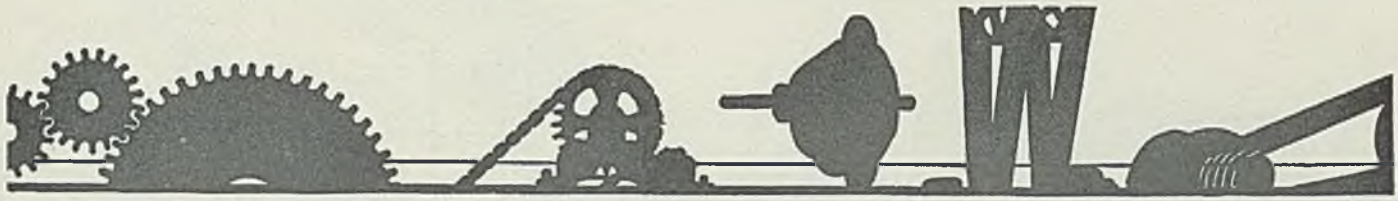
PLATE BEARING SURFACES

Wear resistance of bearing surfaces of shafts, spindles and crankshafts can be increased by the use of chromium plate. The usual procedure is to grind the surface undersize, plate oversize and grind to size. Such bearings would have withstood the recent flood without losing their mirror surfaces or becoming rusty and rough.

CHROME PLATING CASTINGS

Manufacturers who plate chromium on iron castings will find that many of their plating difficulties will disappear if they instruct the foundry to add nickel or some other material to the iron to close up the grain.

Power Drives



Silencing Drives

ON A SPECIAL machine an open gear reduction with an idler gear between to give the proper center distances and same direction of rotation became extremely noisy as the teeth wore. Grease lubrication did not silence this loose metal-to-metal contact.

Two alternative methods of silencing the drive were suggested: To use a nonmetallic idler or to replace the gears with a silent belt drive. Length of shaft did not provide sufficient space for enclosed silent chain.

The gears were badly worn so that, if a nonmetallic idler gear had been used, replacement of both driving and driven gears would have been advisable.

The solution, as adopted, was to use V-belts on pressed steel sheaves. As this drive reversed under load the lighter steel sheaves provided less flywheel effect to be overcome at the point of reversal. Because of the reversal the rated capacity of the V-belts installed was increased 25 per cent above the normal capacity usually provided for a similar drive operating continuously in the same direction. As the center distances were fixed, a flat belt drive probably would have required an idler to maintain tension.

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Flywheels on Lineshafts

TRANSMISSION engineers and machine designers have long realized the importance of a flywheel on machines subjected to pulsations or reciprocating motions, to provide sufficient momentum to carry the rotation past the point of shock or reversal. Lack of sufficient flywheel capacity necessitates the application of more power to drive machines past these points. Larger motors, however, do not give the same smoothness in operation as does a properly proportioned flywheel, and in addition add to the cost of operation and overhead.

Some experiments in textile mills, where a slight variation in speed may result in a broken thread, have indicated that excellent advantages in smoothness of operation and freedom from breakage result from placing a flywheel on the lineshaft. Machine shop equipment is not so sensitive to slight variations in speed. However, in many heavily loaded lineshaft drives the shock load, such as of starting a heavy cut, applying the load in polishing or grinding, stamping, punching, or other shock operations, may synchronize on several machines. In some cases the resultant drop in speed is noticeable.

When cast iron pulleys were used on lineshafts their weight gave considerable flywheel effect; light steel pulleys have little such effect.

A few years ago an eastern shop installed a flywheel on a heavily loaded lineshaft driving a group of punch presses cutting and forming a nonmetallic material. While no accurate tests were made on speeds and power consumption before and after (an ammeter and a tachometer of the recording type would have been necessary to obtain reliable data), the engineer in charge was well satisfied that the flywheel improved operation.

When installing a flywheel on a lineshaft, place it near a hanger and install another hanger on the other side so that it is supported and does not add a bending stress to the shaft. Obviously the flywheel should be well balanced and be operated within safe peripheral speeds.

The editors of STEEL would appreciate hearing from any readers who have experimented with flywheels on lineshaft drives.

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Maintenance Rivalry

RIVALRY between departments is a good thing, if it is controlled and handled properly. But when rivalry gets to a point where it fosters ill-will between departments to such an extent that they are out to "get" each other the plant suffers at least intangible if not real damage. Such happens occasionally where the control of the electrical and mechanical departments is placed under two entirely independent heads. Conditions may be made worse when one of these heads is considerably higher in rank than the other. This may not give the man lower in rank an equal opportunity to defend his men and their contentions.

An excellent example of this is shown in a certain plant. One particular drive failed frequently in one of the mechanical elements, due to sudden and uncontrollable stoppage. Many types of drive are subject to such hazard but by careful co-ordination of electrical and mechanical protections damage should be negligable. Unless so co-ordinated the weakest element fails.

In this case a motor was used which was rated considerably higher than necessary for ordinary loads on this drive with the overload relays set at the corresponding point for the size of the motor when operating at full load with normal overloads. As a result when a stoppage occurred the motor plugged along until something gave, and it was not the motor.

Arguments never got anywhere. "You tend to your end and we'll tend to ours. It was your end that failed, not ours." Judging from outward appearances the electrical department was right. However, trouble always shows up in the part of least mechanical strength which may be far removed from the cause or where the remedy should be applied.

Overload protection adjusted to the normal load with slight overload allowances to handle variations in load would have taken care of this problem easily and economically. Passing the buck instead of co-operating to solve a problem was expensive. A single head over both departments, who understood the limitations of drives, probably would have obtained results after the second failure. If he did not know what to do the engineering representative of a manufacturer of control equipment could have solved the problem and made the proper recommendations.

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Drives which give long life, low maintenance, freedom from interruptions to production, and have efficient transmitting capacity are the most economical in the long run. The type depends upon the requirements.

Methods and Materials

Foresees Wide Application for New Low-Alloy High-Tensile Steels

LOW-ALLOY, high-yield strength steels, designed to be used in the "as-rolled" condition, are due to supplant ordinary mild steel in a large percentage of its applications, in the opinion of one prominent authority. He summarizes his conclusions as follows:

High-yield strength steels meet two requirements. All of them, by offering greater strength, make possible either a reduction in weight or an increase in strength without increase in weight of the fabricated part or structure. A number of them, by reason of improved resistance to corrosion, lengthen the life of structures made from them. One or the other, or both of these characteristics in combination, are compelling reasons for the widespread adoption of these steels in the future.

Already these new steels have been discussed widely and employed to some extent in connection with the construction of cars and locomotives to cut the nonrevenue weight of this equipment, reduce maintenance cost and lengthen its life by resistance to corrosion. Their use is almost indispensable in the construction of the light-weight, diesel-powered units used for drawing the extremely light-weight trains of the Zephyr type. They have been recommended extensively for use in building ships and small boats. Trucks, buses and automobiles appear to be among the units which will go over to these new steels.

Possibilities in connection with building construction are vast. Whether it will prove advantageous to use structural shapes of the new steels for framework remains to be seen. But there is no question about the advantages of light-weight, corrosion-resistant elevated water tanks, light-weight elevators, light-weight stairways and floors. There is no question about the utility of the new steels in connection with bridge construction, in standpipes, power transmission lines and many other structures.

As an illustration, a great saving was effected in the construction of a power transmission line in West Virginia. The site for most of the line was a wilderness, far from railroads and served by no highways other than mountain trails. By the use of high-yield strength steel, weight of the heavy corner angles of the transmission towers was cut about 30 per cent, so that there was a big saving in hauling the steel sections to the job.

Crane Weight Reduced

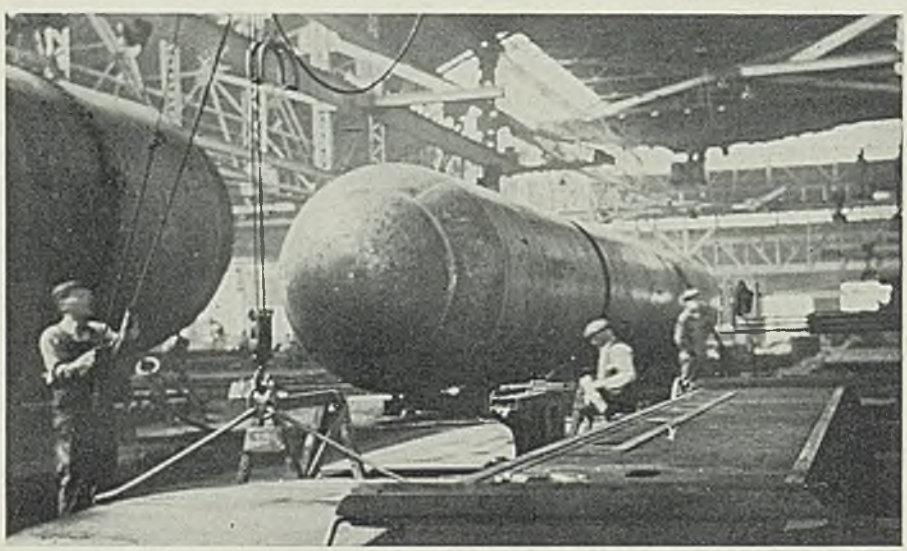
Overhead traveling cranes undoubtedly will be constructed more and more out of high-strength steels. A saving in weight, for instance, reduces the inertia of deadweight that must be overcome in starting and stopping; the result is a faster operating crane, in which less power is consumed and in which the wearing parts stand up longer.

Clamshell and other types of buckets already are being fabricated from the new steels, with resulting increase in their capacities and, when corrosion resistance is combined with high-yield strength, with reduced maintenance expense and increased life.

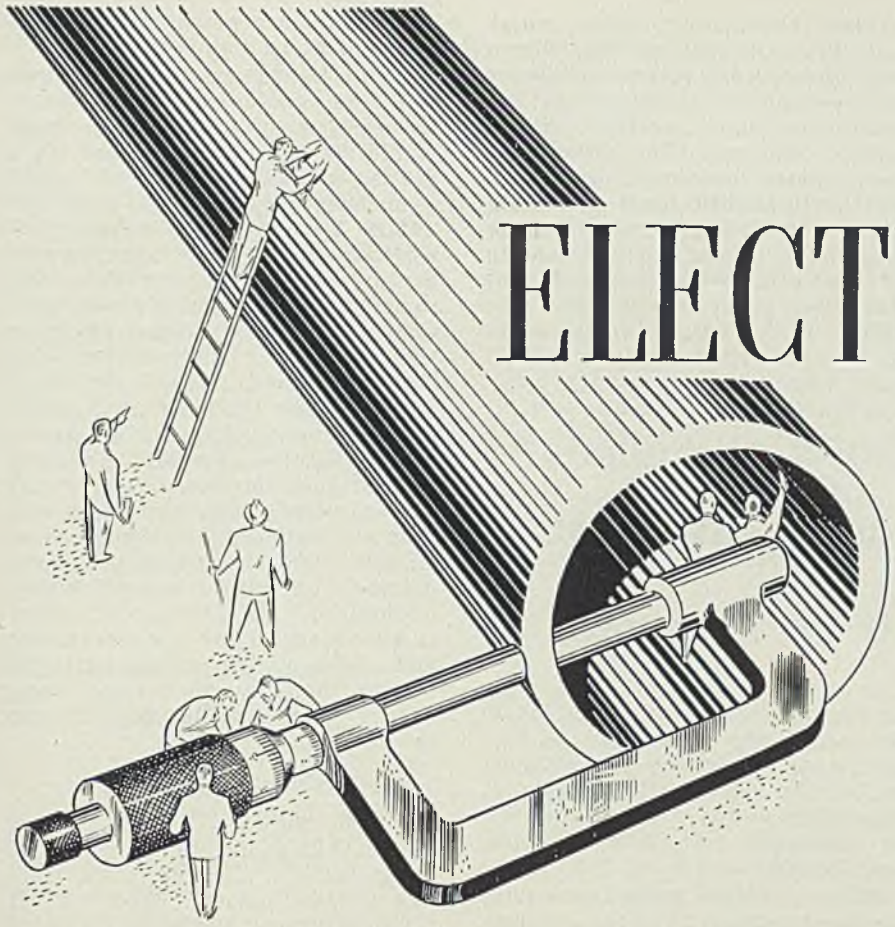
High-strength steel already is being used for the construction of mine cars. Gas producers also have been fabricated out of high-strength, corrosion-resistant steel. These structures, as well as mine cages, various types of conveyors and drive chains, all can be built to advantage out of the new steels.

A particularly important field for high-yield strength steel is the power plant field, for the reason that many existing power plants must be reconstructed so that utility companies may derive the economies from operation at high steam temperatures and pressures, such as 900 degrees Fahr. and 1400 pounds per square inch. This means a large tonnage,

Welded Pressure Tanks of Large Size



Two unusually large welded pressure tanks recently were fabricated by the Chicago Bridge & Iron Works in its Chicago plant. These tanks were 12 feet in diameter and 104 feet long. They were entirely of butt welded construction and all joints were X-rayed for soundness



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in the aggregate, for boilers, superheater drums, piping, valves and fittings for these plants.

Boron Makes Cast Iron Hard, Abrasion Resistant

Addition of boron to cast iron makes it extremely hard and abrasion resistant, according to a recent patent. The product is designed for lining steel tubes, and as described the addition of boron may be accomplished by melting 75 pounds of pig iron containing 3 or more per cent carbon, 2 to 4 per cent silicon and phosphorus preferably under 0.05 but not more than 0.10 per cent, in a No. 50 crucible with 5 pounds of borax. The crucible is sealed with a top containing a small vent hole. Melting takes about 1¾ hours in an oil-fired furnace, and the resulting alloy contains from 3 to 3.30 per cent carbon, 1 to 1.15 per cent boron and 1 to 1.5 per cent silicon. With 1.02 per cent boron in the iron the brinell hardness is 705, while with 1.7 per cent, the hardness is 800 in the material as cast.

Wheel Dressing Diamond Cost Must Take in All Factors To Be Accurate

The following article is abstracted from the Quarterly Review published by J. K. Smit & Zonen, Amsterdam, Holland. J. K. Smit & Sons Inc., New York, is American representative for the company.

IN THE majority of cases, diamond costs set up in connection with grinding practice are inaccurate because all the factors which enter into the cost have not been taken into consideration. The five most important factors to be considered in arriving at a diamond cost are as follows:

Factor No. 1. Kind of stock to be ground. Under this heading we must consider the material, whether it is steel, cast iron, brass or aluminum. In the case of steel, whether the material is hardened before grinding or whether it is soft, or as we term it, green grinding.

Factor No. 2. Diameter and width of face of wheel, grit, grade and bond.

Factor No. 3. Amount of stock to be ground from the part during the operation on which cost is to be figured.

Factor No. 4. Selection of the proper diamond for the condition of the wheel to be dressed.

Factor No. 5 The proper application of the diamond. Under this heading, the following points must be considered: Angle of application, depth of cut taken with the diamond on the wheel, rigidity of holder, and power or hand traverse feed of the diamond in dressing.

Keeping the above vital factors in mind, let us cite from actual test experiences. Let us assume that we are grinding the pins of a six-throw automobile crankshaft. In arriving at this cost, let us assume that factors 1, 2, 4 and 5, as outlined above, will remain constant, and consider for the time being only factor 3 and the part it plays in determining the cost figure. Referring to the grinding of the pins on the six-throw automobile crank, we find that we are removing 0.040-inch of stock from the pins on this test run.

Three cranks are ground each time the wheel is dressed and the diamond cost is 15 cents per dressing, or 5 cents per crank ground. The second day of our test, we find that we are grinding only two cranks per dressing and upon checking the pins before the grinding operation, we find that we are removing 0.060-inch of stock from the pins owing to something wrong with the pin lathes or careless inspection of the cranks during the turning operation. Note that the cost per dressing remains the same, namely 15 cents per dressing, but the dressing cost per crank is 7½ cents per crank or 50 per cent higher than on the first day.

Effect on Daily Cost

Now on the third day after checking the pin lathes and holding the pins to a closer limit before the grinding operation, we find that we are grinding four cranks per dressing. Upon checking the pins we find that we are removing 0.025-inch of stock from the pins, and the cost per dressing remains the same, namely 15 cents, but the diamond cost per crank ground is 3¾ cent.

Let us briefly take into consideration factors 1, 2, 4, and 5 and see how they affect our cost figures from day to day.

Factor No. 1. Change in the heat treatment of the steel which varies from day to day, will also change the diamond cost, because of the difference in the loading of the wheel from hard to soft parts ground. Another part of Factor 1 is the type of grinding which affects the diamond cost. These are plunge cut, traverse cut, profile and radius work.

Factor No. 2. Effect of wheel diameter. Tests have shown that when the wheel is new and up to its maximum diameter it will produce more pieces per dressing than it will when worn down to its minimum diameter. This is because of the difference in periphery speed. However, the cost per dressing will remain about the same but the cost per part will vary. Changing of the grit and grade or the bond or the width of face also play an important part in the cost.

Factor No. 4. Kind of diamond selected. In the majority of cases, a test run will be made with a certain type of diamond tool. Figures will be established from this test and used as a standard for diamond costs. However, the kind and quality of the diamond on future orders is not maintained. On future orders, there is a tendency to buy a less expensive and lower quality of diamond, expecting, however, that these diamonds will produce the same cost as the test run.

Mechanical Application

Factor No. 5. Herein lies an ever-changing mechanical condition which affects diamond costs from day to day, namely, depth of cut taken with the diamond, angle of application, rigidity of holder, inaccuracies in feeding mechanism during the dressing operation and the mechanical condition of the grinding machine in general. The majority of the conditions outlined in Factor 5 have been overlooked in the past and charged to inaccuracies, inattention and carelessness of operators, but with a little educational work on the part of the shop foreman and diamond suppliers, this human element phase of diamond cost can be cut to a minimum if carefully considered.

It is impossible to establish a diamond cost which will hold from day to day if the foregoing factors are ignored or if any one of them in the process of the test is not considered.

In the majority of cases costs have been set up as a certain amount per dressing. Figures used are anywhere from three months to three years old. With the rapid changing of wheel, experimenting from one manufacture to another, the ever-changing materials ground and changes in heat treating all affect these figures. We believe that the consumer is not interested in the diamond cost per dressing since it is inaccurate, but that he is interested in cost per part ground.

Under the general practices in the use of diamonds today, the diamond is the only tool used that is really expected to have brains. It is the only tool that is expected to compensate for all the inaccuracies and

changes of conditions under which it works. We have observed machines in which the spindle bearings had become so worn that they chattered. Obviously, parts could not be ground accurately in these machines. Naturally, this condition would fracture the diamond but from the consumer's standpoint, the fault is not with the machine but with the diamond.

In other words, the diamond is expected to compensate for mechanical failures in the equipment when they occur. This is a further illustration of the fact that costs set up today cannot be maintained tomorrow unless the vital factors which produce the costs are taken into consideration. A diamond, like any other tool, has its limits. Also, diamonds perform more efficiently in some applications than in others.

Results of Tin Research Described in New Pamphlets

Three new bulletins recently have been issued by the International Tin Research and Development Council, London. The first is entitled "The Constitution of the Tin-Rich Antimony-Tin Alloys," written by Prof. D. Hanson and W. T. Pell-Walpole. W. D. Jones is the author of the second paper, "Influence of Surface Cuprous Oxide Inclusions on the Porosity of Hot-Tinned Coatings on Copper." The third, "The Hot-Tinning of Copper: the Attack on the Basis Metal and its Effects," is by E. J. Daniels.

Copies of these bulletins are available gratis from the American representative of the council, L. J. Tavener, 149 Broadway, New York.

Airplane View of Industry's Equipment for Production

Factory Equipment, by Joseph W. Roe and Charles W. Lytle, cloth, 517 pages, published by the International Textbook Co., Scranton, Pa., and supplied by STEEL, Cleveland, for $4, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This book has been prepared primarily for the engineer who must have a working knowledge of production machinery, from the viewpoint of selection or application for economic production. The field covered is exceptionally wide and should be of interest to all wishing more information on equipment now in use in industry.

Following a general discussion on building and manufacturing, the author considers the drafting department, patternmaking and woodworking, smelting and refining, metals used in industry, molding, casting, forging, pressing, stamping, spinning, welding, soldering, brazing, heat treating, toolroom, tools for cutting metals, lathes, boring machines, drills, planes, milling, gear cutting, screw thread cutting, grinding, etc. While the discussion of each topic necessarily is brief, it is sufficient to present a good picture of the particular equipment or operation.

A chapter on selecting equipment, following a discussion of the various machines, serves as a summary and compares the fields of the main types of machine tool equipment. It also goes into the economics of the equipment, gives problems as illustrations and includes charts comparing initial and operating costs. A classification of materials handling equipment is given in another chapter, with a selected description of the more important types. There is added, at the end of each chapter, a set of sample questions and a list of references.

Metallurgists Report on Current Research Studies at Regional Meeting

(*Concluded from Page* 68)

metallurgist, Landis Machine Co., Waynesboro, Pa. At the outset, he emphasized that grinding is not an exact science, but still remains an art. Experiments on high speed steel of the 18-4-1 type mechanically stressed by cold drawing and by severe stamping with obvious distortion of the metal indicate that such pre-stressing tends to fade out if the part is uniformly heated to 2350 degrees Fahr. and uniformly quenched.

If the heating is nonuniform, the pre-stressing effects are ratined or accentuated in the hardened tool. Nonuniform heating may not result in cracked tools but there is a tendency to crack because of unbalanced stresses partly contributed to by such pre-stressing.

Dilute HNO_3 was suggested by the author for the ultimate inspection for cracks in ground surfaces. Strong acids such as HCl and H_2SO_4 reveal grinding cracks and grinding stresses but without a preliminary HNO_3 inspection no distinction can be made between grinding cracks and grinding stresses.

Grinding Stresses Removed

Grinding cracks cannot be removed from hardened and ground high speed steel, whereas grinding stresses may be entirely removed, said Mr. Morrison. Redrawing hardened and ground high speed steel at 1050 degrees Fahr. for 1 hour appears to effect complete removal of grinding stresses. There is a progressive improvement in stress relief as ground high speed steel is drawn at 500, 600, 700 and 800 degrees Fahr. One hour at 800 degrees Fahr. does not effect complete removal of severe grinding stresses.

In concluding, the author made some observations on the tendency to improve the performance of ground tools by means of adherent films and by the cyanide-nitriding of finished ground tools. In discussion, Mr. Morrison was asked the purpose of the grease stick sometimes used on the wheel in grinding. His reply was that use of the stick probably reduces affinity of the wheel for the metal. This is one reason why a coolant is used in grinding. The worst thing that can happen, he said, is for the abrasive wheel to fill up.

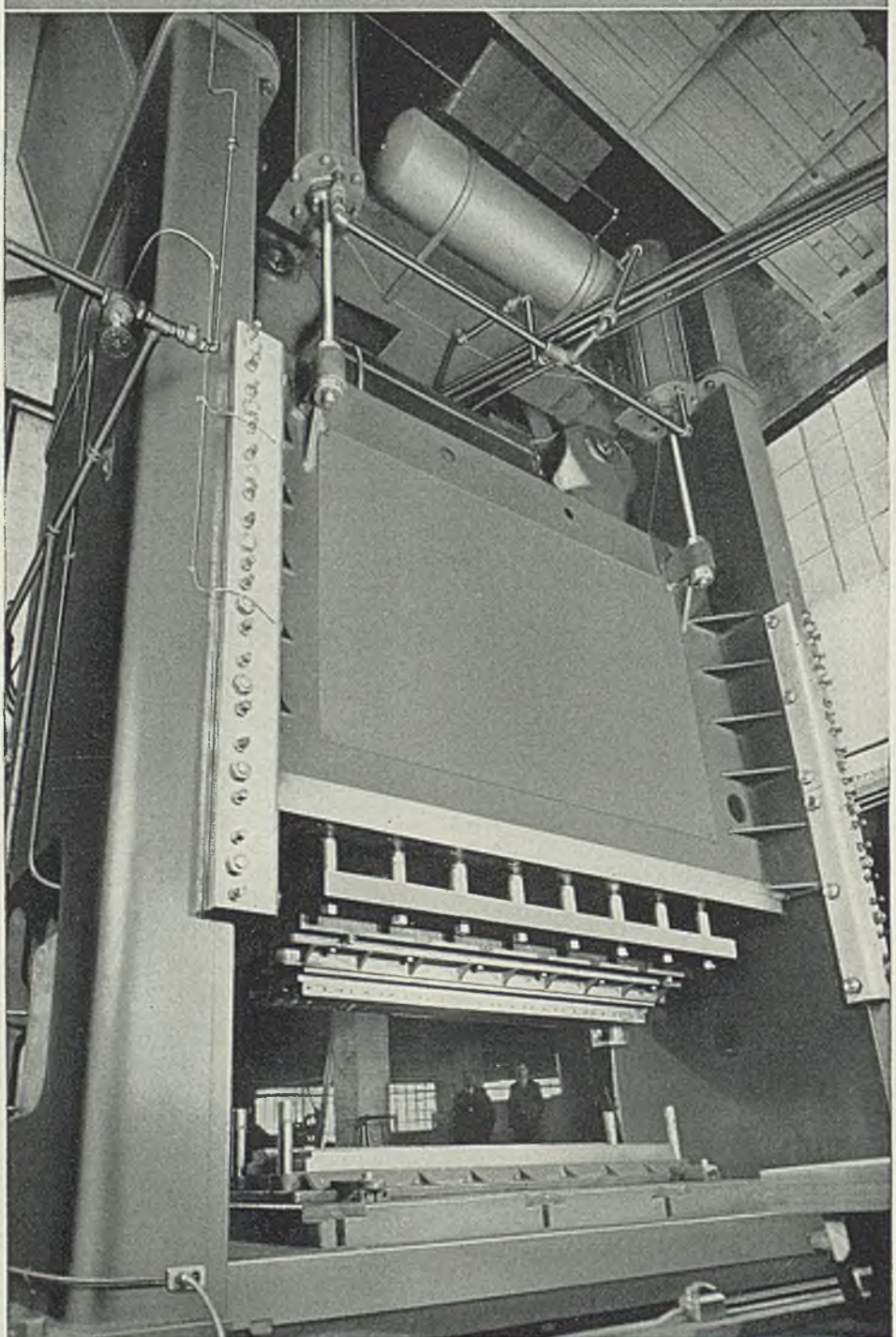
WELDING was viewed from a somewhat different angle by T. Holland Nelson, consulting metallurgical engineer, Philadelphia, and vice chairman of the Philadelphia chapter of the society, in the final paper of the session. At the outset, Dr. Nelson stated that after all there is not much difference between the steel melter, the welder and the heat treater.

The speaker's remarks covered a complete investigation of the phenomena occurring inside the parent metal, the weld metal, and the condition of the metals after welding and heat treating. It was made clear that welding is one of the oldest of the iron and steelmaking processes, and is not a matter of a few weeks' training in the dropping globules of melted metal between two plates. Sound welding, he asserted, requires a working knowledge of the fundamentals of iron and steel melting and ingot casting.

Stating that there is little to worry about in the welding of mild steels, Dr. Nelson devoted most of his attention to alloy materials and a glimpse into the future in connection with their use. A weld solidifies in much the same manner as an ingot, and, similarly, it can have pipes, blowholes, segregations, etc. This point the speaker proved through use of a series of macrographs.

Welds made with bare rods and

One of the largest mechanical presses in the world



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The builders report that on the press shown here reductions of more than 50 per cent in weight, about 30 per cent in height and 50 per cent in floor space were realized.

Bethlehem is well prepared in both experience and facilities to make plates with any special qualities needed to give the best results from this modern method of building machine housings.

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BETHLEHEM STEEL

showing considerable porosity and low tensile strength were contrasted with welds made with a high-grade coated rod. The coated rod controls the atmosphere and slag and produces homogeneous welds with high tensile properties and comparatively free from porosity and other defects. Dr. Nelson stated that even today there is wide variance in rod coatings and sooner or later some effort toward standardization must be undertaken.

The speaker dwelled at some length with resistance welding of 18-8 chrome-nickel stainless steel and convincingly demonstrated that an ingot is cast in the two sheets of metal. Much of his work in connection with 18-8 has been done with shot welding and he showed by macrographs that the cross section of a shot weld reveals that solidification of the molten metal forms annular rings, the number being dependent upon the number of cycles of current used in making the weld. These annular rings are formed, he said, because the molten metal begins to freeze in the extremely brief period between cycles.

Each weld has a corona or area of metal affected by the heat of the weld. It is possible, stated Dr. Nelson, to control the weld in such a way that the corona does not reach to break through the surface of the metal. Intergranular corrosion will result when the corona affects the surface of 18-8.

Shrinkage Questioned

Discussing this paper, E. C. Bain pointed out that molten metal always shrinks when it cools and raised the question as to whether the indentation cused by the electrodes in a resistance weld were indicative of the fact that shrinkage had occurred. Since shrinkage must occur in a weld, Mr. Bain contended that piping is likely to occur unless the metal is compacted as evidenced by the indentations.

In answer, Dr. Nelson stated he had never calculated the indentations and compared them with the shrinkage of the metal; however, he expected to do so. He explained that shot welds are made under considerable pressure of the electrodes and this was the direct explanation of the indentions. At the same time, he stated positively that it is possible to make shot welds without surface indentat'ons on the metal and the welds show no piping whatever.

C. E. MacQuigg, manager, Union Carbide & Carbon Research Laboratories Inc., Long Island City, N. Y., complimented Dr. Nelson highly on his paper, but pointed out that the production of welds involves many factors other than those discussed. Sound welds are made, he said, by maintaining close control over all of these factors.

Welding, etc. . . .

by Robert E. Kinkead

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Self-Reliance

SOME years ago an electrical manufacturer decided a potential market existed for a considerable number of electric arc welding machines. He built some machines and went to the market and showed people how to use the machines to do welding. As each customer learned more about welding, he bought more machines from the manufacturer who sold him the first one. But the electrical manufacturer kept right at the job of finding new uses and new customers for the steadily improved machinery. Presently his sales were expanding in a geometrical ratio. Competition developed but the manufacturer kept right on selling more welding machines in spite of it.

Substitute for welding machines the name of any equipment or merchandise sold in a free market and in open competition and you have a tried and proved formula for business strategy that is safe.

There is no safety in size of a business, nor in sly underhanded competition, nor in miracle men. There is no short cut to the financial stability that lasts year after year. Stealing another manufacturer's market which he has developed by long and arduous labor is about the most expensive and futile undertaking that can be called business activity. It seems like the easiest way to the avaricious—it is usually the least profitable and least satisfying way.

The steel industry offers many examples of the truth that lies in these simple principles. Success lies in developing one's own markets, doing one's own job well.

Development and Profits

THE Washington Award, conferred on Charles Franklin Kettering for his high achievements in guiding industrial research toward the greater comfort, happiness and safety of mankind in the home and on the highway is significant. The award was made on recommendation of national engineering societies representing civil, mining, mechanical and electrical engineers.

Investors in General Motors Corp. would concur with the engineering societies. Kettering's genius for converting scientific facts and engineering skill into useful products has made work for millions and profits for investors of more than a billion dollars.

The key to success in the case of Kettering, General Motors, and others lies in recognition of the necessity and inevitability of continual change. Their efforts are organized to bring about beneficial changes, not to resist them.

In by far the greatest number of cases of businesses which get into financial trouble, it is found that management has sought safety for invested capital in the power of tangible assets and trade agreements which try to hold conditions constant against the normal tendency to change. The evidence is overwhelming that research and development are the sources of employment of workers and safety for their savings.

* * *

ONE of the smartest welding departments we have inspected recently has as foreman a machinist and toolmaker who knew nothing of welding six months ago. The welds turned out by his department are accurately placed, of correct contour, and excellent in appearance. The costs of the department are lower than similar costs in neighboring shops in spite of the fact that the workmanship is superior. Machinists, because of their training, make excellent welding foremen where welded steel machinery parts are to be built.

FOUNDRY PROBLEMS AIRED AT FORTIETH

HEREWITH are reports of various technical sessions held during the fortieth annual convention of the American Foundrymen's association in Detroit, May 4-9. Additional reports will appear in next week's issue of STEEL.

Apprentice Training

RECOVERY in the heavy industries has amounted to about 50 per cent but in most lines of manufacture at the present time a shortage of skilled labor is reported. This fact was brought out at the apprentice training session by Chairman S. W. Utley, Detroit Steel Casting Co., Detroit. But despite this shortage, he stated unemployment in this country is around nine million.

It is evident, he continued, that in past years we have failed to train a sufficient number of men for industry. This he attributed in part to a lack of interest on the part of management and to a mistaken social problem in this country. Organized labor, he contended, has been trying to create a shortage of labor by discouraging apprenticeship. In conclusion, Mr. Utley mentioned that the job facing industry today is to win back some of the boys who are going into lines of employment other than the foundry.

This country's accomplishments in the field of general education for rich and poor alike have placed it in advance of the whole world, stated F. R. Hoadley, Farrel-Birmingham Co., Ansonia, Conn. In this one respect, he maintained, we can prove the results of the high standard of living which has resulted from our economic system under the protection of our constitution. But what a frightful pity if we do not apply the same natural instincts and pride to the education of apprentices today who must be the future keymen of industry.

An adequate, even a safe number of skilled craftsmen, can be provided only if every executive, superintendent and foreman makes it his sworn duty to train men for his own future needs, the speaker advised.

In presenting a brief description of the apprentice plan of his company, Mr. Hoadley was of the opinion that by supplementing the old manual training system with mental schooling, the average intelligence of the graduate apprentices must improve, and in due course there should result a supply of material for foremen and superintendents.

The speaker maintained that if a small fraction of the energy we put into sales, production and finance is applied to apprenticeship, the problem is solved. It must not be a haphazard program, he warned. It must emanate from the chief executive of each company in the form of definite orders and should be followed up as closely as the monthly statement. Superintendents and foremen must be as eager to obtain good apprentices as they are to get good castings, he stated in conclusion. Otherwise, there will be few good castings in the future.

Unless management gets back of an apprentice program, it will never work, stated H. W. Boulton, Murray Corp., Detroit. He spoke on "Apprentice Training in Detroit Industries" and described the procedure followed in inaugurating an apprenticeship program in that district.

In discussing a plan of procedure for those interested in apprentices he suggested that the company first determine what department can use apprentices. An individual should be appointed as a supervisor, one who has teacher instinct and who will be in sympathy with the work. A schedule of work to be mastered by the apprentice should be laid out along constructive lines.

J. G. Goldie, Cleveland Vocational school, Cleveland, spoke on "Training Foundry Apprentices in

. . . Interesting Sidelights of the

AN ILLUMINATED miniature iron ore pile with blast furnace background, ore bridges, railroad locomotive and the ore carrier GEORGE D. FINK, supplied an attractive and artistic touch to the pig iron display of the Hanna Furnace Corp., Cleveland, merchant pig iron division of the National Steel Corp., Pittsburgh.

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Featuring the exhibit of the Sterling Wheelbarrow Co., Milwaukee, was an exceptionally large steel cope flask, 10 feet long, 8 feet wide and 10 inches high. The entire outside of this flask was made from one continuous piece of steel.

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Behind its exhibit of various brands of foundry, malleable and basic pig iron, Republic Steel Corp., Cleveland, built up an attractive background showing its stainless steel in many forms of decorative effects. These stainless products ranged from picture frames and table tops to window grilles.

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The line of abrasive and refractory products made by the Norton Co., Worcester, Mass., was mounted on a traveling belt and exposed to view through an opening in the background concealing the mechanism.

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An attractive display which engaged the attention of visitors was the model of a complete blast furnace plant encased in glass at the booth of the Ford Motor Co., Dearborn, Mich. The forward part of a lake ore boat in miniature was cut away to show the position of iron ore in the hold. Next was shown an ore bridge which distributed the ore to the trestle bins. The stockhouse and filling systems serving the blast furnace were portrayed in model form as was the stack itself. The distribution of the stock within the stack could be inspected. At the rear of the booth various steps involved in the pouring of a Ford engine were shown by the use of actual equipment and parts.

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The background of the exhibit of the International Nickel Co. Inc., New York, was composed of sheets of electrically-deposited nickel 99 per cent pure. Included in the many com-

Annual A.F.A. Meeting

Cleveland" and presented many details of the method employed for making this school one of the most successful of its kind in this country.

Cast Iron

IN SPEAKING on the behavior of manganese in the cupola at a cast iron session, M. T. Davis III, General Electric Co., Ontario, Calif., cited a series of tests covering 36 heats and pointed out that there is a gradual increase in cupola loss of manganese in a long series of charges of high-test cast iron. In the 36-inch cupola studied, he stated, the loss amounted to 25 per cent at the beginning of the heat and 40 per cent near the end.

Mr. Davis found that the smallest losses of manganese occur in the first and last charges of any particular series of high-test cast iron. High temperatures are partly responsible for high losses in manganese, and the speaker emphasized that long heats of high-test cast iron ultimately attain higher losses than shorter heats. In his opinion, the most important determinant of the loss of manganese is the amount of manganese which is charged into the cupola.

In a written discussion of Mr. Davis' paper, J. A. Bowers, melting superintendent, American Cast Iron Pipe Co., Birmingham, Ala., pointed out that the moment charging is discontinued on the cupola loss of manganese increases rapidly. Blast pressure is more of a governing factor on manganese loss, he contended, than the temperature at which the metal is tapped. About 25 per cent is the average loss of manganese in large cupolas with a blast pressure of 20 ounces and where the tapping temperature is 2600 degrees Fahr., he stated.

Carl Harmon, Chevrolet Motor Co., Saginaw, Mich., speaking on "Determining the Height of Molten Metal in the Cupola," described a method which affords gaging the melt electrically. Several sticks of carbon extending through the lining are connected to gages. These sticks are jacketed in porcelain and are packed with a clay substance to hold them rigid. The electrodes have a life of two heats, the speaker said.

J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., who as co-author with H. Johnson of the same company, spoke on "Effects of Coke Below Tuyeres," cited data to show that any increase in the height of the tuyeres above the sand bottom increases the carbon pickup to a large degree. Test data presented by the speaker disclosed that a higher carbon value is obtained with intermittent flow than with continuous flow.

Contact of the melted steel with the incandescent coke doubtless is effected by the degree of tenacity with which the slag clings to the pieces of coke after each tap, and the reluctance of the slag to release its mantle of protection about the coke and float back to the surface of the melted steel in the well, Mr. MacKenzie contended. In conclusion, he pointed out that a highly viscous slag will tend to produce a lower carbon pickup while a cupola is operated with intermittent flow, all other factors being equal.

C. A. Reams, power and construction, Ford Motor Co., Dearborn, Mich., speaking on "The Development of Blast Cleaning in the Foundry Industry," presented considerable chronology on the subject. In discussing future conditions in this field, the speaker was of the opinion that castings will be designed for production blast cleaning and will be annealed in controlled atmosphere furnaces thereby shortening blast cleaning. Strict attention will be paid to sand conditioning, he asserted. Better sprays will be developed as well as harder abrasives. The speaker also looks for the ventilation of blast cleaning equipment to be speeded up.

Malleable Cast Iron

SOME of the abstruse problems connected with the changes that take place in malleable iron during the annealing stage were discussed by H. A. Schwartz, manager of research, National Malleable & Steel Casting Co., Cleveland, at a session devoted to malleable cast

Foundry Exposition in Detroit . . .

mercial applications of cast nickel alloys, such as in cast iron, cast steel, nickel bronze, and nickel-chromium heat and corrosion-resistant alloys, was a single casting of a nickel alloy containing 45 parts employed by a musical instrument house in manufacturing a clarinet, and another of 72 separate parts for an oboe. Each of these castings weighed only a few pounds and were poured in such a way that one pot of the alloy made 45 of these conglomerate castings.

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Through its subsidiaries, Carnegi-Illinois Steel Corp., Pittsburgh, and Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., the United States Steel Corp., New York, employed a modern illustrated revision of the nursery rhyme relating to the "little pigs that went to market" to tell foundry show visitors of its piglets of malleable and foundry iron. These piglets weigh about 45 pounds apiece.

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In connection with its display of low-phosphorus pig iron, Chateaugay Ore & Iron Co., New York, exhibited the racing bobsled which emerged the winner in recent Adirondack races and which was then taken to Germany for Olympic competition. This sled, designed by a most ingenious lad, has cast iron runners made from the company's iron.

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Among operating exhibits was that of the Detroit Electric Furnace Co., Detroit. This company used one of its 35-pound capacity electric furnaces to melt a 20 per cent nickel-iron alloy which was poured into ash trays in a permanent mold manufactured by the Eaton-Erb Foundry Co., Vassar, Mich.

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A 6-foot diameter rotating globe, with the continents coated with silicon carbide abrasive grain and water areas coated with aluminum oxide abrasive grain, proved of interest to visitors in the display of the Carborundum Co., Niagara Falls, N. Y.

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A circular, car-type mold conveyor was operated by the Link-Belt Co., Chicago. Carried on the cars of the conveyor were the numerous products of the company, including chain, roller conveyor, hangers, pillow blocks, and similar items.

iron. The speaker enumerated some of the variations observed in typical specimens and by way of conclusion stated that while the work had no immediate practical value it was undertaken and the results incorporated in a paper for the guidance of future metallographers in their quest for the causes of some of the peculiar phenomena which confront men engaged in research.

A reference to the formation known as bull's eyes prompted W. R. Bean, Whiting Corp., Harvey, Ill., to recall some of his experiences in the early days of research on malleable. The term bull's eyes was coined offhand to cover and describe this formation, and in time the term became accepted generally. He considered the latest work of Dr. Schwartz extremely valuable as a pioneering expedition into what probably will prove to be fruitful territory.

Pouring Temperatures Controlled

C. F. Joseph, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich., presented an interesting paper on the methods and equipment employed in measuring and controlling pouring temperatures at the Saginaw plant where approximately 500 tons of malleable iron is melted daily. Referring to the fact that statements of 2900 degree Fahr. temperature iron sometimes are seen, the speaker doubted if any iron actually is poured at that temperature.

In his experience, most of the iron is poured at temperatures between 2650 and 2700 degrees Fahr. He ascribed the apparent discrepancy to the fact that in many instances the optical pyrometers through one cause or another do not give true readings. Later in the discussion several speakers referred to the fact that pyrometers should be checked frequently for accuracy. Also the man using the pyrometer should be sufficiently skilled to make allowance for varying degrees of light, the condition of the atmosphere, slag on metal, etc.

Another interesting discussion centered on the lower fluidity of an iron mixture containing large amounts of steel. Mr. Bean directed attention to the fact that hereditary traces of some of the characteristics of the parent metals persist throughout successive meltings. The use of insulated ladles was recommended as an important factor in maintaining a practically uniform temperature of metal.

Another malleable cast iron session was devoted to presentation and discussion of a paper on malleable sand control by H. W. Dietert and F. Valtier, H. W. Dietert Co., Detroit. This paper was based on a questionnaire sent to foundrymen operating malleable foundries and to which 26 had sent replies. The authors had tabulated the replies and presented a running comment of the result.

As with every other branch of the foundry industry, the replies indicated that complete unanimity does not prevail. Comparatively wide variations were noted in sand characteristics, bond, green strength, permeability and moisture content. In some instances no sea coal was added to the sand. In others sea coal was added to the facing, while in what is regarded as the most modern technique, sea coal was incorporated in the entire sand supply.

Several people contributed to a discussion regarding the effect of hard and soft ramming on synthetic as opposed to naturally bonded sand. All agreed that the synthetic sand must be rammed harder and this in turn precipitated a discussion as to whether size of the sand grains affect the result. Some held that the ideal molding sand should consist of grains of uniform size, while others claimed better results are obtained when definite proportions of the sand contain grains varying in size.

The opinion also was expressed that the character of the clay plays an important part in the resulting characteristics of the sand. This probably is partly due to the fact that a greater quantity of ordinary clay is required than where a clay of what may be termed greater intensity is employed.

Replying to a question from the floor, Mr. Dietert stated in ordinary practice where conditions are fairly uniform from day to day a permeability test once a day and fineness test once a month should be sufficient.

One foundryman, questioning the use of all sand containing sea coal, wondered if sand of that kind did not liberate a greater quantity of gas. The speaker pointed to the fact that heat travels rather slowly through the sand and that only a comparatively thin layer of sand immediately in contact with the casting is raised to a temperature sufficiently high to burn the sea coal. The remainder of the sea coal in the sand is not affected.

Nonferrous Casting Practice

TWO subjects were given important consideration at a session on nonferrous casting practice, namely, manganese bronzes and the production of aluminum bronze castings to withstand high pressure. Dr. F. R. Hensel, P. R. Mallory Co., Indianapolis, contributed a paper on manganese bronzes, emphasizing chemical composition, melting procedure, types of furnaces used, gating, feeding, pouring, effect of hardening elements and allied subjects.

Sam Tour, vice president, Lucius Pitkin Inc., New York, pointed out the importance of the use of manganese bronze, and Dr. G. H. Clamer, president, Ajax Metal Co., Philadelphia, discussed composition, tensile strength, zinc limit and the possible use of cement-bonded sand for casting propellor blades.

M. T. Ganzauge, superintendent of brass foundry, Goulds Pumps Inc., Seneca Falls, N. Y., presented a paper on pressure aluminum bronze castings. The author stated that defective castings may be kept to a minimum if certain rules are observed and standardized. Gating of this type of casting, use of carbon dioxide in the mold, precautions for chills, etc., were other subjects considered. The necessity for handling this type differently from the ordinary gun metals and red brasses was stressed, including some of the difficulties encountered.

James L. Wick Jr., Falcon Bronze Co., Youngstown, O., initiated general discussion on this subject and D. J. Matignon, Apex Bronze Foundry, Oakland, Calif., referred to gating as a consideration. Mr. Tour spoke of the necessity for emphasis on alloying and melting practice and stated that reducing atmosphere is a cause of gassing.

New Officers Elected

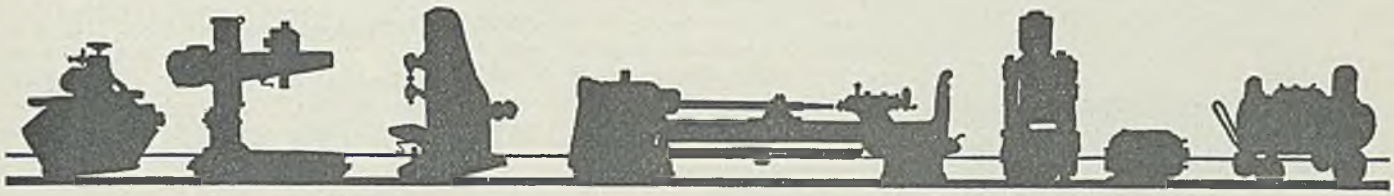
A report of the nominating committee of the nonferrous section and report of the committee on analysis of defects in nonferrous castings concluded the meeting. The following officers were elected: Harry St. John, Detroit Lubricator Co., Detroit, chairman for two years; Harold J. Roast, Roast Laboratories & Canadian Bronze Co., Montreal, Que., vice chairman for two years. The following will compose the committee for four years: J. J. Curran, Walworth Co., Greensburg, Pa.; Dan Curry, International Nickel Co., New York; John Diedrich, Blackhawk Foundry & Machine Co., Davenport, Iowa; and William Laird, Westinghouse Electric & Mfg. Co., Pittsburgh.

Mr. St. John, chairman of the committee on defect analysis, reported that a classification of causes of defects was being made, a complete report is being made up, and moved that the report, when submitted, be used by the American Foundrymen's association.

NEW OFFICE SUPPLIES CATALOG

Of interest in a new comprehensive catalog recently issued by the Shaw-Walker Co., Muskegon, Mich., are sections devoted to steel business furniture and filing equipment. Differing from the traditional practice in this industry, this catalog entitled "Buyers' Guide for the Office" presents the complete Shaw-Walker line and price list in one volume.

New Equipment



Channel Valve—

Ingersoll-Rand Co., 11 Broadway, New York, has recently announced a new valve for air and gas compressors. The only moving parts in this valve are a number of valve channels, within which are flat springs. A much larger area of the valve opening is utilized, resulting in slower air speeds through the valve and a more silent valve. An air cushion between the spring and the channel eliminates impact and thus increases life. Channels are light in weight with consequently reduced wear.

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Explosion-Proof Motor—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently completed a 300 horsepower 3600 r.p.m. explosion-proof industrial motor. An effective method of ventilation was developed to hold the motor size and weight to a minimum. The dual ventilation circulates both the external and the internal air through adjacent ducts in the frame, causing a rapid transfer of heat from the inside of the motor to the outside in a manner similar to that of a heat exchanger.

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Hacksaw Blades—

Henry Disston & Sons Inc., Philadelphia, is offering a new-type hacksaw blade which is tougher and stronger than older types. The new product is known as Nu-Mol and is especially adapted for hand use under extreme abuse and in power saws where the stock is stacked or bundled, resulting in greater strain on the sawblade. These blades are made in all standard lengths, widths, thicknesses, and teeth.

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Spray Gun Strainer—

The DeVilbiss Co., Toledo, O., has developed a new fluid strainer, known as type VS, for attachment to type MBC spray guns. The working part of the strainer is a metal cylinder enclosing a screen supported by a coil spring. The fluid flows from the outside to the inside of the screen, which is easily removable for cleaning. It is connected directly to the fluid inlet of the spray gun, and thus removes all foreign matter from the fluid which it may have gathered in the line as well as from outside sources.

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Three New Drills—

Skilsaw Inc., Milwaukee, is adding to its line a special duty ¼-inch drill and two new models to be known as Defender drills. The two latter designs have capacities of ¼ and ½ inch, respectively. Die cast aluminum alloy frame and a 3-jaw geared chuck and key are features. Model 40, shown herewith, has a ¼-inch capacity in steel. It is classified as a special duty tool for production drilling in light metals and for intermittent drilling in steel and cast iron.

Skilsaw Model 40 drill

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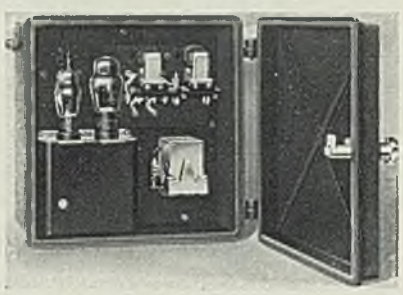
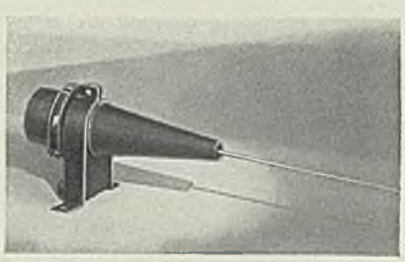
Combustion Safeguards—

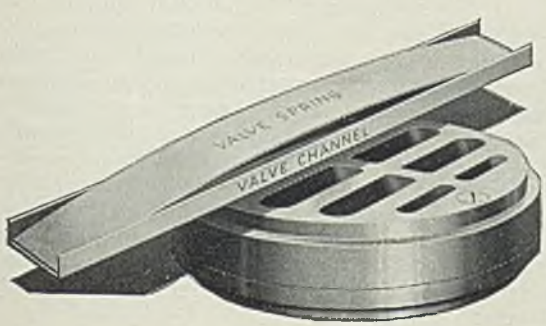
The Brown Instrument Co., division of the Minneapolis-Honeywell Regulator Co., Philadelphia, has just placed on the market a new line of Protectoglo equipment. This apparatus includes two separate types of relays and a flame sensitive electrode which can also be used as a special spark plug for electric ignition. Any standard primary controller and motor valve may be used to complete the system of combustion safeguard.





Top view shows Protectoglo relays of Brown Instrument Co., below, the flame sensitive electrode

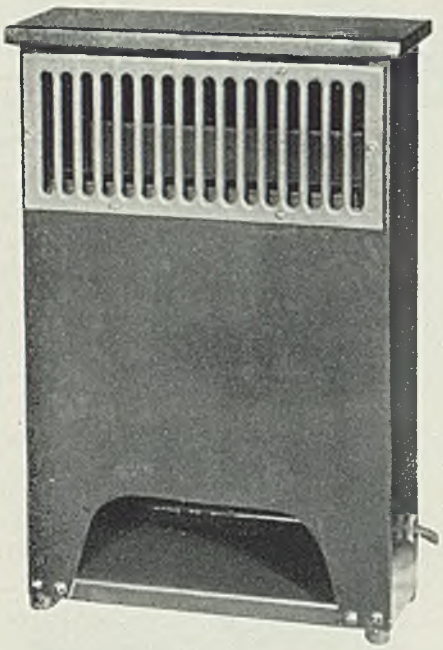
The relays as shown contain vacuum tubes for amplification and rectification of the power input, which, when conducted from the electrode unit to ground through the flame, operates the relay units. Thus any interruption in the flame causes instant shut-down.



Left, the Ingersoll-Rand channel valve assembled, and separate valve channel and spring

Electric Convection Heater—

The Electric Air Heater Co., division of American Foundry Equipment Co., 555 Byrkit street, Mishawaka, Ind., announces a new convection type electric heater. The heating



Electromode convection heater

unit is a ¾-kilowatt calrod cast as an integral part of an aluminum unit. The Electromode convection heater is 4½ inches wide, 9½ inches long, and 16 inches high. Its principal use is as a temperature booster for rooms which are isolated or hard to heat. Units are available in any finish desired.

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High Pressure Valve—

W. H. Nicholson & Co., Wilkes-Barre, Pa., have placed on the market a newly designed hydraulic valve for oil or water service up to 5000 pounds pressure. The valve is available in two, three, or four way types.

Nicholson high-pressure hydraulic valve

The body is furnished in either electric furnace cast steel or bronze, the stem of Monel, base of stainless steel and disk of Everbrite metal, with a steel lever. The valve is constructed with a large diameter stem which is connected to the disk and acts with the disk on the principle of a differential piston. Pressure is maintained in the body of the valve, exerting force downward on the disk and upward on the stem. These opposing forces tend to balance each other and permit easy yet tight operation. Six air holes in the stem provide a cushion against water hammer when the valve is filling. The valve may be installed and operated in any position.

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New Enamel Brush—

Ferro Enamel Corp., Cleveland, announces an improved edging brush to be used in black-edging white enameled ware. To be offered in all sizes, the brush has a set of movable metal guides which permit adjustment to the desired width as the bristles wear down in use.

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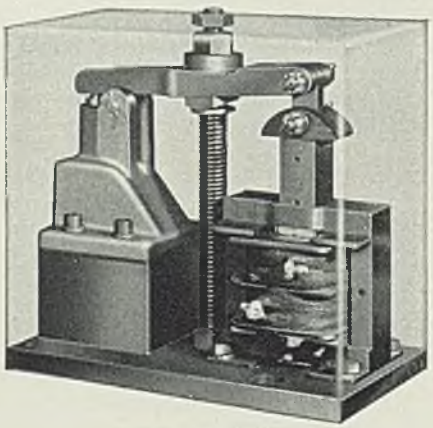
Solenoid Controlled Valve—

Ross Operating Valve Co., Detroit, has introduced a new solenoid controlled straightway air valve of heavy design and rugged construction. It



Ross Air Valve

is intended for service in production plants, for such uses as a by-pass where an operating valve cannot perform the operation. It can be furnished for either normally open or normally closed operation.

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Hydraulic Lift Truck—

Lyon Iron Works, Green, N. Y., is the maker of a new 15-ton hydraulic hand lift truck. A handle and a towing hitch are provided for either hand or power transportation. The elevating is done by hydraulic rams operated from a hand pump. The platform is 30 x 84 inches and the lift is 3¾ inches, the height when raised being 13 inches. There are four rear wheels and two front wheels, all ball bearing. The frames of the base and the platform are of heavy arc-welded members.

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Industrial Analyzer—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has built an industrial analyzer for use in making practically any type of direct current voltage, current or resistance test. The outfit is entirely self contained and consists of an ammeter and a volt-ohmmeter with suitable shunts, multipliers, and range changing switches mounted in a compact case. The unit is particularly adapted for testing industrial motors and control. Its range is 150 to 750 volts, 4 to 750 amperes, and ½ to 600 horsepower. A 0-15 volt scale is included for drop tests, and a 50-millivolt scale for use with external shunts. Uses of this analyzer include trouble shooting in motors, control apparatus, elevators, mine locomotives, and direct current power generating and distribution apparatus.

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Air Circulating Fans—

The Emerson Mfg. Co., St. Louis, recently announced a new line of 24-inch and 30-inch air circulators for cooling large areas requiring high velocity air circulation, such as shops and factories. The A.C. models are

Emerson Circulator

equipped with induction motors and the D.C. fans have brush-type motors. Fans have four formed steel chromium-plated blades. In addition to the floor column model shown here, the fans are available in ceiling, wall-bracket, and counter column models. The 24-inch single speed fan delivers 3600 cubic feet a minute with 185 watts input and the 30-inch model on its high speed delivers 6000 cubic feet a minute at 355 watts.

Steel Specifications Declining Gradually

Automotive, Railroad Demands Still Strong; More Pipe Projects Up

MARKET IN TABLOID

DEMAND . . . . *Declining slowly.*

PRICES . . . *Iron, steel firm. Quantity price system working out satisfactorily. Scrap lower.*

PRODUCTION . . . *Steel ingot production down 1 point to 68½ per cent. Sheet mills, 70 to 75 per cent; tin plate, 90 per cent.*

SHIPMENTS . . . *Fairly steady.*

STEEL demand is subsiding slowly, with automobile and railroad requirements still leading in a broad and active market, and promising to sustain a high average for some weeks.

So long as new commitments by these interests, and for agricultural, container, and household equipment remain near present levels, steelmakers see no sharp decline. A strong undertone prevails, despite a drop of 1 point to 68½ per cent in steelworks operations, and continued lowering of scrap prices.

The general expectation in the industry is that a fairly high rate can be counted upon until midsummer. Automobile manufacturers anticipate their June steel purchases will equal the tonnage shipped to them this month, and aim to keep assemblies on a brisk schedule through June, to stock dealers in advance of the changeover to 1937 models. Last week their purchases rose slightly, while output of cars, 118,786, was just above that in the preceding week.

Inquiries for 5800 freight cars came out during the week, including 2800 for Southern Pacific; 2000 for Missouri Pacific, and 1000 for Norfolk & Western. Approximately 135,000 tons of rolled steel will be required for the 11,700 cars now active in the market. Railroads actually have authorized 25,000 freight cars which are yet to be purchased, and steelmakers expect demand for car material will be heavier in the last half of the year than in the first.

Some large industrial construction projects promise to develop considerable demand for structural steel and pipe this summer and fall. Continental Can Co. has authorized $6,000,000 in plant expansion at Memphis, Baltimore, Wheeling; Container Corp. of America, $7,000,000 at Fernandina, Fla.; Socony-Vacuum Corp. $1,500,000 at Olean, N. Y. Of $42,500,000 appropriated by Standard Oil of Indiana for modernization this year, $3,500,000 will be spent for pipe lines. Shell Oil Co. will spend $4,000,000 at Houston, Tex., and is preparing to construct a 304-mile pipe line in California, taking 25,000 tons of steel.

At Pittsburgh, the largest order for river barges in 12 months, 29 all-steel coal carriers for Hatfield-Campbell Creek Coal Co., Cincinnati, requires 4500 tons of plates. Sheridan, Wyo., has awarded 2700 tons of plates for a welded pipe line; and bids are being taken on 15,000 of plates for the Stone river pipe line, Los Angeles. Structural shape awards in the week continued at a relatively low level, 13,290 tons.

Pressure for scrap for export has eased with the conquest of Ethiopia, both Italy and England, which have been buying avidly for several months, now being virtually out of the market, although demand from these and other European countries is expected to pick up again after a period of price adjustments.

Lake Superior iron ore shipments are accelerating with improvement in upper-lakes weather conditions, and the Pittsburgh Steamship Co., United States Steel Corp. subsidiary, this week will have in commission 68 of its fleet of 85 vessels, 25 more than in the past two years.

Steelworks operations in the Pittsburgh district last week dropped 1 point to 62 per cent; Cleveland 4 to 75½; Detroit 6 to 94; Youngstown 2 to 76. Buffalo advanced 3 to 73, and others were unchanged.

Daily average steel ingot production in April, 151,625 gross tons, was 17.8 per cent higher than in March, and the largest since 158,057 tons in April, 1930. Total output in April was 3,942,254 tons, compared with 3,342,619 tons in March. The 13,295,237 tons made in the first four months this year was 19 per cent larger than in the same period last year.

STEEL'S iron and steel composite is off 4 cents to $32.96, due to the decline in scrap; the finished steel index remains $52.20, while the scrap composite is down 38 cents to $13.54.

COMPOSITE MARKET AVERAGES

	May 9	May 2	April 25	One Month Ago April, 1936	Three Months Ago Feb., 1936	One Year Ago May, 1935	Five Years Ago May, 1931
Iron and Steel	$32.96	$33.00	$33.08	$33.10	$33.48	$32.35	$31.07
Finished Steel	52.20	52.20	52.20	52.20	53.70	54.00	49.02
Steelworks Scrap	13.54	13.92	14.33	14.39	13.83	10.27	9.31

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.

A COMPARISON OF PRICES

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

Finished Material

	May 9, 1936	April 1936	Feb. 1936	May 1935
Steel bars, Pittsburgh	1.85c	1.85c	1.85c	1.80c
Steel bars, Chicago	1.90	1.90	1.90	1.85
Steel bars, Philadelphia	2.16	2.11	2.16	2.11
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.01½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.99
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galv., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.50	2.50	2.50	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.40	2.40	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pitts.	2.10	2.10	2.40	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	28.00	30.00	28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	30.00	28.00
Billets, open-hearth, Pittsburgh	28.00	28.00	29.00	27.00
Wire rods, Pittsburgh	40.00	40.00	40.00	38.00

Pig Iron

	May 9, 1936	April 1936	Feb. 1936	May 1935
Bessemer, del. Pittsburgh	$20.8132	20.8132	20.8132	19.80
Basic, Valley	19.00	19.00	19.00	18.00
Basic, eastern del. East. Pa.	20.8132	20.8132	20.8132	19.81
No. 2 fdy., del. Pittsburgh	20.3132	20.3132	20.3132	19.30
No. 2 fdy., Chicago	19.50	19.50	19.50	18.50
Southern No. 2, Birmingham	15.50	15.50	15.50	14.50
Southern No. 2, del. Cincinnati	20.2007	20.2007	20.2007	19.38
No. 2X eastern, del. Phila.	21.6882	21.6882	21.6882	20.68
Malleable, Valley	19.50	19.50	19.50	18.50
Malleable, Chicago	19.50	19.50	19.50	18.50
Lake Sup., charcoal, del. Chicago	25.2528	25.2528	25.2528	24.25
Ferromanganese, del. Pitts.	80.13	80.13	80.13	90.13
Gray forge, del. Pittsburgh	19.6741	19.6741	19.6741	18.66

Scrap

Heavy melting steel, Pittsburgh	$14.75	15.75	14.80	12.00
Heavy melt. steel, No. 2, east. Pa.	12.00	12.70	12.00	9.25
Heavy melting steel, Chicago	13.25	14.35	14.30	10.20
Rail for rolling, Chicago	15.00	15.75	15.50	11.05
Railroad steel specialties, Chicago	14.75	15.85	15.75	11.40

Coke

Connellsville, furnace, ovens	$3.50	3.50	3.50	3.60
Connellsville, foundry, ovens	4.25	4.25	4.20	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Prices Subject to Quantity Extras and Deductions

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
Detroit, del.	2.05c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.35c
Pittsburgh, No. 20	2.95c
Gary, No. 10	2.45c
Gary, No. 20	3.05c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	1.95c-2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
*Philadelphia, del.	2.26c-2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Base, 3 to 25 tons)

(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.	
Stand. wire nails	2.10c
Cement c't'd nails	2.10c
Galv. nails, 15 gage and finer	4.10c
do. finer than 15 ga.	4.60c

(Per pound)

Polished staples	2.80c
Galv. fence staples	3.05c
Barbed wire, galv.	2.60c
Annealed fence wire	2.65c
Galv. fence wire	3.00c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.40c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.05c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleve., Chi., up 5c Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons.*)

Pittsburgh, Buffalo, Chicago, Massilon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni	1.05
5100 0.80-1.10 Cr	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon Van.	0.95
9200 spring flats	base
9200 spring rounds, squares	0.25

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

(Base, hot rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in. Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, del.	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold strip, 0.25 carbon and under, Pitts., Cleveland	2.60c
Detroit, del.	2.81c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
*70-75 lbs.	$25.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.60c
Track bolts, base	3.60c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932 lists:

Carriage and Machine

½ x 6 and smaller	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off

Plow Bolts

All sizes	70-10 off

Stove Bolts

In packages with nuts attached 72½-10-10 off; in packages with nuts separate 72½-10-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	65-5 off
Elevator bolts	65-5 off

Nuts

S. A. E. semifinished hex.; ½ to ⅞-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila. to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more, no discount on size extras	$3.05
Do., under 5 kegs; no disc. on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
¼ and ⅜	60	44½
½	64½	55
¾	67½	59
1—3	69½	61½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel

2	62	53½
2½—3	65	56½
3½—6	67	58½
7 and 8	66	56½
9 and 10	65½	56

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel

⅛, butt weld	56
¼ and ⅜, butt weld	59
½, butt weld	63½
¾, butt weld	66½
1 to 3, butt weld	68½
2, lap weld	61
2½ to 3, lap weld	64
3½ to 6, lap weld	66
7 and 8, lap weld	65

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4 in.	46.00

Class A pipe $3 over Class B Stnd. fitgs., Birm. base..$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo & Youngstown	$28.00
Philadelphia	34.67
Duluth	30.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Chi., Cleve., Young.	28.00

Wire Rods

Pitts., Cleve., No. 4 to 5	$38.00
Do., No. 5 to 15/32-inch	40.00
Do., over 15/32 to 47/64-inch	42.00

Chicago up $1; Worcester up $2

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.80c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.50- 3.65
Connellsville, fdry.	4.25- 4.35
Connel. prem. fdry.	5.35- 5.50
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.70-10.15
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants

Tank lots	Spot
Pure and 90% benzol	18.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	7.25c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.30

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20.20	.....	19.20	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago or Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†19.68	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		Lylees, Tenn.	22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent $22.75; 6.51-7—$23.25; 7-7.50—$23.75; 7.51-8—$24.25; 8-8.50—$24.75; 8.51-9—$25.25; 9-9.50—$25.75. Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon. 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo., Ky.	$45.00
Alabama, Ga.,	$38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	48.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$20.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all-rail	$18.00
Do., for barge	$19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Balti., base	75.00
Do., del. Pittsb'gh	80.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	69.50
Do., less carload	77.00
Do., 75 per cent. Spot, $5 a ton higher.	126-130.00
Silicoman., 2½ carb. 2% carbon, 90.00; 1%,	85.00 100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.30- 1.40
Ferrovanadium, 35 to 40% lb., cont.	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	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 Chinese Spot, N. Y.	Nickel Cathodes
May 2	9.50	9.62½	9.12½	47.00	45.60	4.60	4.45	4.90	*19.00	13.50	35.00
May 4	9.50	9.62½	9.12½	46.87½	45.55	4.60	4.45	4.90	*19.00	13.50	35.00
May 5	9.50	9.62½	9.12½	46.85	45.50	4.60	4.45	4.90	*19.00	13.50	35.00
May 6	9.50	9.62½	9.12½	46.70	45.35	4.60	4.45	4.90	*19.00	13.50	35.00
May 7	9.50	9.62½	9.12½	46.60	45.10	4.60	4.45	4.90	*19.00	13.50	35.00
May 8	9.50	9.62½	9.12½	46.60	45.10	4.60	4.45	4.90	*19.00	13.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
*Yellow brass (high)	15.12½
*Copper, hot rolled	17.00
Lead cut to jobers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	17.37½
Seamless copper	17.50
Rods	
High yellow brass	13.12½
Copper, hot rolled	13.75
Anodes	
*Copper, untrimmed	14.50
Wire	
Yellow brass (high)	15.37½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	6.25- 6.50
*Cleveland	6.50- 6.75
Chicago	6.00- 6.25
St. Louis	6.00- 6.50
Heavy Copper and Wire	
New York, No. 1	7.75- 8.00
Chicago, No. 1	7.00- 7.50
*Cleveland	6.75- 7.00
*St. Louis, No. 1	7.25- 7.50
Composition Brass Borings	
New York	5.87½- 6.00
Light Copper	
New York	6.37½- 6.50
Chicago	5.50- 6.00
*Cleveland	5.75- 6.00
*St. Louis	5.50- 6.00
Light Brass	
Chicago	3.50- 3.75
*Cleveland	3.25- 3.50
St. Louis	3.50- 4.00
Lead	
New York	3.50- 3.75
Cleveland	3.50- 3.75
Chicago	3.37½-3.62½
St. Louis	3.50- 4.00
Zinc	
New York	3.00-3.12½
*Cleveland	2.25- 2.50
St. Louis	2.50- 3.00
Aluminum	
*Borings, Cleveland	8.75- 9.00
*Mixed, cast, Cleve.	12.25-12.50
*Mixed, cast, St. L.	12.75-13.00
*Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5	9.50
Stand. No. 12 alum.	17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	10.00-10.75
Boston, dock. expt.	10.75-11.00
Boston, domestic	9.50-10.25
Buffalo, No. 1	13.50-14.00
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.00-13.50
Cleveland, No. 1	14.00-14.50
Cleveland, No. 2	13.00-13.50
Detroit, No. 1	11.25-11.75
Detroit, No. 2	9.50-10.00
Eastern Pa., No. 1	12.75-13.00
Eastern Pa., No. 2	12.00
Federal, Ill.	11.00-11.50
Granite City, R. R.	12.25-12.75
Granite City, No. 2	10.75-11.25
N. Y., brokers, No. 2	8.00- 8.50
N. Y., brokers, barge (No. 1 for export)	10.00
Pitts., No. 1 (R. R.)	15.25-15.75
Pitts., No. 1 (dlr.)	14.50-15.00
Pittsburgh, No. 2	13.50-14.00
St. Louis	11.25-11.75
Toronto, dealers	7.50
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo, dealers	12.00-12.50
Chicago, factory	12.25-12.75
Chicago, dealer	11.75-12.25
Cleveland	13.75-14.25
Detroit	11.50-12.00
E. Pa., new mat.	12.50-13.00
Pittsburgh	14.75-15.25
St. Louis	9.00- 9.50
Valleys	14.50-15.00

BUNDLED SHEETS

Buffalo	11.00-11.50
Cincinnati, del	7.75- 8.25
Cleveland	10.00-10.50
Pittsburgh	13.50-14.00
St. Louis	7.25- 7.75
Toronto, dealers	4.50

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati	6.50- 7.00
Detroit	8.50- 9.00
St. Louis	6.50- 7.00

STEEL RAILS, SHORT

Birmingham	12.50-13.00
Buffalo	15.75-16.25
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, del.	14.00-14.50
Detroit	15.00-15.50
Pitts., open-hearth, 3 ft. and less	16.25-16.75
St. Louis, 2 ft. & less	14.75-15.25

STEEL RAILS, SCRAP

Boston	9.00- 9.50
Chicago	13.00-13.50
Pittsburgh	15.25-15.75
St. Louis	14.50-15.00
Buffalo	13.50-14.00
Toronto, dealers	8.50

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.25
Buffalo	11.25-11.75
Chicago	7.50- 8.00
Cincinnati, dealers	7.75- 8.50
Detroit, net	9.00- 9.50
Eastern Pa.	10.50
N. Y., brokers, fdry.	7.50- 7.75
St. Louis	7.50- 8.00
Toronto, dealers, net	5.50

COUPLERS, SPRINGS

Buffalo	14.75-15.25
Chicago, springs	14.50-15.00
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
St. Louis	13.00-13.50

ANGLE BARS—STEEL

Chicago	14.50-15.00
St. Louis	13.50-14.00
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	14.50-15.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	15.00-15.50
Cleveland, billet, bloom crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pittsburgh, billet, bloom crops	17.25-17.75
Pittsburgh, sheet bar crops	16.75-17.25

FROGS, SWITCHES

Chicago	13.00-13.50
St. Louis, cut	12.75-13.25

SHOVELING STEEL

Chicago	13.00-13.50
Federal, Ill.	11.00-11.50
Granite City, Ill.	10.75-11.25
Toronto, dealers	6.50

RAILROAD WROUGHT

Birmingham	7.50- 8.00
Boston, dealers	7.25- 7.50
Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	13.50-14.00
Chicago, No. 1, net	12.25-12.75
Chicago, No. 2	13.00-13.50
Cincinnati, No. 2	11.25-11.75
Eastern Pa.	13.00-13.50
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.25-12.75
Toronto, No. 1. dlr.	7.00

SPECIFICATION PIPE

Eastern Pa.	12.00
New York, dealers	7.75- 8.00

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.00-12.50
Cinci., No. 1, deal.	8.50- 9.00
Cincinnati, No. 2	4.50- 5.00
Cleveland, No. 2	8.25- 8.75
Detroit No. 1, new	10.50-11.00
Valleys, new, No. 1	14.00-14.50
Toronto, dealers	6.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.25
Chicago	6.50- 7.00
Cincinnati, dealers	5.75- 6.25
Cleveland	7.50- 8.00
Detroit	6.25- 6.75
Eastern Pa.	8.50
New York, brokers	3.50- 4.00
Pittsburgh	10.00-10.50
St. Louis	4.50- 5.00
Toronto, dealers	4.00
Valleys	10.00-10.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.25- 2.50
Buffalo	8.50- 9.00
Cincinnati, dealers	5.75- 6.25
Cleveland	8.25- 8.75
Detroit	6.75- 7.25
Eastern Pa.	6.50- 7.00
New York, brokers	3.25- 3.75
Pittsburgh	8.75- 9.25
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham, plain	5.00- 6.00
Boston, chemical	6.00- 6.25
Boston, dealers	3.50- 4.00
Buffalo	8.25- 8.50
Chicago	6.00- 6.50
Cincinnati, dealers	5.25- 6.25
Cleveland	8.25- 8.75
Detroit	6.75- 7.25
E. Pa., chemical	11.00-13.00
New York, brokers	4.50- 5.00
St. Louis	4.00- 4.50
Toronto, dealers	5.00

PIPE AND FLUES

Cincinnati, dealers	7.75- 8.25
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	11.00-11.50
Chicago, net	8.50- 9.00
Cincinnati	7.00- 7.50
Eastern Pa.	10.50
New York, brokers	6.50- 7.00
St. Louis	7.50- 8.00

FORGE FLASHINGS

Boston, dealers	7.75- 8.00
Buffalo	12.00-12.50
Cleveland	13.00-13.50
Detroit	9.75-10.25
Pittsburgh	13.50-14.00

FORGE SCRAP

Boston, dealers	6.00- 7.00
Chicago, heavy	15.00-15.50
Eastern Pa.	12.50-13.00

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

AXLE TURNINGS

Boston, dealers	5.75- 6.00
Buffalo	11.00-11.50
Chicago, elec. fur.	13.00-13.50
Eastern Pa.	12.00-12.50
St. Louis	9.00- 9.50
Toronto	4.50

STEEL CAR AXLES

Birmingham	12.00-13.00
Boston, ship. point.	11.00-11.25
Buffalo	15.25-15.75
Chicago, net	14.75-15.25
Eastern Pa.	17.00
St. Louis	13.50-14.00
Toronto	8.50

SHAFTING

Boston, ship point.	13.75-14.00
Eastern Pa.	18.50-19.00
New York, brokers	14.25-14.50
St. Louis	13.50-14.00

CAR WHEELS

Birmingham	11.00-12.50
Boston, iron deal.	8.75- 9.00
Buffalo, iron	13.50-14.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.25-13.75
Chicago, rolled steel	14.50-15.00
Cincinnati, iron	10.50-11.00
Eastern Pa., iron	14.00-14.50
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	14.25-14.75
Pittsburgh, steel	17.00-17.50
St. Louis, iron	11.50-12.00
St. Louis, steel	13.25-13.75
Toronto, net	8.50

NO. 1 CAST SCRAP

Birmingham	11.00-12.00
Boston, No. 1 mach.	9.25- 9.75
Boston, No. 2	9.50-10.00
Boston, tex. con.	11.50-12.00
Buffalo, cupola	12.75-13.25
Buffalo, mach.	13.50-14.00
Chicago, agri. net	10.25-10.75
Chicago, auto	11.50-12.00
Chicago, mach. net	11.75-12.25
Chicago, railr'd net	11.25-11.75
Cinci., mach. cup	10.75-11.25
Cleveland, mach.	16.00-16.50
Eastern Pa., cupola	14.00-14.50
E. Pa., mixed yard	12.00
Pittsburgh, cupola	14.50-15.00
San Francisco, del.	13.50-14.00
Seattle	10.00-11.00
St. Louis, No. 1	11.00-11.50
St. L., No. 1 mach.	12.00-12.50
Toronto, No. 1, mach., net	9.00

HEAVY CAST

Boston, del.	8.00- 8.25
Buffalo, break.	11.00-11.50
Cleveland, break	12.50-13.00
Detroit, No. 1 mach. net	13.00-13.50
Detroit, break.	11.00-11.50
Detroit, auto net	12.50-13.00
Eastern Pa.	13.00-13.50
New York, break. brokers	9.25- 9.50
Pittsburgh	13.50-14.00

MALLEABLE

Birmingham, R. R.	11.50-12.50
Boston, consum.	16.75-17.25
Buffalo	16.00-16.50
Chicago, R. R.	16.00-16.50
Cincinnati, agri. del.	13.00-13.50
Cleveland, rail	17.00-17.50
Detroit, auto, net	14.50-15.00
Eastern Pa., R. R.	17.00-17.50
Pittsburgh, rail	18.00-18.50
St. Louis, R. R.	14.00-14.50
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	12.00-13.00
Boston, dealers	9.00- 9.50
Buffalo	13.50-14.00
Chicago	14.75-15.25
Eastern Pa.	15.00-15.50
New York, brokers	10.25-10.50
St. Louis	14.00-14.50

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	12.00-12.50

LOW PHOS. PUNCHINGS

Buffalo	15.25-15.75
Chicago	15.50-16.00
Eastern Pa.	16.00-16.50
Pittsburgh (heavy)	17.50-18.00
Pittsburgh (light)	16.50-17.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 50-52%	26.00
So. African, 50-52%	26.00
Indian, 50-52%	26.00

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.00c
Boston††	3.10c
Buffalo	3.00c
Chattanooga	3.36c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.11c-3.26c
New Orleans	3.35c
New York‡ (d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.50c
San Francisco	3.25c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.36c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.25c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.36c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.37c
Philadelphia*	2.98c
Pittsburgh (h)	3.15c
Portland (i)	3.50c
San Francisco	3.25c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh (h)	3.15c
Portland	3.35c
San Francisco	3.25c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.75c
Milwaukee	3.16c
New Orleans	3.55c
New York‡(d)	3.31c
Portland	3.35c
Philadelphia*	3.08c
Pittsburgh (h)	2.95c
San Fracisco	3.35c
Seattle	3.70c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York‡(d)	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.10c
San Francisco	4.00c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.40c
Milwaukee	4.66c
New Orleans	4.95c
New York‡(d)	4.30c
Philadelphia*†	4.40c
Pitts.** (h)	4.15-4.45c
Portland	4.50c
San Francisco	4.50c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c

BANDS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York‡(d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston††	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York‡(d)	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c

COLD FIN. STEEL

Baltimore (c)	3.73c
Boston	3.90c
Buffalo (h)	3.55c
Chattanooga*	4.13c
Chicago (h)	3.50c
Cincinnati	3.72c
Cleveland (h)	3.50c
Detroit	3.79c
Los Ang. (f) (d)	5.85c
Milwaukee	3.61c
New Orleans	4.30c
New York‡(d)	3.81c
Philadelphia	3.76c
Pittsburgh	3.50c
Portland (f) (d)	6.15c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.15c
St. Louis	3.75c
St. Paul	4.02c
Tulsa	4.65c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	3.246c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	2.85c
Detroit	3.18c
New York‡(d)	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill. size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic steel; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; † New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 7

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
			Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON	£ s d			£ s d
Foundry, 2.50-3.00 Silicon	$15.50	3 2 6*	$14.14	1 15 0
Basic bessemer	15.50	3 2 6*	12.13	1 10 0
Hematite, Phos. .03-.05	19.64	3 11 0	.....	.....
SEMIFINISHED STEEL				
Billets	$29.17	5 17 6	$18.96	2 7 0
Wire rods, No. 5 gage	44.48	8 19 0	36.37	4 10 0
FINISHED STEEL				
Standard rails	$41.00	8 5 0	$44.12	5 10 0
Merchant bars	1.71c	7 15 0	1.14c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.66c	7 10 0	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.78c	8 1 3	1.55c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.15c	9 15 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.60c	11 15 0	2.29c	6 5 0
Bands and strips	1.93c	8 15 0	1.42c	4 0 0
Plain wire, base	2.15c	9 15 0	1.92c	5 5 0
Galvanized wire, base	2.54c	11 10 0	2.15c	5 17 6
Wire nails, base	2.65c	12 0 0	1.74c	4 15 0
Tin plate, box 108 lbs.	$ 4.63	0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

				French Francs		Belgian Francs		Reich Marks
		£ s d						
Fdy. pig iron, Si. 2.5	$17.39	3 10 0	(a) $17.13	260	$13.93	410	$25.43 (b)	63
Basic bessemer pig iron	17.39	3 10 0	(a) 12.52	190	11.89	350	28.04 (b)	69.50
Furnace coke	5.22	1 1 0	6.26	95	5.16	122	7.67	19
Billets	28.97	5 17 6	28.34	430	18.86	555	38.95	96.50
Standard rails	1.82c	8 5 0	2.00c	671	1.69c	1,000	2.41c	132
Merchant bars	2.00c	9 1 0	1.67c	560	1.00c	650	2.01c	110
Structural shapes	1.93c	8 15 0	1.64c	550	1.00c	650	1.92c	107
Plates, †¼-in. or 5 mm.	2.00c	9 1 3	2.09c	700	1.23c	800	2.32c	127
Sheets, black	2.54c	11 10 0§	1.78c	600‡	1.34c	875‡	2.63c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.98c	13 10 0	2.84c	950	2.29c	1,500	6.76c	370
Plain wire	2.15c	9 15 0	2.68c	900	1.76c	1,150	3.16c	173
Bands and strips	2.17c	9 16 0	1.98c	650	1.23c	800	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price, British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.
**Gold pound sterling carries a premium of 66.00 per cent over paper sterling.

Bars

Bar Prices, Page 88

Pittsburgh—By comparison with early April, May has shown a 5 to 10 per cent increase in volume of merchant bar specifications. This is due partly to the reappearance of some bar users who were well stocked in early April and have since depleted their inventories. The quantity deduction bracket on 150 tons and over is growing in popularity, for which prices are based on 1.70c, Pittsburgh. This is figured as $3 off from the base market of 1.85c, Pittsburgh, for 3 to 25-ton lots.

Cleveland—Each week increases the cumulative total of steel bars placed this year, over the comparable period last year. To a large extent, miscellaneous tonnage is figuring in this record. Demand from manufacturers of farm tools and implements, steam shovels and road machinery is strong, while little change is noted in the volume from automobile interests. Prices are firm.

Chicago—Steel bar sales and specifications continue at their recent active rate and the favorable outlook in the automotive and farm implement industries points to a maintenance of good demand through May. Retail sales of implements and tractors are the heaviest since 1930 and despite heavy production dealers have been unable to accumulate large stocks. Crop prospects continue moderately favorable in spite of insufficient rain in some sections. Automotive bar demand is holding well. Miscellaneous bar buying makes a favorable comparison with that of recent weeks.

Boston—Demand for steel bars is in good volume for current requirements since there has been little contracting for second quarter. Particularly satisfactory is the demand for forging quality bars which has shown a tendency to expand. Bars continue firm at 1.85c, base, Pittsburgh, equivalent to 2.27c, delivered, Boston.

Philadelphia—While commercial steel bar tonnage is normally light in this district, sellers report better specifications recently than early in the quarter. Improvement is of diversified character. Prices are steady.

Ferroalloys

Ferroalloy Prices, Page 90

New York—Ferromanganese shipments are heavy, sellers anticipating almost as good business in May as in April. Prices are steady.

Plates

Plate Prices, Page 88

Pittsburgh—The largest order for steel river barges in this district in almost a year has been placed with the Leetsdale, Pa., shops of Bethlehem Steel Co. Hatfield Campbell-Creek Coal Co., Cincinnati, has awarded a contract for 29 standard coal barges requiring 4500 tons of steel plates and structural shapes. The 29-barge order is the largest since last summer when Mississippi Valley Barge Lines placed an order for 40 barges with the American Bridge Co., Pittsburgh. Prospects now appear favorable for the purchase soon of eight steel tank barges and a total of 12 standard coal barges by several downriver concerns.

Pittsburgh-Des Moines Steel Co. has taken a 350-ton standpipe job at Quincy, Mass., and several small projects are pending. The plate market is based on 1.80c, Pittsburgh.

Cleveland—The market for plates has shown considerable improvement, and the Cleveland mill last week operated at capacity, although for some weeks prior the rate was about 50 per cent. The gain is mainly in demand for railroad and tank material. Numerous small orders for plates are coupled with structural shape requirements, for private work. Akron rubber companies have made several sizable purchases for molds. Five hundred tons for rebuilding one of Republic Steel Corp.'s four blast furnaces at the Corrigan, McKinney plant still are pending.

Chicago—The outlook for heavier plate demand from railroads is more favorable as a result of increasing equipment purchases under consideration. Current demand from railroad shops is in the best volume for the past several years. The plate movement to structural fabricators shows no improvement, but compares favorably with that of previous months. Plate orders for oil tank construction are heavier, some fairly large tonnages having been booked recently. Prices are steady.

Boston—Demand for steel plates continues good. Most orders are small but several jobs involve several hundred tons each. The market holds at 1.90c, Coatesville, Pa., equivalent to 2.22c, delivered, Boston.

New York—While demand for steel plates continues to lag prospects are brighter. Considerable tonnage for railroad cars and repairs is pending and more miscellaneous tank tonnage is being figured. On 300 tons for oil tanks at West Point, N. Y., for the war department bids exceeded the appropriation. Bethlehem Steel Co. was low.

Philadelphia—While plate tonnage continues to lag, indications point to further shipwork soon and further freight car requirements. At present there are understood to be close to 10 boats, principally tankers, under contemplation. An outstanding tank award involves 270 tons for the Patterson Oil Terminals Inc. for erection at Paulsboro, N. J. Plate prices are unchanged at 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia.

San Francisco—Bids will be called for shortly for 15,000 tons of plates for the Stone river pipe line for Los Angeles. General Engineering & Drydock Co., San Francisco, is low in bids for a hopper dredge for the government at San Francisco, requiring 300 tons of plates and 200 tons of shapes.

Seattle—Bids were opened by Seattle May 5 for the East Marginal Way pipe line, totaling 300 tons of plates. Fabricating plants reported increased interest and several sizable jobs are up for figures.

Contracts Placed

4500 tons, 29 standard steel coal barges, 175 x 26 x 11 feet, for Hatfield-Campbell Creek Coal Co., Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa.

2700 tons, 16-inch welded steel pipe, Sheridan, Wyo., to Western Pipe & Steel Co., San Francisco.

1100 tons, five standard coal barges for Ohio River Co., Cincinnati.

598 tons, tanks for Phelps-Dodge Corp., Ajo, Ariz., to unnamed interest.

400 tons, three trawlers for Bay State Fishing Co., Boston, to Bath Iron Works Corp., Bath, Me.

350 tons, standpipe, Quincy, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

270 tons, tanks, Patterson Oil Terminals Inc., Paulsboro, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, flotation cells, Phelps-Dodge Corp., Ajo, Ariz., to unnamed interest.

130 tons, shore pipe, United States Engineer Office, San Francisco, to Pacific Coast Engineering Co., Oakland, Calif.

100 tons, shore pipe, for Port of Astoria, Oreg., to Puget Sound Machinery Depot, Seattle.

100 tons, 14-inch welded steel pipe, specification 1918, Los Angeles, to unnamed interest.

100 tons, penstock and sewage tank addition, Newport, Vt., to Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.

Contracts Pending

15,000 tons, Stone river pipe line, Los Angeles; bids soon.

300 tons, hopper dredge for United States engineer's office, San Francisco; General Engineering & Drydock Co., San Francisco, low at $635,000.

125 tons, fishing trawler for Irving Usen Co., Boston, to Bath Iron Works, Bath, Me.

Unstated tonnage, construction of a self-propelled 20-inch pipe line dredge; bids to St. Paul federal engineers, June 3.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Bolt, nut and rivet buying from railroad car shops is a feature in the Pittsburgh district, many jobbers are replenishing stocks and the agricultural implement trade is buying well.

At Cleveland, orders are in steady volume, and no letdown is anticipated this month. The industry generally is operating at 65 per cent.

Prices hold at 70-10-5 off for small carriage and machine bolts, with 70-10 off for larger sizes, and the market is fairly firm although there are reports of some concessions. Large structural rivets are quoted 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago, and small rivets, 70-5 off list.

Transportation

Track Material Prices, Page 89

Contribution of railroads to the steel industry's tonnage at the moment is principally in carbuildlng materials and rail buying is at a minimum. Not less than 11,700 cars are on inquiry and western roads are expected to bring their purchases to a total of 25,000 cars before midyear. Pending cars include those of the Chesapeake & Ohio, Pere Marquette, Southern Pacific, Norfolk & Western and Missouri Pacific.

At the usual requirements, these 11,700 cars will require from 120,000 to 150,000 tons of steel, delivery of which will be well spread as shops are able to take it in.

Pacific Car & Foundry Co., Seattle, will build the 500 refrigerator cars awarded to it recently by Pacific Fruit Express, at its plant at Renton, Wash. The cars will require 4500 tons of shapes, 750 tons of plates and 750 tons of axles.

Chesapeake & Ohio will open bids May 11 on its inquiry for 5300 to 5400 freight cars and Pere Marquette on the same date for 500 cars. Awards are expected to be made this week.

Missouri Pacific has reinstated its inquiry for 1500 box and 500 hopper cars, federal court authorizing the trustee to ask for bids. Part of the cost may be met by equipment trust certificates.

The pending 1000 all-steel coal cars, of 57½ tons capacity each, for Norfolk & Western will be built in outside shops, instead of their own, the trade is reliably informed. The company now has a number of cars going through its shops at Roanoke, Va.

A brisk demand for relaying rails continues, buying having become especially noticeable about two to three weeks ago. Much of light-rail buying by industrial concerns for track siding repairs and renewals has also come into the market. Demand from coal mines is still of significant proportions, although it has declined somewhat from the peak reached about the third week of April.

Domestic freight car awards in April of 4427 brought the total for the first four months up to 14,009, which compares with 1180 in the corresponding period of last year, 20,707 in the first four months of 1934 and 58 in the same period of 1932. April business was the second largest this year, being topped by the February total of 6900. Further comparisons follow:

	1936	1935	1934	1933
Jan.	2,050	24	152	3
Feb.	6,900	806	19,725	0
March	632	0	30	5
April	4,427	350	800	50
4 mos.	14,009	1,180	20,707	58
May		2	717	8
June		5,151	1,835	500
July		500	19	306
Aug.		200	105	202
Sept.		875	7	23
Oct.		1,250	75	514
Nov.		100	254	533
Dec.		10,050	110	316
Total		19,308	23,829	2,460

Car Orders Placed

Chicago & North Western, steel underframes for eighteen 50-ton automobile box cars, to American Car & Foundry Co., New York.

Chicago, Rock Island & Pacific, remodeling four buffet baggage cars, to American Car & Foundry Co., New York.

Locomotives Placed

Alton & Southern, one 2-8-2 type locomotive, to Baldwin Locomotive Works, Eddystone, Pa.

Car Orders Pending

Missouri Pacific, 1500 box and 500 hopper cars; court permission given to ask bids.

Norfolk & Western, 1000 57½-ton all-

steel coal cars.
Southern Pacific, 2800 freight cars, principally box and gondola cars; bids June 1.

Buses Booked

J. G. Brill Co., Philadelphia: Nine 30-passenger trackless trolleys for St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo.
General Motors Truck Corp., Pontiac, Mich.: Ninety motor buses for New York City Omnibus Corp., in addition to 486 previously approved by New York state transit commission.
American Car & Foundry Motors Corp., New York: Four 30-passenger for Northern Texas Traction Co., Fort Worth, Tex.

Sheets

Sheet Prices, Page 88

Pittsburgh — Possibly within another week sheet producers will begin considering third quarter prices. So far through the second quarter the quantity method of quoting sheets apparently has pleased the majority of buyers, and aside from a few detail refinements which may be made in the near future, the basic idea appears to have solved a price problem. Specifications increased last week, both stamping and full-finished grades leading in the improvement, with some gain also in heavy and electrical sheets. The galvanized market appears to be maintaining its early spring peak longer than usual this year.

Cleveland—Pressure for sheet deliveries to automobile manufacturers has eased slightly, although mills still have good backlogs, and earliest deliveries on new orders for most grades of sheets range from three to four weeks. Some of the slack in automotive tonnage has been taken up by an increase in demand from manufacturers of refrigerators, washing machines, and stoves.

Chicago—No slackening is apparent in sheet demand, nor is any anticipated during the balance of May. Automotive interests are placing orders for June shipment and the tonnage involved compares favorably with that being taken against previous commitments. Miscellaneous demand also is well maintained and mills are pressed to give deliveries of better than three to four weeks on most grades. Demand for galvanized roofing is suffering because of heavy buying during the recent period of price weakness. Quotations currently are reported steady and mills are gratified by the success to date of the new pricing policy adopted a short time ago.

Boston—As a result of the heavy specifications against first quarter sheet contracts, current buying is

small. Consumption, however, actually is heavy. No active new buying is expected before the early part of June. Mills are firm at 3.10c. base, Pittsburgh, for No. 24 galvanized, but occasionally jobbers are selling carloads at slight concessions.

New York—Sheet consumption is well sustained, with considerable pressure for deliveries in many quarters as stocks ordered in March become absorbed. Consumption is exceeding trade expectations. Manufacturers of household devices are among the most active consumers, although building requirements are expanding. The minimum delivery on cold finished sheets now is around four weeks, with some producers unable to do much under five and six weeks. On certain specialties such as electrical sheets producers are booked up to July. Galvanized sheets are available in two to four weeks, depending upon coating and other factors. Black and blue annealed are available in two to three weeks.

Philadelphia—Due primarily to continued heavy demands in the Middle West from the automotive industry, sheet sellers here report deferred deliveries on cold finished sheets and on certain grades of hot rolled. New tonnage is expanding slowly, as consumers use up stocks laid in the closing weeks of last quarter. Prices in general are steady, although some minor deviations are noted from time to time—for instance, in the matter of cash discounts, where sellers base the discount on the delivered price instead of the mill price. Bids will be opened May 15 on 52 tons of No. 16 gage coated sheets, 24 x 72 inches, for the Western state penitentiary in Pennsylvania.

Buffalo—Sheet mills here continue to operate at 85 per cent, and have bookings for this rate for this month.

Cincinnati—Bookings assure near-capacity operation of sheet mills through May. New ordering is in less volume than the 1936 peak, but considered seasonally heavy.

St. Louis — Sheet business continues to expand. Demand for galvanized material, for roofing and general manufacturing, is reported the most active for this season in a number of years.

Birmingham, Ala. — Operation of sheet mills in the southern territory is steady. Mill stocks are being kept at high level, but shipments from mills direct also are heavy.

Pipe

Pipe Prices, Page 89

Pittsburgh—The inquiry of Shell Oil Co., West coast subsidiary of Shell Union Oil Corp., for 304-mile pipe line requiring 25,000 tons of pipe is of considerable interest to pipe producers here. This project along with the 360-mile Old Dutch Refining Co., Muskegon, Mich., line are the most promising in the market for line pipe. Plans of Shell Oil Co. to spend about $4,000,000 for new plants and equipment at Houston, Tex., and Socony-Vacuum Corp. to spend about $1,500,000 for similar work at Olean, N. Y., will in turn require substantial lots of tubular products. Recent estimates by the federal housing administration state that 250,000 new homes will be built in 1936, a development from which standard pipe will greatly benefit. At present the average of all pipe mill operations is close to 55 per cent, a slight increase from two weeks ago.

Cleveland — Small orders from municipalities for cast pipe are fairly numerous. Steel pipe demand here is restricted mainly to jobbers' requirements. Of the $42,500,000 budget for modernization and expansion this year by Standard Oil Co. of

Indiana, $3,500,000 is slated for pipe lines.

Chicago—Cast pipe shipments against old contracts are fairly steady but new business is slow. Considerable pipe laying for projects under consideration for the past 12 months remains to be done and more favorable weather is aiding such work. Both inquiries and awards recently have been light. Prices continue steady.

Boston—Considerable activity is reflected in the cast pipe market here. A number of large tonnages and a great many small orders have been placed. New inquiry, however, is comparatively small.

New York—The cast pipe market here continues very quiet, with no lettings or inquiries of size.

Secondary market on commercial steel pipe is showing a firmer tendency than in some months, although a further test will be required to gage the full extent. Tonnage reflects gradually improved building operations.

Philadelphia—A substantial line pipe tonnage has been placed here, it is reliably reported. Local pipe sellers are figuring on 1200 feet of 24-inch and 600 feet of 12-inch welded steel pipe for the navy, on which bids are to be opened May 15.

Birmingham, Ala.—While new lettings are not as numerous, and tonnages a little depressed, there is enough business in hand to warrant full operation of pipe shops in the district. Some spot business has been refused recently, because of impossible delivery specifications

San Francisco—Less than 500 tons of cast pipe is pending, and awards are confined to lots ranging from 30 to 60 tons. The only new inquiry of size calls for 268 tons of 12 and 16-inch class C pipe for San Diego, Calif., up for figures on May 7. Western Pipe & Steel Co. of California, San Francisco, has been awarded 2700 tons of 16-inch welded steel pipe for Sheridan, Wyo.

Seattle—Demand remains slow, with awards delayed and little new business developing. Beall Pipe & Tank Co., Portland, Oreg., was awarded about 150 tons of 14-inch dipped steel pipe for Camas, Wash. Seattle opened bids May 5 for 175 tons 8-inch centrifugal cast pipe and accessories for the East Marginal Way improvement. United States Pipe & Foundry Co., Burlington, N. J., has booked a small tonnage of 4 and 6-inch for Centralia, Wash., and 225 tons of 4 to 8-inch for King county district No. 3 are pending.

Cast Pipe Placed

1600 tons, Harwick, Mass., to United States Pipe & Foundry Co., Burlington, N. J., through C. Repucci, Boston.

800 tons, 6, 8 and 12-inch, Mansfield, Mass., to Warren Foundry & Pipe Corp., Phillipsburgh, N. J.

800 tons, 6, 8 and 12-inch, Providence, R. I., to United States Pipe & Foundry Co., Burlington, N. J.

350 tons, Westerly, R. I., to United States Pipe & Foundry Co., Burlington, N. J.

300 tons, Seville, O., to James B. Clow & Sons, Chicago.

278 tons, 12-inch, WPA work, Boston, to Warren Foundry & Pipe Corp., Phillipsburgh, N. J.

250 tons, Salisbury, Mass., to Warren Foundry & Pipe Corp., Phillipsburgh, N. J.

200 tons, 6 and 8-inch, Waterbury, Conn., to Donaldson Iron Co., Emaus, Pa.

200 tons, Milton, Mass., to Warren Foundry & Pipe Corp., Phillipsburgh, N. J.

150 tons, Bellevue, O., to James B. Clow & Sons, Chicago.

110 tons, Danville, O., to James B. Clow & Sons, Chicago.

100 tons, 6 and 8-inch, Concord, N. H. to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, Auburn, N. H., to Warren Foundry & Pipe Corp., Phillipsburgh, N. J., through procurement division, treasury department, Boston.

Steel Pipe Placed

150 tons, 14-inch dipped, for Camas,

Wash., to Beall Pipe & Tank Co., Portland, Oreg.

Cast Pipe Pending

375 tons, sewer project, Columbus, O.; general contract bids in.
268 tons, 12 and 16-inch, San Diego, Calif.; bids May 7.

Steel Pipe Pending

25,000 tons, 260-mile pipe line and 44 miles of gathering lines, Shell Oil Co. line between Bakersfield, Calif. and Martinez, Calif. (San Francisco Bay). Company is the West Coast subsidiary of Shell Union Oil Corp.

Strip Steel

Strip Prices, Page 89

Pittsburgh—Surprising vitality is shown in volume of strip steel specifications and a slight increase occurred last week over the week preceding. Requirements of strip for automobile frames, fenders, and a smaller parts are still amounting to heavy tonnage. Requirements for refrigerator manufacture, building trim and miscellaneous uses are also well represented. Most buyers seem satisfied with the present basis of quoting, with 1.85c, Pittsburgh, base on hot-rolled and 2.60c, Pittsburgh or Cleveland, for cold-rolled.

Cleveland—While strip tonnage is considerably lower than late in March and early April no further decline has been noted since those shipments were completed and prices stabilized. Specifications from automobile manufacturers and parts-makers are more normal; mills are giving deliveries in two weeks.

Chicago—Strip buying is in better volume than was expected 30 days ago. Heavy tonnages taken in anticipation of higher prices have been consumed rapidly and new business lately bulks fairly large. Active demand from automotive interests is in prospect for at least the next 30 days, and a steady rate of consumption among miscellaneous users. A steady tone has been shown in prices on new business lately, the situation being in marked contrasts to that prevailing earlier this year.

Boston—Consumption of strip steel is active. There is little new buying, however, as consumers and jobbers generally have large stocks. The market is unchanged at 2.80c, base, Worcester, Mass., for cold-rolled strip steel and 1.85c, base, Pittsburgh, for hot-rolled strip.

New York—Automobile accessory manufacturers continue to specify heavily for narrow cold strip, this being the feature of the market for this product.

Wire

Wire Prices, Page 89

Pittsburgh—For the past two weeks specifications covering plain manufacturing wire indicate the downward trend of mid-April has ceased and demand has been on a steady basis. On a Pittsburgh base, plain manufacturing wire is quoted 2.40c per pound for 6-9 gage base, with spring wire on a 3.05c, Pittsburgh base. Nails appear firmer than in some months and though buying is light, the $2.10, Pittsburgh, base is well observed. Jobbers' allowances in all wire products except woven wire fencing continue at $2 per ton for carloads on either stock or direct shipment and $3 per ton for less-carload, with the woven-wire fence allowance $4 per ton on either carload or less-carload.

Cleveland—Demand for farm fencing and material, long held back by adverse weather conditions, has increased to substantial proportions, and orders for manufacturers' wire are well sustained. Some mills affected by the floods have lost considerable business because of in-

ability to give deliveries for five to six weeks, not having been able to accumulate the usual stocks.

Chicago—Demand from manufacturers' wire consumers is holding well, particularly in the automotive industry, and with fair business being received for merchant products, the outlook for May is favorable. While some buyers anticipated future requirements during the first quarter price weakness, new business has been in fair volume and prices generally are well maintained. The movement of merchant products in agricultural districts, while restricted in some sections, makes a fair showing, with further improvement seen for later in the year.

Boston—Current buying of manufacturers' wire is active all through New England, as consumption is high and few consumers have placed second quarter contracts. The market is firm at 2.40c, base, Pittsburgh, equivalent to 2.50c, base, Worcester, Mass.

Philadelphia—Wire demand shows improvement, as consumers absorb stocks laid in at substantial concessions before the beginning of this quarter. New price schedules appear to be maintained, except in nails. Weakness in this particular product continues, notwithstanding the substantial reduction in the official price a few weeks ago.

Buffalo—Nail purchases are being resumed slowly but most jobbers are well stocked with purchases made before the price advance.

Semifinished

Semifinished Prices, Page 89

Pittsburgh—Tin bars, needed to sustain a 90 per cent rate of operations in the tin plate rolling industry, are having the heaviest call of any semifinished steel item at present. Next are the needs for sheet bars, for a 70-75 per cent rate of production in the sheet industry. Forging and rerolling billet demand appears fair, but wire rod requirements are less than a month ago. The semifinished steel market is based on $28 per ton, Pittsburgh, base for billets, blooms, slabs and sheet bars. Wire rods are $38, base, and forging-quality billets, $35.

Boston—Demand for rerolling and forging billets is good. Consumers in general did not contact for second quarter and are ordering as needed. The current market is firm at $28, base, Buffalo, equivalent to $33.885, delivered Boston, for open-hearth rerollers, while the market on forging billets is $35. Some consumers, particularly those using rerolling billets, again have sought to obtain combination rail and water rates, but without success.

Wire rod demand is active and the market is firm at $40, base, Worcester, for Nos. 4 to 5.

Cold Finished

Cold Finished Prices, Page 89

Pittsburgh — Demand for cold-drawn carbon steel bars still is close to the 1936 weekly peak in specifications and shipments. The strong automobile assembly forecast for late this month and June is substantially aiding cold-drawn bar business. The price is unchanged at 2.10c, Pittsburgh.

Quicksilver

New York—Domestic quicksilver prices are easy in a generally dull market. Currently, small lots of 15 to 25 flasks are $76 to $77 a flask. Some large consumers have been in the market for moderate quantities of foreign quicksilver at shaded prices.

Shapes

Structural Shape Prices, Page 88

Pittsburgh—Early contract will be issued by Westinghouse Electric & Mfg. Co. for the purchase of 2800 tons of structural shapes for its Mansfield, O., building, on which Rust Engineering Co., Pittsburgh, is general contractor, this being the largest structural job closing at present. Last week the state named C. L. Johnson & Son, Mansfield, Pa., as low on the steel truss bridge in Tioga county, Pennsylvania, which takes 212 tons of fabricated structural.

New York—The only outstanding job placed was one involving 1900 tons. Action is expected in the next few days on a number of other tonnages. New work continues to come out and seven new projects involved in new inquiries will require a total of about 3000 tons. The market on plain structural shapes continues unchanged at 1.90c base, Bethlehem, Pa.

Linde Air Products Co. has acquired a seven-acre tract on Island road, Essington, Pa., near Philadelphia, for early erection of an oxygen plant. Upon completion, it will be the company's sixty-ninth plant in this country.

Cleveland—Structural shape awards have increased, those for the week including 1000 tons for the Dayton Power & Light Co., Dayton, O., and 700 tons for a Pennsylvania railroad grade elimination in Bedford, O., both to Fort Pitt Bridge Works, Pittsburgh; and numerous smaller jobs. Construction engineering firms report a good demand for industrial building. Among the larger expansion programs scheduled for this year are $42,500,000 for Standard Oil Co. of Indiana; $4,000,000 for Shell Oil Co., at Houston, Tex.; $1,500,000 for Socony-Vacuum Corp., Olean, N. Y.; $6,000,000 to $7,000,000, Container Corp. of America, at Fernandina, Fla.; $6,000,000, Continental Can Co., Memphis, Baltimore and Wheeling.

Chicago—American Bridge Co. and Bethlehem Steel Co. have been announced as low bidders on the various sections of the Chicago outer drive development involving 15,000 tons. Early awarding of this material is anticipated. Few other large projects are materializing and most inquiries in the Central West are for state bridges. Pending bridges in Missouri, Oklahoma, Arkansas and Indiana involve 4000 tons. A substantial tonnage will be required for grade crossing eliminations in Illinois and nearby states for which inquiries have yet to be issued.

Boston—Most fabricating shops in this territory are operating on full schedules and have backlogs which make it difficult for them to promise deliveries on new work in less than six to eight weeks. These have been augmented by contracts for repairs or replacements for bridges damaged by the recent floods. It is estimated that 400 to 500 bridges in different parts of New England will require repairs or replacement. Plain shapes continue firm at 1.90c. base,

Shape Awards Compared

	Tons
Week ended May 8	13,290
Week ended May 1	14,884
Week ended April 24	13,326
This week, 1935	7,625
Weekly average, 1935	17,081
Weekly average, 1936	19,381
Weekly average, April	16,431
Total to date, 1935	286,669
Total to date, 1936	368,235

Bethlehem, equivalent to 2.205c delivered, Boston.

Philadelphia—Demand is more active, and in addition to four projects booked by district fabricators recently totaling about 2000 tons, several sizable projects are being figured. Possibly the largest new project is a junior high school here, involving 2000 tons of shapes. Another large project in prospect is a school at Lehigh and Twenty-second, 5000 tons of shapes and approximately 1700 tons of bars. Shapes are steady, at 1.90c, Bethlehem, Pa., or 2.01½c, Philadelphia.

Birmingham, Ala.—All structural steel fabricating shops are in active operation. New business is coming in slowly. A large amount of steel is to be fabricated for several weeks.

San Francisco—The majority of structural awards in the week were limited to less than carload lots, and the total placed did not exceed 1000 tons. Robert E. McKee, Los Angeles, is low bidder on the general contract for four double hangars for Hickman Field, T. H., requiring 2000 to 3000 tons. Bids were opened May 1 for 600 tons for two sound stages for Century-Fox Film Corp., Los Angeles.

Seattle—For 500 refrigerator cars for the Pacific Fruit Express, Pacific Car & Foundry Co., Seattle, will require 4500 tons of light shapes. Bids will be opened May 21 for 324 tons of shapes and 180 tons of plates for Fort Peck, Mont., gate shafts.

Shape Contracts Placed

2900 tons, Randolph street viaduct, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

1600 tons, press shop, Chrysler Corp., Detroit, to R. C. Mahon Co., Detroit.

1250 tons, junior high school, Scranton, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

1000 tons, Railway Express Co. garage, Boston, to Lehigh Structural Steel Co., Allentown, Pa., through Hegeman Harris Co. Inc., Boston.

850 tons, Livernois avenue grade separation, Detroit, to American Bridge Co., Pittsburgh.

710 tons, Rackham graduate school, Ann Arbor, Mich., to R. C. Mahon Co., Detroit.

700 tons, Pennsylvania railroad grade elimination, Bedford, O., to Fort Pitt Bridge Works, Pittsburgh.

510 tons, state highway bridge, Duanesburg, N. Y., to American Bridge Co., Pittsburgh.

510 tons, state highway bridge, Port Chester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

410 tons, temporary grandstands, city stadium, Philadelphia, to Belmont Iron Works, Eddystone, Pa.

300 tons, bridge, Shawano county, Wisconsin, to Wisconsin Bridge & Iron Co., Milwaukee.

275 tons, bridge, South Bend, Ind., to Fort Pitt Bridge Works, Pittsburgh.

250 tons, bridge, Benton, Wis., to Wausau Iron Works, Wausau, Wis.

240 tons, switch house addition for Ford Motor Co., Dearborn, Mich., to Wisconsin Bridge & Iron Co., Milwaukee.

210 tons, bridge, Kandiyohi county, Minnesota, to American Bridge Co., Pittsburgh.

175 tons, bridge, Harrison county, Ohio, to Bethlehem Steel Co., Bethlehem, Pa.

175 tons, extension to shipping department of Central Iron & Steel Co., Harrisburg, Pa., to unnamed fabricator.

175 tons, state highway bridge, Menasha, Wis., to Milwaukee Bridge Co., Milwaukee.

175 tons, overpass, Austin county, Texas, to Mosher Steel & Machinery Co., Dallas, Tex.

170 tons, furnace material, Hamilton, O., to William B. Pollack Co., Youngstown, O.

160 tons, building alterations for Chemical & Pigment Co. plant, Baltimore, to American Steel Products Co., Baltimore.

160 tons, Uptown theatre, Washington, to Dietrich Bros., Baltimore.

155 tons, bridge, McHenry county, Illinois, to R. C. Mahon Co., Detroit.

130 tons, Clinton prison administration building, Dannemora, N. Y., to Belmont Iron Works, Eddystone, Pa.

100 tons, two state bridges at Montpelier, Vt., to American Bridge Co., Pittsburgh.

Shape Contracts Pending

15,000 tons, outer drive link, Chicago; American Bridge Co., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa., low on various of five sections.

4000 tons, two freighters for Matson Navigation Co., San Francisco; bids postponed from May 4 to May 18.

3000 tons, hospital building, Jersey City, N. J., for Hudson county.

2000 to 3000 tons, four double hangars, Hickman Field, T. H.; Robt. E. McKee, Los Angeles, low on general contract.

2000 tons, junior high school, Twenty-fourth and Master, Philadelphia; bids May 19.

2000 tons, steel piling, Cape Cod canal, Mass.; plans being prepared by United States Army engineers, Boston.

1596 tons, gates and valves, Bartlett dam, Salt River project near Phoenix, Ariz.; bids May 16.

1300 tons, sheet piling, dam for government at Nauuno, T. H.; bids soon.

1175 tons, state bridges, Missouri.

1175 tons, state bridges, Oklahoma.

1000 tons, office and shop building, United Aircraft Corp., East Hartford, Conn.

1000 tons, state bridges, Arkansas.

350 tons, also about 250 tons of reinforcing bars, New York Central railroad grade elimination at Triskett road, Cleveland; general contract to Lowensohn Construction Co., Cleveland.

703 tons, 1998-foot deck plate girder and deck truss underpass bridge, Schuylkill county, Pennsylvania; Bates & Rogers Construction Co., Chicago, low bidder at $302,727.95 on bids opened May 1. Included, 50 tons of deformed steel bars and 12 tons of plain steel bars.

700 tons, Shervier hospital addition, 227th street, Bronx, N. Y.

500 tons, storehouse, Erie Basin, Brooklyn, N. Y., for Todd Shipyards Corp., New York.

450 tons, horticultural building, Syracuse, N. Y., for New York state fair.

400 tons, state highway bridge, Batavia, N. Y.

400 tons, Chesapeake & Ohio railroad trestle, Cincinnati; bids May 15.

324 tons (also 180 tons plates) Fort Peck dam gate shafts, Montana; bids May 21.

310 tons, state bridge over Pennsylvania railroad, Newark, Del.; bids asked.

300 tons, White Plains, N. Y., distributing station, for Borden Co., New York.

225 tons, Pennsylvania state bridge, Monroe county, route 168; H. J. Williams Co., York, Pa., general contractor.

213 tons, steel truss bridge, Tioga county, Pennsylvania; C. L. Johnson & Son, Mansfield, Pa., low bidder at $41,540.30 on May 1 opening. Included, 31 tons of plain steel bars.

200 tons, plant extension, Ludlum Steel Co., Dunkirk, N. Y.; bids in.

200 tons, hopper dredge for U. S. engineers, San Francisco; General Engineering & Drydock Co., San Francisco, low at $635,000.

200 tons, Faulkner hospital addition, Jamaica Plains, Mass.

200 tons, library building, Holyoke, Mass.; general contract to Daniel O'Connell & Son, Holyoke.

175 tons, state highway bridge, Ayer, Mass.

150 tons, Baptist home, Roxbury, Mass.

150 tons, Liberty public school, Pittsburgh, including 100 tons bars; bids May 13.

150 tons, power house for United States military academy, West Point, N. Y.

100 tons, New Jersey state highway bridge, route 25, over Pennsylvania railroad, Kinkora, N. J.; bids asked.

100 tons, bridge, Lawrence, Mass.; Lathrop and Shea, New Haven, Conn., low.

Tonnage unstated, superstructure, Old Harbor Village housing project, South Boston, Mass.; bids May 25.

Unstated, hopper dredge for United States engineers, Portland, Oreg.; Bethlehem Steel Co., San Francisco, low.

Unstated, five radial gates for Cle Elum, Wash., dam; bids at Denver May 28.

Unstated, two ring follower gates for Alcova dam, Wyoming; bids at Denver May 26.

Coke By-Products

Coke By-Product Prices, Page 89

New York—Demand for all of the coal tar derivatives is greater than the supply. Recent advances on sulphate of ammonia and naphthalene are well maintained. Benzol, toluol, industrial xylol and solvent naphtha are firm.

Reinforcing

Reinforcing Bar Prices, Page 89

New York—Demand for concrete reinforcing bars in this territory the past week has been negligible. Early action, however, is expected on a considerable amount of pending tonnage.

Pittsburgh—Additional to highway construction work and a number of bridge projects, heavy distributors' requirements indicate the marked presence of a large number of spring building projects. A surprising number of these are under private sponsorship. Among government purchases, bids on the 2900-ton inquiry for the Fort Peck dam, Montana, April 30, have been rejected.

Cleveland — State highway and grade elimination work has been coming out at the rate of about 100 tons of reinforcing bars weekly. Carnegie-Illinois Steel Corp. booked 170 tons for the Pennsylvania railroad grade elimination in Bedford, O. Rust Engineering Co., Pittsburgh, will buy about 220 tons for the Westinghouse Electric & Mfg. Co.'s building project at Mansfield, O., which also will require 2000 tons of structural shapes. Prices are firmer, although not all mills have as yet followed the action of others in publishing prices quoted to distributors and consumers.

Chicago—Shipments against old contracts are in excess of incoming business and inquiries are insufficient to take up the slack caused by quietness in new bookings. Awards include 600 tons for the new Lever Bros. plant, Roby, Ind., and 165 tons for the Des Plaines, Ill., sewage disposal plant. Low bidder for Chicago outer drive work involving 500 tons, has been announced. Prices are fairly steady.

Boston—The market has firmed up and the price generally now is 2.10c, base, Buffalo, equivalent to 2.46c, delivered, Boston, for new billet material. Individual orders are small.

Philadelphia — Bar prices have firmed up on sizable business, and further tests should be supplied shortly, with 6500 tons pending for the bureau of engraving and printing building, Washington, on which John McShain has the general contract. Some important school work also is active. Incidentally, a number of the smaller WPA school jobs on which bids were taken early last December and later held up have been placed over recent weeks. One trade leader estimates that perhaps 80 per cent of the bars for these various projects has now been awarded.

San Francisco—Although awards in the week involved a relatively small tonnage several new inquiries have just come into the market, including the placing of 2750 tons for the Bartlett dam, Salt river project, near Phoenix, Ariz. In addition, close to 1600 tons of structurals will be needed for gates and valves. Bids open May 15 for 1000 tons for two sound stages for Century-Fox Film Corp., Los Angeles.

Seattle—The market shows little change. Some tonnages are pending, but no important new projects have developed. Bids have been

Concrete Awards Compared

	Tons
Week ended May 8	2,391
Week ended May 1	4,679
Week ended April 24	4,627
This week, 1935	3,907
Weekly average, 1935	6,862
Weekly average, 1936	6,905
Weekly average, April	4,756
Total to date, 1935	96,998
Total to date, 1936	131,200

opened on 2997 tons required for the Fort Peck, Mont., dam project, but no award has been made. For the same project bids will be received May 21 for an additional 540 tons of reinforcing steel. Hoard Engineering Co., Seattle, has been awarded the contract for the women's gymnasium at Washington state college, Pullman, involving 450 tons.

Reinforcing Steel Awards

600 tons, Connecticut state highway bridge, Middletown, Conn., to Jones & Laughlin Steel Service Corp., Long Island City, N. Y.

600 tons, plant, Lever Bros., Roby, Ind., to unstated interest.

250 tons, building for Spencer Kellogg & Sons, Chicago, to Concrete Engineering Co., Omaha, Nebr.

235 tons, state road work, York county, Pennsylvania, through Banks Construction Co., Wilkes-Barre, Pa., to Truscon Steel Co., Youngstown, O.

225 tons, state road project, Lehigh county, Pennsylvania, through Collins & Maxwell, Easton, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

170 tons, Pennsylvania railroad grade elimination, Bedford, O., to Carnegie-Illinois Steel Corp., Cleveland, through William E. McHugh Co., Cleveland.

165 tons, sewage disposal plant, Des Plaines, Ill., to Calumet Steel Co., Chicago.

146 tons, over-crossing at Pueblo, Colo., to unnamed interest.

Reinforcing Steel Pending

2900 tons, Fort Peck dam, Montana; bids rejected by Kansas City, Mo., army engineers April 30.

750 tons, boardwalk and comfort station, Long Beach, N. Y.; general contract to Faircroft Engineering Corp., Brooklyn, N. Y.

500 tons, outer drive link, Chicago; W. E. O'Neil Construction Co., Chicago, low on general contract.

450 tons, women's gymnasium, Washington State College, Pullman; Hoard Engineering Co., Seattle, general contractor.

250 tons, reservoir, Salem, Oreg.; Kern & Kibbe, Portland, Oreg., low on general contract.

250 tons, women's dormitory, Washington State College; bids at Pullman, May 15.

220 tons, building, Westinghouse Electric & Mfg. Co., Mansfield, O., in addition to 2000 tons of structural shapes as recently noted; Rust Engineering Co., Pittsburgh, general contractor.

200 tons, Pittsburgh Plate Glass Co. building, Newark, N. J.

175 tons, Soldiers Memorial, St. Louis.

100 tons, administration building, San Francisco airport, Calif.; bids May 13.

Unstated, postoffice and court house, Missoula, Mont.; A. D. Belanger, Seattle, low.

Unstated, reclamation projects, Yakima, Wash., and Owyhee, Oreg.; bids at Yakima, May 28 and Ontario, Oreg., May 20.

Unstated tonnage, junior high school, Twenty-fourth and Master, Philadelphia; bids May 19.

Pig Iron

Pig Iron Prices, Page 90

Pittsburgh—Schedules of foundries in the shops of steel mill equipment builders are outstanding consumers in this district. Several large foundries of this type are working on a three-shift per day, six-day week basis, and account for sizable consumption, though scrap's proportion in the melt still is at least one of 50 per cent. A wide range to operations in jobbing foundries is reported, but those on small castings seem the busiest. Shipments against old contracts have not been entirely cleaned up, yet the figure of $19.50 per ton for No. 2 foundry and malleable has been adequately tested on all new business.

Cleveland — While shipments of merchant pig iron in April were about 10 per cent less than those in March, as previously reported, the movement so far this month is slightly larger than in the comparable period in April. Deliveries to automobile foundries have been fairly steady, while more iron has

been shipped recently for railroad castings. New orders are frequent, but light, prices being steady and deliveries fairly prompt.

Chicago—Heavier shipments are in prospect this month compared with April. A small decrease developed last month, but new business has been improving and steady consumption is scheduled for most foundries at least the next 30 days. Heavy requirements of the automotive and farm implement industries predominate casting demand, though miscellaneous orders remain active, as evidenced by schedules of jobbing plants. Market is steady.

Boston—Foundry operations have expanded, so that the rate of pig iron consumption is greater. Stocks laid in last fall are sufficient in most cases to take care of requirements, and current buying is limited to scattered car load orders. Domestic producers continue to complain of foreign competition and it is known that foreign iron is filling a larger percentage of the New England requirements than previously. In some cases foreign iron has sold at $2 a ton under the domestic market. The domestic market is unchanged at $20.50, Everett, Mass., furnace, for foundry iron.

New York—Pig iron sellers last week experienced one of the dullest weeks in some time, reflecting in some measure the interest centered in the foundrymen's meeting in Detroit.

Philadelphia—While the major portion of the 4000 tons of Russian iron which arrived here recently is understood to be for a Delaware river pipemaker, it is also understood that this buyer is definitely out of the market for new tonnage. Purchases of domestic iron continue spotty, but as some stocks laid in last quarter are being absorbed, a better volume of new tonnage is expected to develop soon. Foundry operations are at least being sustained on an average.

Buffalo—Buying is being resumed slowly, and some consumers who have not been in the market previously, are now purchasing. Immediate shipment is also the rule. Local furnaces are shipping good tonnages by canal and want more barges for immediate loading. The 10 blast furnaces in production represent the peak of operations for this area since 1930. Danger of shortage of material for local furnaces has been averted with the arrival of the season's first cargoes of ore and stone.

St. Louis—While shipments are steady, new buying has receded and it is not expected that heavy tonnages will be bought this month. Shipments during April were about on a parity with March. Because of the heavy melt so far this year, sellers look for an increase in business soon.

Cincinnati—The market had a routine aspect during the past week. Orders are small, while melters buy for immediate requirements. Those with stocks are disinclined to maintain them, this plan holding shipments below first quarter tonnage.

Birmingham, Ala.—Small-lot purchases are amounting to a little more than has been moved during the past few weeks, and the market is considered improving again. Production of 172,965 tons in this section for April will probably be reached again.

Scrap

Scrap Prices, Page 91

Pittsburgh—A second mill in this district, by paying $15 a ton for No. 1 steel, covering a small quantity last week, reaffirmed the market which settled to a lower plane two weeks ago. Extreme caution characterizes the purchasing policy of consuming mills here regarding scrap and brokers in turn are rapidly winding up shipments on orders.

Only in cast scrap where No. 1 machinery cast is quoted $15 to $15.50, heavy breakable, $13.50 to $14, and No. 1 cupola, $14 to $14.50, is there any strength. No. 1 heavy melting steel is quoted $14.50 to $15.00, scrap rails, $15.25 to $15.75, hydraulic compressed, $14.75 to $15.25, and machine turnings, $10 to $10.50. The 8000 tons of No. 1 steel sold by the Pennsylvania railroad ten days ago brought prices from $15.40 down to the $15 level on material which was allocated for the Pittsburgh district.

Cleveland—Iron and steel scrap markets in northern and eastern Ohio continue quiet as to new buying and further easiness in quotations appears in evidence. At Youngstown No. 1 heavy melting steel has declined 75 cents, compressed sheets 50 cents. In Cleveland the market has dropped by 50 to 75 cents in most of the steel lines, but the cast iron grades continue strong and unchanged. New buying is at a minimum, but shipments continue of fair volume.

Chicago—Scrap is weak and most prices are off an additional 50 cents a ton. This brings heavy melting steel down to $13 to $13.50, but quotations remain easy even at the lower levels. New buying is absent and some steelworks which recently indicated they would pay no more than $13.50 for heavy melting steel now are talking $13. While shipments against contracts continue heavy, offerings are substantial and this contributes to weakness.

Boston—An easier tone continues in iron and steel scrap and there is comparatively little interest on the part of buyers. The supply of scrap has shown a material increase, partly as a result of damage caused by recent floods.

New York—Because of lack of interest on the part of domestic scrap consumers generally, brokers here have dropped buying prices on most grades of iron and steel scrap. Machine shop turnings have gone off $1.25 a ton, and brokers now are offering $3.50 to $4 a ton for them, f.o.b., New York.

Philadelphia—Scrap prices continue to decline, steel and cast scrap being among the major items affected. No. 1 steel is now $12.75 to $13, delivered, domestic consuming point, with the inside figure representing purchases by the leading eastern Pennsylvania consumer for shipment from Northern New Jersey to Bethlehem. On small nearby shipments this buyer is picking up tonnage at $12.50, Bethlehem. This interest has also reduced his offering price at Sparrows Point to $12.50. One district consumer has recently refused a substantial tonnage of $13, delivered. No. 2 steel is off to a flat price of $12.

Buffalo — Dealers are making heavy shipments on recent orders. Scrap is moving directly into charging boxes in most cases and mills will take all the tonnage that can be loaded. Buying has been suspended as a result of a drop in the local offer to $13.50. Rumors of probable further decrease are given little credence by principal dealers who say that even the $13.50 price is unattractive. First barges from the seaboard reached here during the past week bringing in several thousand tons of heavy melting steel, cast and stove plate. More tonnage is enroute.

Detroit—Quoted ranges on scrap are nominally unchanged here, but heavy production lists this week may force the market lower. In spite of the fact that local steelworks' scrap consumption continues high, automobile scrap offerings are the heaviest in recent years.

Cincinnati—Following weakness for several weeks and adjustments downward in some grades, the iron and steel scrap market has reached a generally lower level of prices, av-

Behind the Scenes with STEEL

Consolation

GREAT tidal waves of summer heat have suddenly pushed in on us, dulling the senses and slowing the gait. Visions of a cool spot by a bubbling brook and tall tinkling glasses filter through the shimmering sultriness but fade rapidly from view.

One consolation, for which we thank the *Aluminum News-Letter*, is that we can cut our lawn this summer with an aluminum lawn mower, weight only 24 pounds, just about half the heft of the old-style mowers. Of course, we do not have one of the new mowers; in fact we do not even have a lawn to mow, but it's a consoling thought anyhow.

* * *

INQUISITIVE CAMERA DEPT.—II

Three of the master minds in STEEL'S *business and circulation department, congratulating themselves upon receipt of a 52-page contract. Left to right, Russ C. Jaenke, R. T. "Bob" Mason and John Henry*

Progress

ANOTHER consoling thought—to us, anyway—is that you can now buy a "Jiffy" cabbage shredder and vegetable peeler, of stainless steel. Its manufacturer says the device peels "thinner than thin—wastes nothing."

If you are having trouble with your cabbages or vegetables, let us know and we'll tell you all about where you can pick up one of these kitchen triumphs.

* * *

Correspondent

OF MORE than passing interest is the following letter received recently from an experienced engineer whose advancing age has not dimmed his powers of perception. He states:

"Enclosed is my check for subscription to STEEL. . . . At present I have charge of the ———— office of the South Penn Highway Survey, for which I am preparing plans.

"I wonder if you can visualize what a tremendous engineering feat this project will be—crossing the mountains from Pittsburgh to Philadelphia on a great super-highway with less than a 3 per cent grade, over fills 150 feet deep, through tunnels 1½ miles long 700 feet under the crest of some of the mountains. The road will have at least eight lanes for traffic. . . . It is the most interesting and responsible job I have ever had, with the least pay I have ever earned. . . .

"Well, if we get the Townsend plan and a few more fool 'share the wealth' laws passed no one will have anyhing to worry about except he rich who will do all the work. The WPA will go on a strike to have their hours reduced from 30 to 20 per week, with full pay and no making up lost time. . . .

"Just heard two young fellows on the street talking about conditions. One said the country was fast going to hell; the other replied that the country had already gone to hell and that he was going out on strike to celebrate it."

* * *

Forbidden Fruit

ALL you "Behind the Scenes" readers will be interested in another "behind the scenes" article which appeared in the April 9 issue of the Pittsburgh weekly BULLETIN-INDEX.

Further than the fact that the article appeared on Page 5 and was headed "Butterfield 8:" we can tell you nothing. Family paper and all that sort of thing, you know.

* * *

At the Show

WHILE this department makes no effort to cover industrial expositions and shows, we can pass along the information that at the Foundry Show in Detroit last week the International Nickel Co. displayed a silver plated clarinet with keys and levers cast of 20 per cent solid nickel silver. We do not know whether an attendant picked it up every two hours and played *Moon Over Miami*, but it might have been a good idea. For full particulars of the A.F.A. convention, see pp. 22, 82, 83, 84.

—SHRDLU

eraging 50 cents below former level.

St. Louis—With absence of buying the market for iron and steel scrap has weakened further, with a number of specific reductions on important grades. Despite the weak tone, however, dealers are not pushing sale, and there is a general disposition not to sell short. The weakness has had the effect of holding back country scrap.

Birmingham, Ala. — With movements still fairly good, purchasing though in small tonnages, prices unchanged, the scrap iron and steel market in Birmingham district is considered firm.

Seattle—The market is unchanged, Japan showing little interest. However, prices are stationary, local mill buying continuing in volume to offset consumption. Tidewater stocks are not large and dealers are in the market for suitable tonnages.

Warehouse

Warehouse Prices, Page 92

Pittsburgh—A heavier call for building steel for outdoor construction is featuring the local jobbing market, and many jobbers report the first week of May to be the heaviest in the past four to six weeks, from the standpoint of specifications.

Cleveland — Warehouse volume generally is satisfactory, although a slight decline in the number of orders so far this month is reported by one or two sellers, and some decrease in tonnage, by others.

Chicago—May to date is holding gains in sales recorded in April, but warehouses anticipate a leveling off in business following four months of continuous upturn. Prices are unchanged.

New York—Improvement is reflected in demand for finished iron and steel out of warehouse. Daily average rate of bookings so far in May is equal to that in April. Prices are unchanged and with the exception of galvanized sheets, are quite firm.

Philadelphia—Jobbing demand is being well sustained at the April rate, which for some jobbers was slightly in excess of the March rate. Demand is highly diversified, although steel for light building work is perhaps in best volume.

Detroit—Some inquiry for warehouse steel for plant rehabilitation work, such as new conveyor systems, is beginning to appear. The tool and die trade also is more active, and business has been augmented by the appearance of outdoor construction work.

Cincinnati—Shipments from warehouse so far this month hit a higher level than in April. Steady demand for industrial materials has been augmented by small tonnages for building purposes, both on private and governmental projects, with many inquiries still pending.

Seattle—Business is active, all items moving in increased volume. Industrial demand is better and public works projects continue to call for miscellaneous items. Sheets are showing a heavier turnover than other jobbers' stocks. Prices are steady.

St. Louis—Demand continues in liberal volume. Shipping directions are reported particularly satisfactory on sheets, bars, plates and standard shapes. Building activities continue to expand, railroad buying is reported active, and the general manufacturing trade continues to account for heavy tonnages of a variety of commodities.

Tin Plate

Tin Plate Prices, Page 88

Pittsburgh—The tin plate industry continued last week to produce 90

per cent. Considerable encouragement is derived from prospects for packers' cans. Tin plate being worked up into general line cans is in a highly satisfactory volume. The price holds at $5.25 per base box, Pittsburgh, for standard tin plate.

Iron Ore

Iron Ore Prices, Page 91

Cleveland—This week Pittsburgh Steamship Co., United States Steel Corp.'s Great Lakes subsidiary, will have in commission 68 iron ore carriers, all that it now contemplates for this season, out of its fleet of 85 vessels. Last year the maximum number it had in commission was 42, and in 1934, 43.

Although the shipping season was later in getting started than anticipated, due to ice conditions, boats now are getting under way rapidly. Considerable ice still is being encountered in Lake Superior, and adverse weather conditions may slow up the movement. Railroads, however, are shipping ore to the loading docks, and mining operations are increasing. Predictions are made that the ore movement this season will amount to 35,000,000 to 40,000,000 tons.

From Escanaba, in April, 19,446 tons of ore was shipped, this constituting the entire movement for the month, in contrast with 400,062 tons in April last year.

Nonferrous Metals

Nonferrous Metal Prices, Page 90

New York—Continued fair demand for lead and further strengthening in the statistical position of the prime western zinc market featured major domestic nonferrous metals last week. Straits tin prices eased while other metals generally were steady.

Lead—Sales were fairly well sustained with leading sellers apparently well satisfied with the week's total business. Prices were unchanged at 4.45c, East St. Louis, and 4.60c, New York, with St. Joseph Lead still obtaining $1 premium per ton on the latter market.

Copper—All first hands held electrolytic asking levels firm at 9.50c, Connecticut. Observers anticipate no price change and continued light routine consumer buying over the summer months. Fabricators put into effect on May 4 their previously announced rise of ¼-cent on copper and brass sheet, drawn copper bar and anode prices. Base prices on scrap allowances now apply on lots of less than 10,000 pounds instead of 36,000 pounds as previously. Lots of 10,000 pounds and over take a premium of ½-cent per pound.

Zinc—Prime western stocks declined 2649 tons during April while unfilled were reduced to 35,148. Outlook for the market is favorable due to prospects of active shipments this month. All prices were firm on the basis of 4.90c, East St. Louis, for prime western.

Tin—Consumers kept well out of the market despite sustained tin plate operations of around 90 per cent of capacity and the easy Straits tin price structure. No offerings of Chinese 99 per cent tin are expected until the last of June. Spot Straits tin closed lower at around 46.50c.

Antimony—Chinese spot held nominally unchanged at 13.50c, duty paid New York, while American spot advanced ⅛-cent to 12.75c, New York, in a dull market.

Metallurgical Coke

Coke Prices, Page 89

The rate of metallurgical coke shipments in the Pittsburgh district is at the highest in five to six years. Beehive coke continues to share to a proportionately good extent along with by-product grades, and on the former, the standard furnace beehive price holds firm at around $3.50 to $3.65, f.o.b. Connellsville, Pa. The foundry trade is testing the unchanged market of $4.25 to $4.35 for common grades of beehive coke and the market on premium brands of $5.35.

Shipments of foundry coke at Chicago continue at a high rate, well above that of a year ago. Some improvement is noted in volume of shipments in New England. In the Birmingham, Ala., district production continues heavy, with considerable tonnage moving to outside points.

Steel in Europe

Foreign Steel Prices, Page 92

London—(*By Cable*)—Shortage of foundry pig iron in Great Britain continues acute and exports have been reduced, with increasing tonnages being imported from the Continent, India and Russia. The larger part of domestic pig iron production is for steelworks use. All steelworks are experiencing active domestic demand, with no prospect of abatement. Except for some tube manu-

facturers steelmakers are operating at capacity. An order has been received from South Africa for a large power plant.

The Continent reports export demand dull, principally due to the general political situation. The market for steel in China is improving as Japanese competition is subsiding.

Equipment

Pittsburgh—American Sheet & Tin Plate Co. here has begun to circulate some inquiries for the proposed continuous mill at the Clairton works of Carnegie-Illinois Steel Corp. As previously detailed, a large part of the Clairton works will be scrapped and it is expected that upon the absorption of Sheet & Tin Plate by Carnegie-Illinois that further inquiries will be issued. The present inquiries are for certain parts of the hot mill only. Another prominent inquiry before the equipment trade is one from the American Steel & Wire Co. for several small rod mills to be built at Cleveland divisions. It is reliably reported here that Richard Thomas Ltd., Wales, England, is placing a contract for a continuous strip mill with a leading Pittsburgh equipment manufacturer.

Carnegie-Illinois has received an appropriation for rehabilitating a blast furnace at its Ohio works. It is expected that the work will get under way shortly and will be completed about Jan. 1, 1937. Somewhat similar work is expected to get under way shortly at the Carrie works in the Pittsburgh district, which supplies hot metal to the Homestead steelworks. There are seven steelworks blast furnaces there, four of which are operating. Nos. 6 and 7 furnaces are in need of extensive repairs.

Chicago—Activity in equipment markets holds recent gains and in a number of instances is fairly brisk. Machine tool orders and inquiries make a favorable comparison with the rate of previous months and with conditions a year ago.

Green Says A.F.L. To Organize Steel

EXECUTIVE council of the American Federation of Labor on Friday virtually turned down the offer of the committee on industrial organization headed by John L. Lewis to provide $500,000 to unionize the iron and steel industry.

In a letter addressed to the convention of the Amalgamated Association of Iron, Steel and Tin Workers at Canonsburg, Pa., William Green, president of the A. F. of L., stated that "plans and purposes of the executive council and the stipulation upon which said plans are based are predicated upon the presumption that the executive council may be permitted to inaugurate and carry forward an organizing campaign in the iron and steel industries free from interference on part of any group or groups either within or outside of federation."

Mr. Green declared it to be the plan of the council to carry out instructions of the recent San Francisco and Atlantic City conventions of the Federation to inaugurate this organization program. Steps for such a campaign were taken at the Miami convention of the A. F. of L. in January.

Mr. Lewis is the apostle of industrial or vertical organization of industry, and his committee proposes to organize all labor of such mass production industries as steel, rubber, and automobiles in one big union for each industry. Mr. Green has been

defending the craft type of organization, although broadening this scope somewhat in view of the sensitive temper of the labor movement.

While the Amalgamated convention debated and lent every outside indication last week of anything but united opinion, the International Association of Machinists labor union stole a march by distributing circulars at Pittsburgh mill gates last week, inviting those eligible for membership to attend a mass meeting May 10 at Pittsburgh. This union aims at membership from steel mill tool and die makers, roll turners, machinists, welders, apprentices, etc., and is avowedly opposed to John L. Lewis' policies.

At the close of last week the Amalgamated convention approved a report by its wage scale committee which recommends a general wage increase of approximately 15 per cent for the sheet and tin mill agreements to be made this year. As is generally known, however, these agreements embrace only a few small mills.

CARNEGIE GRANTS VACATIONS

In response to employe representatives' request, Carnegie-Illinois Steel Corp., Pittsburgh, has decided to grant vacations with pay this year to employes with five or more years of continuous service.

Mirrors of Motordom

(*Concluded from Page* 34)

mained around 1800 jobs, of course preponderantly the 120's. It set a high of 8000 models produced in April, and May looks to be as good. Packard's 115 model, the nomenclature for the small six, now looks as though it may be placed on the assembly line about Aug. 1.

Incidentally, since W. H. McCreary, who was Packard's steel buyer, died there has been no successor. Steel and other metal purchases have been divided among three men.

Unlike the American household that has come to accept a couple of cars as necessity, our overseas neighbors go in for one car, so they like it big to carry the entire family all at once.

Seven-passenger cars are the predominately popular model for export from the motor plants in this country. Even if the model is larger than accommodating seven, it has a ready market.

General Motors Export, for example, for some time has been taking some of its five-passenger domestic models, having the finished bodies sliced down vertically through the center, and then welding in panel and top pieces of a foot or two in width. The effect of, of course, something approaching the American conception of a hauling van.

Therefore, it was not surprising last week to have Edward G. Budd Mfg. Co., Philadelphia, announce it had begun to ship tools, dies and stampings for a seven-passenger, 142-inch wheelbase car for Russia.

Orders were placed through Amtorg Trading Corp., after which Budd engineers collaborated with Russian designers. The shipment is valued at around $1,000,000 and equipment will be set up in the Zis plant in Moscow.

Detroit recalls that a year or so ago Amtorg had a delegation of buyers in the city looking over dies and tools that could be profitably purchased for export. Murray was one that benefited from export die business.

About the middle of May, the parties in Detroit who in April closed the option to buy the Franklin plant at Syracuse, state they will have an announcement to make relating to future manufacturing plans . . . . The merger that was generally expected to take place between Niles-Bement-Pond Co. and General Machinery Corp. has been blocked for the present by a holder of 4000 Niles-Bement shares who has brought suit restraining submission of the plan to stockholders until further court order . . . .A new gas-tight spark plug has been developed by Champion Spark Plug Co., using a dry powder cement for plug sealing against compression losses . . . . Pontiac claims to have cut its foundry and machine shop defect and scrap losses to 4 per cent so far this year. One innovation at the Pontiac foundry is the making up of cupola charges whereby the contents of regulation dump-bottom buckets are based entirely on weight . . . . Contrary to recent statement, Hercules Motor Co.'s machine shop capacity at Muskegon, Mich., is being used for its own production and no contracts to rough-machine castings for Campbell, Wyant & Cannon Foundry Co. have been closed. . . Plymouth plants in Detroit, Los Angeles, and Evansville, Ind., have recently been equipped with an overhead monorail chain-type conveyor system, principally for motor blocks. The Detroit conveyor system has a peak load of 383 motors, each weighing 750 pounds.

Great Lakes Red Book for 1936 Out Shortly

The *Great Lakes Red Book*, a vest-pocket directory giving the names of owners, operators, vessels, and appointments, where made, of captains and engineers of all ships on the Great Lakes, for 1936, will be ready about May 15. The Red Book is published each year at Cleveland by the Penton Publishing Co., publisher of STEEL.

The 1936 edition of the Red Book lists over 1500 vessels of the Great Lakes. There is also a complete directory of the shipbuilding and ship repair yards on the Great Lakes. This directory gives the names of all principal officers and the drydock, repair and building facilities at each yard.

Individual vessels and fleets are alphabetically arranged. The capacities of all ore carriers are given, and there is also a complete port directory.

The price is $1.

Construction and Enterprise

Ohio

CINCINNATI—G. H. Frederick Distillers Inc., 4849 Glenway avenue, G. H. Frederick president, plans construction of distillery in Dearborn county, Indiana, just across state line from Harrison, O. Cost estimated at $250,000.

CINCINNATI—Charles E. Lex Jr., city purchasing agent, room 143, City hall, is taking bids due May 12 on various valves and sluice gates for city water purification plant, total cost estimated $90,000. Engineers are Burns & McDonnell, Dixie Terminal building.

CLEVELAND—Thornton Co., sheet metal fabricator, F. A. McCloud president, 3441 East Seventy-sixth street, plans one-story 60 x 182-foot addition.

CLEVELAND—Gas Machinery Co., 16100 Waterloo road, Northeast, will add 2700 square feet to its office building, for which Dunbar Co., 8201 Cedar avenue, has general contract.

CLEVELAND — Electric Vacuum Cleaner Co., 1734 Ivanhoe road, plans to open an assembly plant in the rural resettlement administration's homesteads in Arthurdale, Va., late in May.

CLEVELAND — County commissioners, George H. Stahler clerk, new courthouse, taking bids May 26 for two Littleford No. 101 utility spray tanks, 800-gallon capacity, equipped with necessary attachments, to include a 50-gallon-per-minute pump, two oil burners, and a 5-horsepower gasoline engine. Estimated cost $3400.

CLEVELAND—County commissioners, George H. Stahler clerk, new courthouse, taking bids May 15 for two two-stage direct connected air compressors with 105-cubic-feet-per minute-capacity, mounted on four wheel mountings, Sullivan model 105, with pneumatic tires. Cost estimated $3600.

HARTVILLE, O.—Ohio Bell Telephone Co., 750 Huron road, Cleveland, plans construction of substation, one story, 18 x 22 feet, here, cost to be about $8000. Architect is A. W. Bailey, care of owner.

MINERVA, O.—Board of public affairs, Margaret Wright clerk, is taking bids May 25 for power plant equipment, including new 1500-kilowatt turbine and other generating equipment and accessories, two superheaters, and meters. Engineer is Ralph Hadlow, 5005 Euclid avenue, Cleveland. (Noted STEEL March 16 and May 4.)

MONROEVILLE, O.—Village plans water filtration plant to cost $25,000. Mayor is Clarence H. Zipfel; engineers George Champe & Associates, 1025 Nicholas building, Toledo, O.

PLEASANT HILL, O.—Village taking bids for waterworks improvements, to include installation of high pressure pump in connection with well, and improvements to water tower, including new standpipe.

TROY, O.—City plans light plant addition and improvements to include 650-horsepower water tube steam boiler, mechanical stoker and auxiliary equipment, alterations to present building. George Smith is service director, Froelich & Emery, Second National Bank building, Toledo, O., engineers.

WOOSTER, O.—Central Ohio Light & Power Co., Ferdinand Bates, manager Wooster division, plans erection of substation in connection with Holmes county rural electrification.

YOUNGSTOWN, O.—Youngstown Sheet & Tube Co., Stambaugh building, will install turbine at electric power plant at cost of $350,000.

Michigan

DEARBORN, MICH.—Ford Motor Co. plans new addition to power plant, to cost $300,000, with equipment. Giffels & Vallet Inc., Marquette building, Detroit, engineer.

DETROIT—Davis Tool & Engineering Co., 6481 Epworth avenue, will construct a plant addition, which will increase floor space by about 3000 square feet.

DETROIT — Standard Fuel Engineering Co., 667 Post avenue, South, is building an addition and will install machinery to double present plant capacity. George H. Willett is president.

ESCANABA, MICH. — Escanaba Paper Co. plans extensions and improvement in power plant, to include installation of turbogenerating unit, high pressure boiler and auxiliary equipment, total cost to be $150,000.

GRAND RAPIDS, MICH.—Grand Rapids Varnish Corp., 565 Godfrey street, southwest, plans expansion program to cost nearly $1,000,000, calling for expenditure of $630,000 for construction of plant addition on Steele avenue, plus at least $250,000 for installation of new machinery and equipment. Barnes Construction Co., 1310 Chicago avenue, Southwest, has general contract for construction of first unit. Harry L. Mead is architect, 902 Michigan Trust building.

Connecticut

BRISTOL, CONN.—Wallace Barnes Co., 30 Main street, plans addition to rolling mill, to cost $37,000.

MANCHESTER, CONN.—City is surveying cost of sewage disposal system, planned to cost about $25,000. J. F. Bowen is engineer, 570 Woodbridge street.

MIDDLETON, CONN.—City taking bids due May 15 for construction of sewage disposal plant, with PWA aid, to cost $550,000. Engineer is Thomas F. Bowe, 110 William street, New York.

Massachusetts

WALTHAM, MASS.—H. F. Beal, superintendent public works, City Hall, is in charge of plans for erection of 600,000-gallon steel standpipe.

New York

BATH, N. Y.—Ward Foundry Co., Blossburg, Pa., plans erection of foundry on Wilson avenue, to cost $37,000.

BEACON, N. Y.—City plans con-

struction of sewage disposal plant to cost $149,257. PWA aid has been applied for. Barker & Wheeler, 36 State street, Albany, N. Y., engineers.

BROOKLYN, N. Y.—Signal corps procurement district, Fifty-eighth street and First avenue, will receive bids until May 15 for motor generator and battery units, circular 36-208; until May 25 for generators, circular 36-207.

NEW YORK — Department of docks, Randall's Island park, north of the Triboro bridge, will erect a $75,000 one-story boat repair shop. Architect is Aymar Embury II, 150 East Sixty-first street.

NEW YORK—Consolidated Edison Co., 4 Irving place, plans improving coke-handling plant, coke yards and pockets at 427 East 110th street, work to cost $37,000.

NEW YORK—National Broadcasting Co., 30 Rockefeller Plaza, plans construction of 500,000-watt broadcasting station for station WJZ. A 640-foot tower and equipment will be included, total cost to be $300,000.

NEW YORK—Linde Air Products Co., 30 East Forty-second street, has acquired a seven acre tract on Island road, Essington, Pa., near Philadelphia, for early erection of an oxygen plant.

ROCHESTER, N. Y. — Eastman Kodak Co., Kodak Park, plans three new buildings: One six-story, 61 x 142-foot laboratory addition, one five-story, 122 x 566-foot paper department building, and a five-story, 42 x 162-foot plant for manufacturing lenses and special photographic apparatus. Total cost to be approximately $1,100,000.

Pennsylvania

ALLENTOWN, PA.—Council will receive bids May 19 for waterworks improvements, to be divided into three contracts: A 30,000,000-gallon reservoir, a 10,000,000-gallon reservoir, and electric wiring and lighting for each reservoir. Morris Knowles Inc., engineers, 507 Westinghouse building, Pittsburgh. (Noted STEEL May 4.)

BRADFORD, PA.—Kendall Refining Co. will spend $1,200,000 for modernization and building, including a new steam generating plant, high pressure boilers, and a new electric generating unit.

EDGEWORTH, PA. — Edgeworth Water Co. is starting construction of a water softener plant at the foot of Chestnut street on the Ohio river. Estimated cost $40,000.

FARM GROVE, PA.—Farm Grove Mfg Co., care of A. H. Morris, Farm Grove, plans erection of garment factory to cost $40,000.

NEW KENSINGTON, PA.—Aluminum Co. of America, Gulf building, Pittsburgh, is improving its manufacturing facilities here with a building program to cost around $500,000, with equipment. New buildings will include a jobbing shop and a structural shop. The carpenter shop, the box shop, garage and lumber storage sheds will be removed to the property recently bought from the American Sheet & Tin Plate Co.

TOLEDO, O.—National Superior Co., subsidiary of National Supply Co., 3320 Bishop street, has started work on a plant addition to be 82 x 292 feet, costing over $100,000.

TOLEDO, O.—Great Lakes Stamping Co. has acquired the plant of the former Jeannin Electric Co., on Fassett street, here, and will expand it.

WILKES-BARRE, PA. — J. B. Carr Biscuit Co., J. B. Carr president, 169 North Pennsylvania avenue, is taking bids for construction of four-story, 30 x 100-foot, addition to food products plant, to cost $35,000.

Illinois

CHICAGO — Zenith Radio Corp., 2630 South Iron street, plans installation of electric power equipment in new plant addition to cost $200,000. (Noted STEEL April 20.)

CHICAGO — Accurate Machine Works has been incorporated at 1441-43 West Harrison street, by Edward M. and Ross Steinle, Walter H. and Walter J. Everhart, to manufacture dies, tools, stampings, machinery. Correspondent is Anthony C. Cremerius, 1553 West Madison street.

CHICAGO—Standard Oil Co. of Indiana, Edward G. Seubert president, 910 South Michigan avenue, will spend about $42,500,000 for modernization and expansion of its facilities in 1936. Of the total, $16,000,000 will go for production, $10,000,000 for manufacturing, $7,000,000 for water transportation, $6,000,000 for marketing development, and $3,500,000 for pipelines.

PARIS, ILL.—Local improvement board, L. McCord clerk, will take bids soon for construction of water system and sewage disposal plant, with gasoline and electric pumping equipment and storage tank, to cost $250,000. Warren & Praag, Decatur, Ind., engineers.

Indiana

FORT WAYNE, IND.—Peter Eckrich & Son, 2506 Broadway, will take bids soon for construction of one-story, 200 x 300-foot, meat curing plant and office addition on Osage street, to cost $125,000.

HAMMOND, IND. — Lever Bros. Co., 164 Broadway, Cambridge, Mass., plans one-story electric generating station in connection with two main buildings of its new soap-making works, to cost $500,000. Stone & Webster Engineering Corp., 49 Federal street, Boston, engineer.

LA PORTE, IND.—Board of public works, L. Darrow chairman, will take bids soon for construction of sewage disposal plant to cost $250,000, with PWA aid. R. B. Moon & Co. Inc., 930 Indiana Pythian building, Indianapolis, engineer.

LAWRENCEBURG, IND.—Peoples Coal Co. will build a conveyor system and make alterations and additions to its incline and coal tipple on the Ohio river.

LOGANSPORT, IND. — Muehlhausen Spring Co., manufacturer of mechanical springs, is building one-story addition, 80 x 150 feet, to cost $75,000 with equipment. Arthur J. Wolf Construction Co., Logansport, has general contract.

Maryland

BALTIMORE—Dealer, box 9337, *Daily Construction Bulletin*, Water and Commerce streets, in the market for two 750-kilowatt non-condensing turbines, 3-60-2300 volts, and exciters.

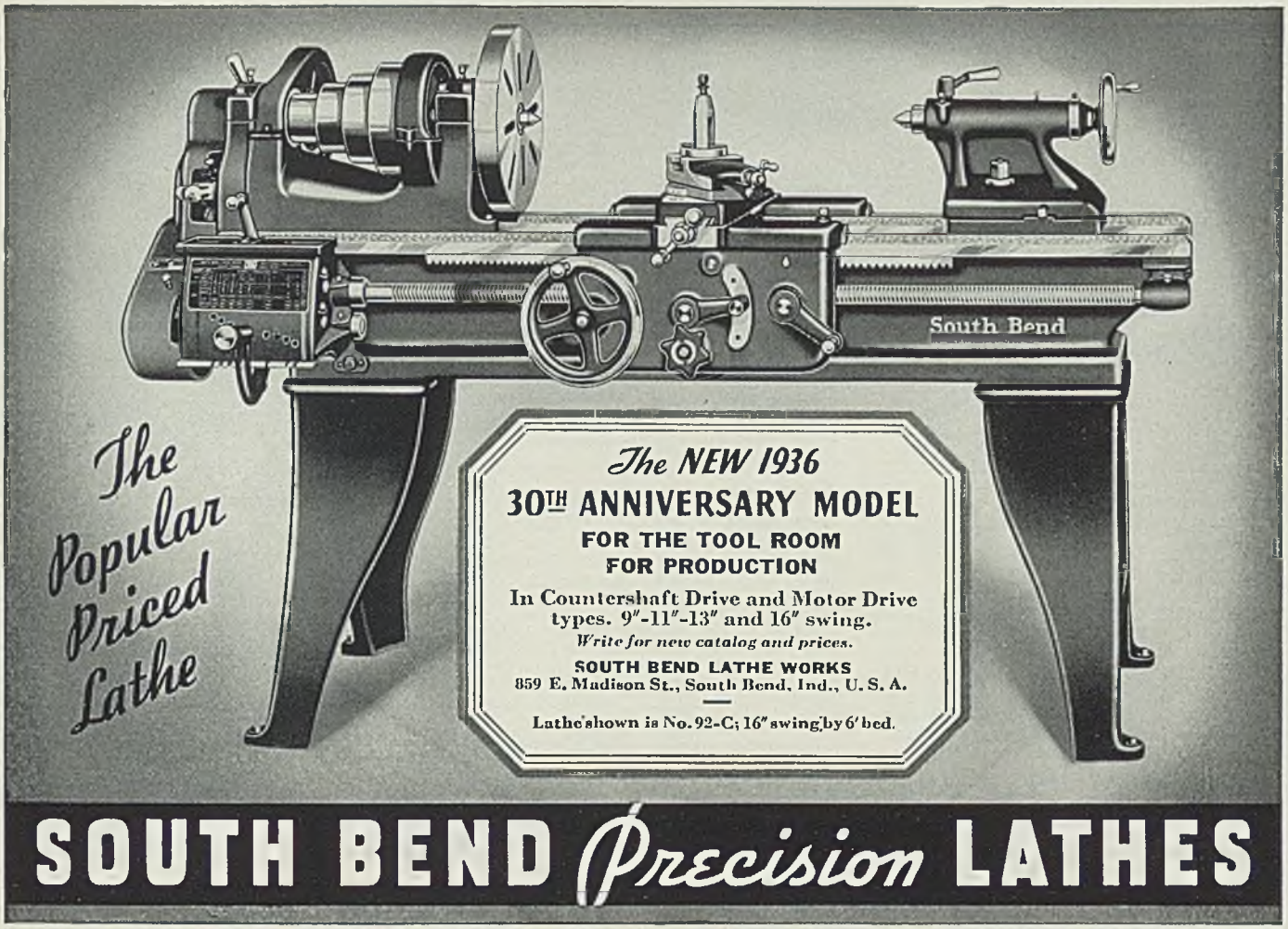
BALTIMORE—Holabird quartermaster depot, Major E. B. Besse purchasing and contracting officer, will take bids May 29 on hand and machine tools and shop equipment, invoice 398-36-147.

OCEAN CITY, MD.—City plans $110,000 sewage treatment plant, for which Clarke Gardner, Salisbury, Md., is engineer. W. T. Elliott is mayor.

SALISBURY, MD.—Eastern Shore Public Service Co., Frank A. Mitchell president, plans $700,000 expenditure in 1936 for improvements, replacements and expansion of system.

SHARPTOWN, MD.—City will ask

(*Please turn to Page* 116)



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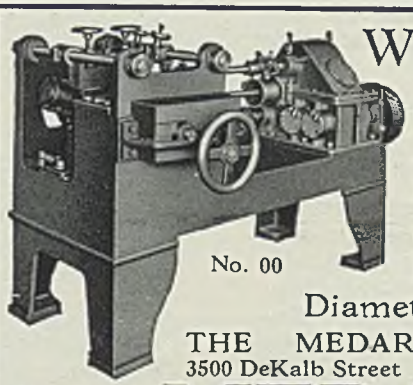

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MEDART

(*Continued from Page* 114)

bids about May 29 for waterworks pumping station and equipment to cost $47,000. Clarke Gardner is engineer, Salisbury, Md., and J. L. Cooper is mayor.

District of Columbia

WASHINGTON—General purchasing officer, Panama Canal, will take bids May 14 for equipment for oxy-acetylene plant, to include oxygen compressor, acetylene compressor, acetylene generators, electrolytic cells, oxygen cylinders, schedule 3142.

WASHINGTON—Navy department, bureau of supplies and accounts, is receiving bids until May 15 for an engine lathe, medium to heavy duty, schedule 7802, delivery Mare Island, Calif.; chucks and drills, schedule 7780; hacksaw blades, schedule 7800, delivery Brooklyn, N. Y., and Philadelphia.

Kentucky

LOUISVILLE, KY.—Kentucky Consumers Oil Co., Seventh and Bank streets, will build an unloading terminal for petroleum products on the Ohio river.

MAYFIELD, KY.—King Specialty Co., plans rebuilding portion of plant recently fire-damaged.

RICHMOND, KY.—City plans erection of filtration plant at sewage disposal plant, for which bonds of $40,000 will be issued.

VINE GROVE, KY. — Mission Springs Distilling Co., Louisville, Ky., plans erection of $150,000 distillery here.

Georgia

ATLANTA, GA. — William E. Dunn Jr., 470 Peachtree arcade, is in the market for three screw cutting lathes, 16-inch, 20-inch and 24-inch, and for shapers, 24-inch.

ATLANTA, GA.—Southern Iron & Equipment Co., P. O. box 2029, is in the market for a duplex pump, 4 x 8 x 10 inches.

COLUMBUS, GA.—Swift Mfg. Co. will take bids soon for a one-story mill addition. Engineer is Roberts Co., Bona Allen building, Atlanta, Ga.

Mississippi

BELMONT, MISS.—Town receives bids May 27 for construction of waterworks system to cost $32,000. An elevated tank and pumping system will be included. Totten & Loving, engineers, Atlanta, Ga.

VICKSBURG, MISS.—United States engineer will receive bids until June 2 for electric generating set, invoice 1106-36-260.

North Carolina

CANTON, N. C. — T. E. King, South Main street, is in the market for a locomotive type boiler, 40-60 horsepower stack and other accessories, 125-pound pressure.

ELM CITY, N. C.—Board of aldermen will take bids May 19 for 75,000-gallon steel water tank on 80-foot tower. W. L. Trevathan & Co., engineer, Wilson, N. C. J. W. Winstead is mayor.

GREENSBORO, N. C.—Mock, Judson, Voehringer Co., Inc., J. K. Voehringer president, plans addition to hosiery mill, with installation of electric power equipment, to cost $159,000.

LEXINGTON, N. C.—United Furniture Co., B. C. Philpot president, plans rebuilding furniture plant, damaged recently by fire

TARBORO, N. C. — City is receiving bids for two types of diesel engines to supplement present equipment at power plant.

South Carolina

PELZER, S. C.—J. P. Stockton, 100 Worth street, New York, recently purchased Pelzer Mfg. Co., and plans considerable improvements in machinery and minor repairs to buildings.

Tennessee

ALMA, TENN. — City plans construction of 100,000-gallon water storage tank and tower.

Virginia

ROANOKE, VA.—S. E. and J. A. Turner are in charge of installation of bottling plant in building at 212-14 Fifth street, Southwest, for Dr. Pepper Bottling Co. of Texas.

WILLIAMSBURGH, VA.—Eastern State hospital, Dr. George W. Brown superintendent, taking bids due May 14 for construction of central heating plant, including boiler house, auxiliary equipment, and for complete sewage treatment plant. Wiley & Wilson, American Bank building, Richmond, Va., engineers.

Missouri

JEFFERSON CITY, MO.—Missouri state building commission, Edgar M. Eagan executive secretary, Capitol building, Jefferson City, will take bids soon for extension and improvement to power plant at state hospital No. 3, Nevada. Estimated cost $192,000, including new equipment. Black & Veatch, 4706 Broadway, Kansas City, Mo., engineers.

ST. LOUIS—St. Louis Dairy Co., 2000 Pine street, plans installation of electric power equipment in new addition to milk products plant, 100 x 210 feet, to cost over $200,000.

Arkansas

BENTONVILLE, ARK. — City plans improvements and extensions to water plant.

Oklahoma

OKLAHOMA CITY, OKLA. — British-American Oil Co., First National Bank building, is in the market for two steel oil derricks, 132 feet high, to cost $14,000. C. A. Sidwell is engineer, First National Bank building.

Texas

MINGUS, TEX. — City plans waterworks to cost $83,000, bids to be received after May 15. Engineers are Hawley, Freese & Nichols, Capps building, Fort Worth, Tex.

Wisconsin

DENMARK, WIS.—Denmark Brewing Co., is taking bids for construction of addition to brewery, 36 x 44 feet. Edwin A. Wettengel, Appleton, Wis., is architect.

MILWAUKEE—Kinite Foundries, 1400 East Park place, has been incorporated to produce alloy steel castings and metal products, by P. H. Dorr, W. S. Coles and John R. Hale.

MILWAUKEE — Chain Belt Co., 1600 West Bruce street, is enlarging plant No. 4 in West Milwaukee by erecting two wings, 50 x 90 and 32 x 110 feet. Architects are Eschweiler & Eschweiler, 720 East Mason street.

MILWAUKEE—Metal Treating Inc. has been organized by Clarence F. Graham, 4259 North Thirty-sixth street, and a heat treating plant is

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(*Concluded from Page* 116)

being equipped at 1571 West Pierce street.

BELOIT, WIS. — Electric Equipment Mfg. Co., 1326 Clary street, is starting construction of a new one-story factory, 150 x 200 feet, with separate power house, on Collie road.

BELOIT, WIS.—Fairbanks, Morse & Co., main plant here, has started work on a new two-story pattern shop and pattern storage building, 81 x 231 feet, and a new welding shop, 75 x 168 feet. Total cost, with equipment, will be $100,000.

NEENAH, WIS.—Alvord, Burdick & Howsen, 20 North Wacker drive, Chicago, have been appointed engineers for new municipal water filtration and softening plant estimated to cost $100,000. H. S. Zemlock is city clerk. (Noted STEEL April 27.)

WAUSAU, WIS.—Marathon Battery Co., storage battery manufacturer, will build a new shop, 60 x 150 feet, for its subsidiary, Marathon Bait Co., maker of fishermen's supplies, on Henrietta street.

Minnesota

CRYSTAL LAKE, MINN.—Council plans municipal electric light and power plant with diesel engine generating units. An election will be held soon to approve financing. Power Engineering Co., Metropolitan Life building, Minneapolis, engineer.

FARIBAULT, MINN. — Faribault Woolen Mills plans construction of power plant and installation of either condensing turbines or diesel equipment. Ralph W. Richardson, 919 New York building, St. Paul, is engineer.

FARIBAULT, MINN. — Village plans sewage disposal plant, financing dependent on bond issue to be approved at election. Buell & Winter Engineering Co., 503 Insurance Exchange, Sioux City, Iowa, engineer.

MADISON, MINN. — City taking bids May 25 for new boiler and auxiliary equipment for municipal power plant. Engineers are Perkins & McWayne, Paulton block, Sioux Falls, S. Dak.

RED WING, MINN. — Midwest Brewing Co. has been incorporated by Clinton W. and E. E. Redlund and Charles N. Shane. The incorporators plan to remodel and operate a brewery in Red Wing.

Kansas

EUDORA, KANS.—Village plans waterworks system, financing dependent on bond election of $54,000. Shockley Engineering Co., 800 Graphic Arts building, Kansas City, Mo., engineer.

South Dakota

CUSTER, S. DAK. — Custer Consolidated Gold Mining & Milling Co. will install a 100-ton mill with cyanide equipment on the old Saginaw and Apex properties, eight miles northwest of Custer. Charles A. Clarke is president.

Iowa

DES MOINES, IOWA — Western Silo Co., 1003 Murphy street, plans erection of factory to cost $38,000.

Pacific Coast

LOS ANGELES—Hepburn & McTavish Ltd., 432 Colyton street, distiller, plans steam power plant in connection with new distilling plant, to cost $80,000. Architect is Arlos R. Sedgey, 910 Serrano avenue.

MONTEREY, CALIF.—C. J. Rutland, P. O. box 790, is in charge of plans of M. Spazier, Santa Monica, Calif., for construction of soap factory on Del Monte avenue, Monterey, to cost $50,000.

OAKLAND, CALIF. — Owens-Illinois Pacific Coast Co., 1855 Folson street, San Francisco, plans power plant at new glass container manufacturing plant on Fruitvale avenue, Oakland. Including installation of equipment, cost will be $1,800,000. Kaj Theill, 580 Market street, San Francisco, engineer.

SAN LEANDRO, CALIF.—Friden Calculating Machine Co., 1 Montgomery street, San Francisco, plans one-story, 75 x 265-foot, factory on Washington avenue, to cost $50,000.

SAN FRANCISCO—Shell Oil Co., Shell building, will start immediate construction of a 304-mile crude oil gathering system on the Pacific coast, to include pumping equipment at frequent intervals along the line.

WOODLAKE, CALIF.—Woodlake utility district voted bonds April 14 to finance construction of new waterworks system to replace privately-owned one at a cost of $32,000. Engineer is L. H. Gadsby, 714 North Willis street, Visdalia, Calif. (Noted STEEL April 6.)

BROOKS, OREG. — Labish Cold Storage Co., Ronald E. Jones president, plans construction of one-story cold storage and precooling plant, 50 x 160 feet, to cost $50,000.

Canada

DALHOUSIE, N. B. — Gatineau Power Co., Wellington street, Ottawa, Ont., will take bids soon on 10,000-horsepower turbogenerating steam unit to cost $300,000. R. W. Howard, Ottawa, is engineer.

HAMILTON, ONT. — Gerald T. Shipmen & Co. Ltd., 29 Dundas street, London, Ont., plans two one-story additions to paper mill, one to be 45 x 150 feet, the other 85 x 150 feet, at Canell & Bay streets, total cost to be $100,000. Architect is A. M. Piper, 1 Moore building, London, Ont.

TILLSONBURG, ONT.—Walter H. Gilson plans shoe manufacturing plant, with installation of all new equipment.

THOROLD, ONT.—Ontario Paper Co., Thorold, plans construction of hydroelectric generating plant on St. Lawrence river, initial capacity to be 60,000 horsepower. Entire project to cost over $6,000,000.

WINDSOR, ONT.—Duplate Windsor Ltd., A. LaPierre Smoke president, 17 Chestnut Park, Toronto, Ont., plans glass manufacturing plant in Windsor to cost $50,000.

HULL, QUE.—Federal Match Co., Ltd., J. W. Charette president, plans new match factory to cost $100,000.

MONTREAL, QUE. — Syndicate, care of box 1011, Y. M. C. A. building, Drummond street, is in market for mining drills, hoisting machinery, and diamond drill.

MONTREAL, QUE. — Dauray Freres & Cie Inc., 432 Fourth avenue, New York, plans to recondition a factory in Montreal and install equipment for manufacturing yarns and knitted goods, work to cost $35,000.

Alaska

SEWARD, ALASKA—City plans new hydroelectric plant, to include two 375-kilovolt water turbogenerating units. PWA loan and grant of $166,000 has been secured. Hubbell & Waller Engineering Corp., Alaska building, Seattle, engineer.

Foreign

MEXICO CITY, MEXICO—Secretariat of National Economy, Mexican government, plans cane sugar refinery, to cost over $500,000, with equipment.