STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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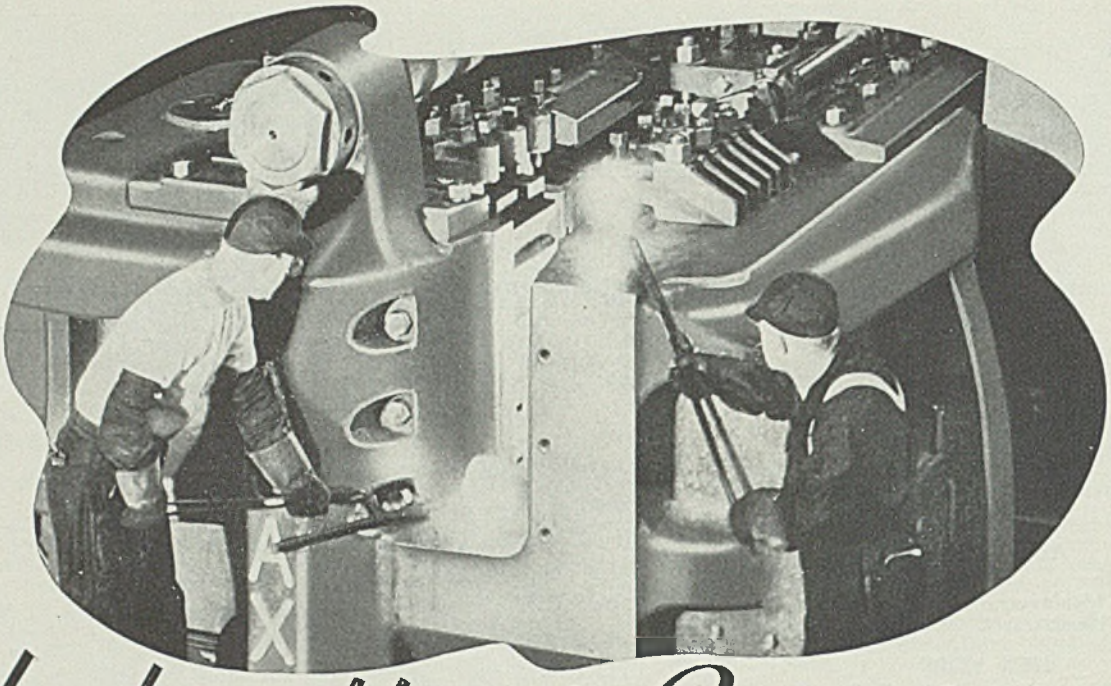

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As the Editor Views the News

ONE way to observe the trend of thought in the minds of industrial executives is to talk with them when they are congregated in annual convention. Last week thousands of them took time off to attend meetings in Milwaukee, Chicago, Cleveland and other cities. Anyone who listened to the addresses and discussion on the scheduled programs or to the informal debates in hotel lobbies and corridors, immediately sensed the fact that while industrialists as a whole are optimistic in regard to the short-term business prospect, they are dubious concerning the long-range future and are particularly concerned about the trend of governmental activity.

• • •

Anxiety concerning governmental policies is not new. Every convention held since early 1933 has been marked by expressions of fear or uncertainty as to the injurious effect of the new deal upon the nation and particularly upon its industries. The concern now manifested by industrialists is prompted by motives quite different from those existing from 1933 to 1936. In those years industry's attitude was colored by resentment, political animosity and misunderstanding. Today industry's concern is based almost entirely upon economic grounds. In a dispassionate, non-political way, many industrialists are working constructively to solve problems resulting from new deal activities.

Attitude Is Non-Political

• • •

This change in attitude is reflected in the current conventions. Few speakers are wasting time in damning the new deal, as they did so vehemently in recent years. Instead they are discussing methods of solving the pressing problems of industry. In considering the delicate labor situation, spokesmen for employers are not bewailing the fact that the government has been notoriously partial to professional unions and manifestly unfair to employers and to unaffiliated employes. They accept the present situation as a condition to be met, an immediate problem to be solved. The Wagner act is terrible; nevertheless, it is the law and must be obeyed. How can we make the best of a bad mess? Industry's attitude in tackling its problems realistically—as reflected in 1937 conventions—is infinitely preferable to its former penchant for crying after the milk had been spilled.

Motives Are Constructive

• • •

The forty-first annual convention of the American Foundrymen's association, held in Milwaukee concurrently with the exhibition of foundry equipment and supplies (p. 76) reflected the vigorous comeback of the castings industry in the recovery period. Attendance was gratifying and the volume of inquiries and sales of equipment at the show was heavy. A significant feature of the convention itself (p. 23) was the unusual emphasis placed upon management problems. Topics such as safety, occupational disease legislation, job evaluation, and foreman and apprentice training vied with the current technical problems for the attention of visiting foundrymen. The foundry industry generally deserves credit for its foresight in devoting adequate attention to safety, hygiene and training problems.

A.F.A. Stresses Management

• • •

While still too early to make definite predictions, experience over the past three seasons with a magnetic roasting and concentrating plant at Cooley, Minn., (p. 48) strongly indicates that a commercial method has been found for reclamation of huge tonnages of low-grade iron ore. . . . Commercial applications of the new finishing process known as Electrocolor, by which colors are deposited by electroplating (p. 63) have been started and metal products such as name plates, instrument panels, molding, hardware, interior decorative trim, giftware, flashlights, lighting fixtures, clocks, and vanity cases now are being finished by this method on a commercial scale. . . . Representatives from 25 countries presented more than 200 papers (p. 82) at the London congress of the International Association for Testing Materials in April.

Research Leads Way to Profits

E. L. Shaner

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RYERSON STEEL-SERVICE

5000 at Foundrymen's National Convention;

Sessions, Exhibits Reflect Recovery

ONE year ago the fortieth annual convention of the American Foundrymen's association was characterized as the milestone which signalized the rebirth of confidence and the return of gratifying activity to the foundry industry after five years of adversity. Today, at the close of the association's forty-first annual convention and exposition in Milwaukee, it can be said that the industry was prepared in material resources and morale to take full advantage of the unprecedented demand for castings which soared up in the past 12 months.

At present, the chief worry of foundrymen is to make deliveries against its backlog of orders and to obtain from equipment manufacturers machinery which is needed to increase production. The only clouds discernible in the distance are shortage of skilled help, unsettled labor conditions and the hindering influence of government on business. Of these, only the problem of the lack of trained workers offers possibility of solution within the industry itself and this through expanded and extended apprentice training programs.

Registration Runs High

More than 5000 foundrymen were registered during last week's five-day convention and exhibition. Sessions were unusually well attended and discussions over technical matters lively. In spite of high operations, foundries are attacking problems of research, metallurgical control and operating technique with renewed vigor.

The show, which was the largest and most complete in some years, was extremely busy. Much new in the way of equipment, accessories and supplies, was shown by the more than 200 exhibitors, and because the foundry industry once more is in the buying mood, considerable business was consummated during the week. Before the show closed, a considerable portion of the equipment bore "sold" tags.

At the opening session of the convention on Monday afternoon, James L. Wick Jr., president, Falcon Bronze Co., Youngstown, O., and president of the association, urged that the foundry industry strive not only for betterment of its products, but also for improvement of labor conditions, particularly through apprentice training. He made a plea for further stimulation of interest through activities of the association and lauded older members who have led in developments of the industry.

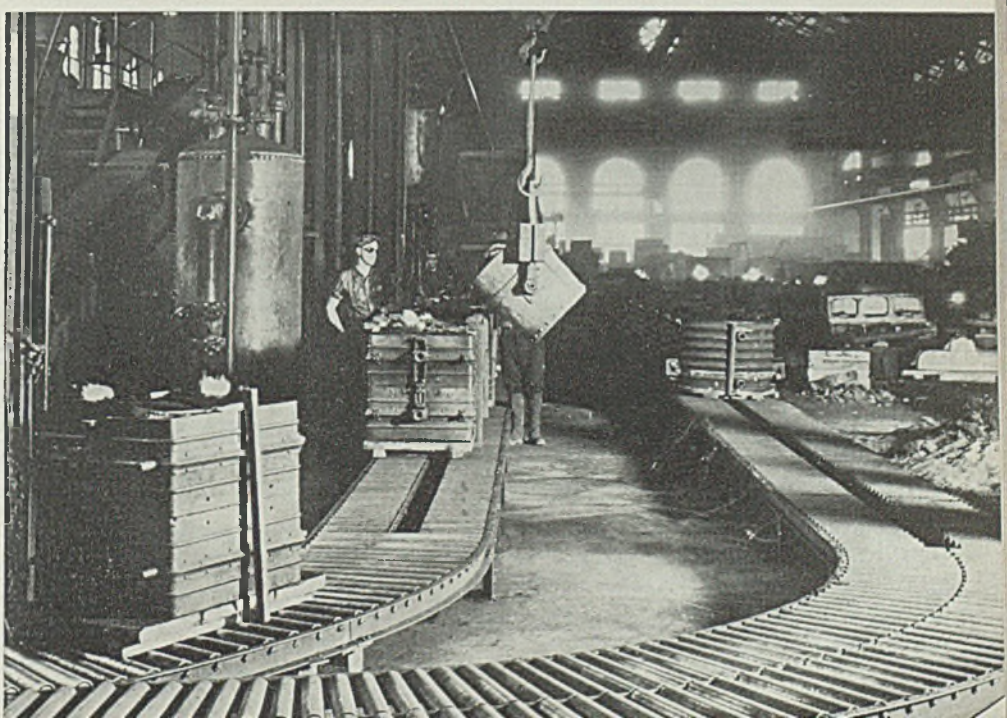
W. F. Bornfleth, manager foundry division, Cutler-Hammer Inc., Milwaukee, and general chairman of the convention, welcomed the delegates. Greetings of Milwaukee were extended by Mayor Daniel W. Hoan, who also besought his listeners to be more active in affairs of local and national government.

A message from the Institute of British Foundrymen was presented by F. G. Steinebach, editor, *The Foundry*, Cleveland, and chairman of the international relations committee. The message read: "Institute of British Foundrymen send cordial greetings to American Foundrymen's association. Best wishes for industrial prosperity and a successful convention."

Must Train Own Workers

Apprentice training and problems relating to the health and safety of workers were considered at length at several convention sessions. The matter of apprentice training is at present of vital concern to both small and large foundries throughout the country because of

Mechanized! A Foundry "Atmosphere" Picture of Today



the shortage of skilled labor. During the depression, most foundries were forced for economic reasons either to drop or curtail their programs. Now, these courses must be re-established or extended.

Speaking at one session, John H. Ploehn, superintendent, French & Hecht Inc., Davenport, Iowa, urged a return to educational systems based on fundamentals rather than the arts. School boards should be more concerned with vocational training, he stated, and attempt to teach a returning respect for trades in general.

At another session, H. A. Nelson, Wisconsin industrial commission, Madison, Wis., pointed out that 95 per cent of industrial accidents are preventable and are the result of carelessness of individual workmen. Therefore, he said, it is necessary to select men carefully, educate them in safety and obtain their wholehearted co-operation.

Defends Use of Machine

Speaking at the annual banquet at Hotel Schroeder Thursday evening, Dr. James S. Thomas, president, Chrysler Institute of Engineering, Detroit, and Clarkson College of Technology, Potsdam, N. Y., discussed the influence of the machine on the present industrial era in which he presented an excellent defense of the machine civilization. Progress of the human race consists of materialistic and idealistic development, he declared, with the materialistic always supporting the idealistic.

In a humorous vein, Dr. Thomas showed that civilization always follows business and all civilization has been industrial. History, he said, is a series of business adventures. Use of the machine today is responsible for the greatest idealistic accomplishments is history.

In recognition of achievement and distinguished service to the foundry industry, the American Foundrymen's association made formal presentation of three medals at the banquet. The John A. Penton gold medal was given to John W. Bolton, metallurgist, Lunkenheimer Co., Cincinnati, in recognition of his work in metallurgy and the practical application of research to the advancement of the foundry industry.

The William H. McFadden gold medal was awarded to Charles W. Briggs, physical metallurgist, United States naval research laboratory, Anacostia, D. C., for his direction of important research and published writings on metallurgy, of great value to steel castings producers. The J. H. Whiting gold medal was presented to Dr. James T. Mackenzie, American Cast Iron Pipe Co., Birmingham, Ala., in recognition of his research and practical work in the advancement of gray iron foundry practice.

President Wick, who presided at the banquet, introduced three former presidents of the association who made the presentation addresses. The Penton medal was presented by E. H. Ballard, general foundry and pattern shop superintendent, General Electric Co., Lynn, Mass.; the McFadden medal address was given by Major R. A. Bull, steel foundry consultant, Chicago; and the Whiting medal, offered through gift of the late J. H. Whiting, was given by Dan M. Avey, secretary of the American Foundrymen's Association and chairman of the board of awards.

Dinner Attendance a Record

All records for attendance at a single assemblage of foundrymen were broken when approximately 1250 gathered Tuesday evening at Hotel Schroeder for the annual stag dinner and entertainment sponsored by the American Foundrymen's association, Foundry Equipment Manufacturers association and Milwaukee chapter of the Foundrymen's association. Speakers included Robert S. Hammond, vice president, Whiting Corp., Harvey, Ill., and president of the Foundry Equipment Manufacturers association; A. F. A. President James L. Wick Jr.; and W. F. Bornfleth, manager foundry division, Cutler-Hammer Inc., Milwaukee, and chairman of the Milwaukee chapter of the A. F. A.

At the annual business meeting on Thursday, President Wick was succeeded by Hyman Bornstein, director, testing and research laboratories, Deere & Co., Moline, Ill., who has served as vice president during the past year. Mr. Bornstein has been active in association work, having served on many committees and as a director from 1932 to 1935. He is a recognized international authority on cast iron.

Has Had Wide Experience

After graduating from Armour Institute of Technology in 1911 as a chemical engineer and John Marshall Law School, Chicago, in 1915, Mr. Bornstein successively served as chemist for the Union Pacific railroad, Swift & Co., and the City of Chicago. He resigned the latter position to become a captain in the ordnance department during the World war. After the war he became associated with Deere & Co.

In addition to the A. F. A., he is a member of the American Chemical society, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials and American Society for Metals.

Marshall Post, new vice president, is vice president and works manager, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He has had an extended career in the foundry industry, beginning as apprentice molder with the American Steel Foundries, Granite City, Ill. Completing the three-year course, he became journeyman molder with the Commonwealth Steel Co. of the same city, later returning to American Steel Foundries.

In 1918, Mr. Post assumed the position of superintendent of foundries, Marion Steam Shovel Co., Marion, O., but returned to the American Steel Foundries in 1920 as works manager of the Sharon, Pa., plant. Later he was made works manager of the Thurlow plant, Chester, Pa. He has held his present position since 1925.

Five directors were elected for three years as follows: H. B. Hanley, in charge of all foundry operations, American Laundry Machinery Co., Rochester, N. Y.; Duncan P. Forbes, president and general manager, Gunite Foundries Corp., Rockford, Ill.; Thomas Kavney, presi-

MORE than 200 manufacturers of foundry equipment and supplies were represented in the Milwaukee exhibition. Reflecting industrial activity, many "Sold" placards were found on equipment early in the week

H. B. Hanley

Thomas Kaveny

D. P. Forbes

C. J. P. Hoehn

C. E. Sims

J. L. Wick Jr.

Hyman Bornstein

Marshall Post

dent, Herman Pneumatic Machine Co., Pittsburgh; C. J. P. Hoehn, president, Enterprise Foundry Co., San Francisco; and James L. Wick Jr., president, Falcon Bronze Co., Youngstown, O.

C. E. Sims, supervising metallurgist, Battelle Memorial institute, Columbus, O., was elected a director for two years to serve the unexpired term of Mr. Post.

Retiring directors are: E. O. Beardsley, president, Beardsley & Piper Co., Chicago; E. W. Campion, president, Bonney-Floyd Co., Columbus, O.; Frank J. Lanahan, president, Fort Pitt Malleable Iron Co., Pittsburgh; W. L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland; and Sam Tour, vice president, Lucius Pitkin Inc., New York.

(For papers presented at the convention, and description of equipment, please turn to pages 74-80.)

Steel Congress in Paris

The sixth international congress for steel development which was scheduled to meet in New York this June, but canceled, will be held in Paris, June 23-26. A call for this meeting has been issued from the executive offices in The Hague, Holland, and delegates have been asked to meet in Duesseldorf, Germany, June 21, for a preliminary conference and to view the Crafts Exhibition which will then be opened by the Nazi State.

Foundrymen's Officers, Directors

MR. BORNSTEIN is the new president of the A.F.A., and Mr. Post, vice president. Mr. Wick, retiring president, is now one of the six newly elected directors

New Mellon Research Home Dedicated at Pittsburgh

Formal dedication of the new home of Mellon Institute of Industrial Research, Pittsburgh, was attended by many industrial leaders and scientists Thursday, May 6.

The impressive new $10,000,000 structure, built of limestone, aluminum, terra cotta and marble, houses laboratories, offices and libraries.

Program for formal exercises included speeches by Richard K. and Andrew W. Mellon, Dr. Irving Langmuir, Dr. H. C. Urey, and Dr. W. P. Murphy.

Invited guests for dedication ceremonies included: W. A. Irvin, president, United States Steel Corp.; Bernard M. Baruch, New York financier; Dr. J. Frank Tone, president, Carborundum Co., Niagara Falls, N. Y.; Dr. A. C. Fieldner, bureau of mines, Washington; Francis P. Garvin of the Chemistry Foundation of New York, and numerous others.

A group of members of the National Association of Directors of Research and guests attended the dedication. On the preceding day they were guests of Dr. John Johnston, New York, director of research, United States Steel Corp., on a visit to the Homestead works of Carnegie-Illinois Steel Corp.

Tool Builders Weigh Labor Relations, Government Policy

DESPITE heavy pressure under which all members now are working, a record number found time to attend the thirty-fifth spring convention of the National Machine Tool Builders' association at Edgewater Beach hotel, Chicago, May 3-4. Pleased and in many cases surprised at the volume of business which has developed within a comparatively short period of time, executives of the machine tool industry are, nevertheless, faced with problems fully as puzzling as those which beset them during the depression.

Among these problems are: Shortage of skilled labor; rising commodity prices; lack of adequate sales and service facilities; complications in handling a rising volume of foreign business; new financing; and revamping and expansion of manufacturing facilities. Literally hanging over the meeting were two big questions: What is the government going to do next; and, what is the future in labor relations?

One significant thing was the participation in the first day's sessions by a number of well known machinery dealers, this through an invitation extended by the directors of the association to the Associated Machine Tool Dealers. This co-operative gesture was signalized by a paper, "Builders and Dealers," by Howard W. Dunbar, vice president, Norton Co., Worcester, Mass., with formal discussion by J. Roy Porter, president, Marschall & Huschart Machinery Co., Chicago.

Mr. Dunbar emphasized the need for new and better figures on the general sales situation in order to make more definite determination than is now possible of the relative merits in every individual case of dealer and direct representation—or a combination of the two. He also urged close attention both by manufacturers and dealers to the growing importance of the engineering type of selling and the new avenues of approach offered by it. There should not be a feeling of competition between direct and dealer salesmanship. Mr. Porter advised more frequent and more constructive sales contacts—bringing out the rather surprising fact that an average of about 38 sales calls are necessary for each customer sold.

In his paper, "Practical Aspects of Depreciation," J. K. Mathiesen, C. P. A., of Mathiesen & Aitken Co., Philadelphia, struck this keynote, "Costs must be reduced to create and hold markets." He defined depreciation as shrinkage in the value of assets, which must be covered in the form of profits. Equipment should be evaluated on the basis of its production ability rather than on any stereotyped rules of bookkeeping.

The speed of depreciation due to technological changes was brought out in the case of a radio plant, in which it had been necessary to replace equipment at least three times since 1922. It is the opinion of Mr. Mathiesen that control by government will increase, that tax rates will not come down for years and that price fixing legislation is a possibility. This paper was discussed by R. E. W. Harrison, vice president, Chambersburg Engineering Co., Chambersburg, Pa., who urged that active sales use be made of the depreciation theme, as is done in automobile selling.

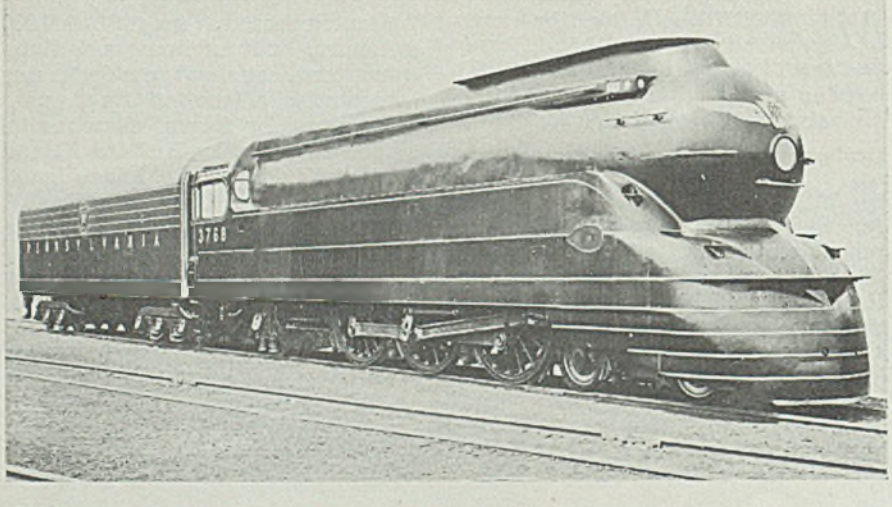
"Big Business" Sponsors Culture

At a luncheon meeting Monday an unusually spirited address was delivered by Dr. James S. Thomas, president of the Clarkson Institute of Technology and of the Chrysler Institute of Engineering. The title was "What Machinery Has Done to Mankind." By innumerable facts, figures and case histories, Dr. Thomas proved that throughout the course of history, culture—as exemplified by music, art, poetry, etc.—has thrived only when subsidized by so-called "big business." The machine makes, and does not destroy, the very conditions on which culture thrives most, despite the fact poets and others who thrive with culture invariably rail against the machine as a terrible destroyer of cultural conditions.

A somewhat similar theme was followed on Monday evening by W. J. Cameron of the Ford Motor Co., in his dinner address on "Industry and Society." Mr. Cameron brought out the further surprising fact that throughout the industrial revolution in England, it was the leading industrialists who fought for shorter hours, better working conditions, higher pay for wage earners and elimination of child labor; while it was the leaders in politics and government who fought against these measures and for years delayed their adoption.

In "A Study of the Business Structure and a Long Look Ahead," Franklyn Hobbs, Chicago economist, stated commodity prices actually are still below the 75-year average, that they must rise a great deal further. As to the proposed reduction in the price of gold, say from $35 to $30, Mr. Hobbs said any

Reduces Wind Resistance One-Third at 60 Miles Per Hour



PENNSYLVANIA railroad's new streamlined steam locomotive, embodying the use of steel plates in an unusual and striking form, shows a reduction in wind resistance of more than one-third at mile-a-minute speeds. This represents a saving equivalent to nearly 300 horsepower. Overall length of the locomotive and tender is 95 feet. The locomotive weighs approximately 169 tons, and the tender loaded 145 tons. A device modeled on the principle of an airplane wing deflects the smoke upward to clear the locomotive and train. Stainless steel strips on the locomotive sides accentuate its streamlined effect

such move would mean practically every American machine enroute abroad would immediately be turned back by prospective purchasers. Looking into the future, Mr. Hobbs predicted a new all-time high for business in 1939.

Employer-employe relationships were dealt with by C. S. Craigmile, works manager, Belden Co., Chicago, under the title, "Present Trends in Shop Management." This is a period of change in shop management, said Mr. Craigmile, the big question now being, "How can we get along with politicians?" Elected politicians are destined to have a lot to do with running business for a long time to come, therefore industrial management must take an interest in politics. Business men of the next generation will not "point with pride" to lack of knowledge of politics.

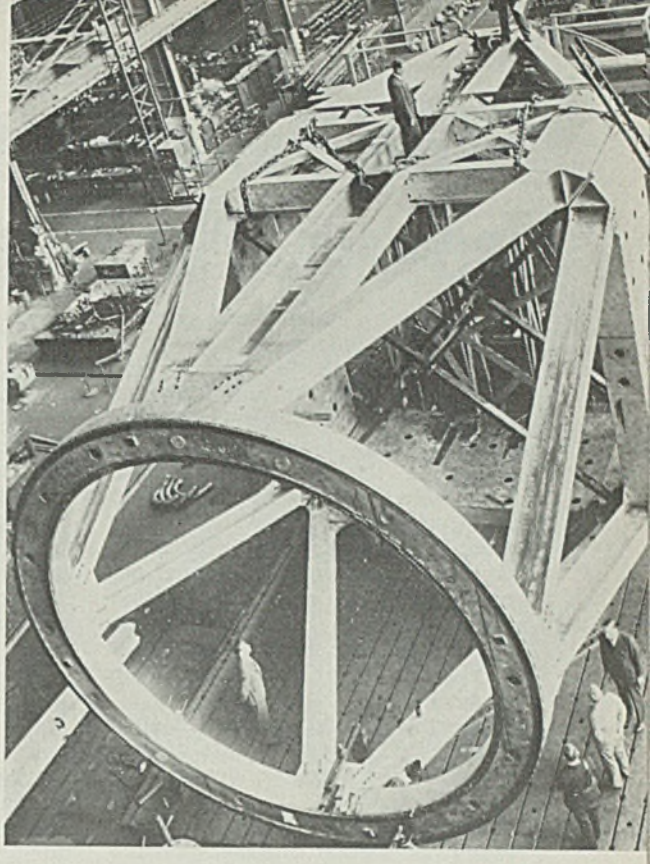
As Mr. Craigmile sees it, the question of "How to get along with employes?" is essentially the same as that of "How to get along with folks?" He recommended more and better personal contacts between employer and employe on a "man to man basis" with managerial problems clearly explained to employes. "Remember," said Mr. Craigmile, "that the word 'boss' is obsolete, and don't ever try to cram views down the throat of the employe."

Clayton R. Burt, president of the association, Tell Berna, who became its general manager on the first of the year, and Mrs. Frida F. Selbert, secretary, received numerous felicitations on the unusually interesting character and "smoothness" of this meeting.

March Machinery Exports 30 Per Cent Above 1936

United States industrial machinery exports in March totaled $18,490,901, a 30 per cent increase over the $14,234,198 sales in March last year, according to the commerce department. Exports increased in seven of the eight machinery groups from 8 to 76 per cent, while textile, sewing and shoe machinery shipments declined 8 per cent.

Despite substantial gains in most types of power-driven metal-working machinery, total shipments in this group advanced only 9 per cent from $4,121,428 to $4,497,750. This was due to considerable declines in a few individual classes, chiefly engine lathes, rolling mill machinery, foundry and molding equipment. Lathes, other than engine, vertical boring mills and chucking machines, milling machines, forging and grinding machinery advanced materially. Other metal-working machinery increased 47 per cent to $479,913.



THIS 100-ton open-frame tube of welded low-carbon steel for a new 200-inch telescope mounting is 60 feet in length and has just been completed in South Philadelphia for water shipment to the Pacific coast. To be shipped complete, it is believed to be the largest single piece ever placed on board a vessel

Steel Forms Gigantic Telescope Base

FABRICATED steel work for a precision instrument, which will have the bulk of a 6-story building and will weigh more than 500 tons, is nearing completion at the South Philadelphia works of Westinghouse Electric & Mfg. Co. It is the mounting for the 200 inch telescope (STEEL, Jan. 25, p. 40) which is to be erected on Mt. Palomar, in southern California, at a cost of $6,000,000.

The mounting comprises essentially two parts—the tube, a 100-ton open frame 60 feet long, square in the middle and round at the ends; and the 350-ton yoke, or cradle, which will support the tube, and which will be about 60 feet long and 46 feet wide.

These two parts are built almost entirely of ordinary low-carbon steel, each comprising several sections, of hollow box construction, electrically welded. The separate sections are bolted together by internal bolt flanges.

Commenting on the use of materials, Norman L. Mochel, metallurgical engineer at the Westinghouse plant, says: "One encounters the erroneous impression a telescope must be constructed largely of special alloys that have low expansivity. While it is true some materials of this type are used in connection with the mirror and other optical parts, most of the material used for the tube and yoke is ordinary mild carbon steel."

He added, however, that in all cases, plates, bars and structural shapes have been rolled by one supplier from specially selected heats, to give the greatest possible uniformity of composition.

Mr. Mochel points out that each outer band for the three sections of the horseshoe end of the yoke required a piece of plate 4½ inches thick by 60 inches wide by 47 feet long. These pieces were formed to the desired curvature under a 12,000-ton forging press.

John H. Gewecke Dead

John H. Gewecke, 53, assistant treasurer, United States Steel Corp., New York, died at his home in Rockville Center, Long Island, May 6, following a brief illness. Born in Brooklyn, N. Y., he joined the Steel corporation in August, 1901, a few months after its organization. He was made cashier in 1919 and assistant treasurer in 1922.

Burned in Dirigible Blast

W. E. Leuchtenberg, president, Alpha-Lux Co., New York, was seriously burned in the Hindenburg dirigible disaster at Lakehurst, N. J., last week. Early reports from a Lakewood, N. J., hospital said he had an even chance for recovery. Mr. Leuchtenberg was a founder in 1919 of the Alpha-Lux Co. which supplies specialties in refractories and gas purifying oxides.

SWOC Forcing Contract Issue; Invitation To Bargain Called 'Futile Waste of Time'

UNABLE to make headway with the large independent steel producers in regard to signing contracts, the Steel Workers Organizing committee last week began talking of a "show down."

Most of the independents have indicated a willingness to bargain collectively with the SWOC to the extent that it can show it represents employes. Terms of the Wagner act are fulfilled when employers express a willingness to talk things over, but they are not required to sign a contract or grant the closed shop or checkoff.

Uncertain of its strength in steel plants, SWOC made threats of calling strikes in independents' coal mines.

"In view of Wagner act see no necessity for signed contracts," wired J. A. Voss, Republic Steel Corp.'s director of industrial relations, to Clinton S. Golden, regional director for SWOC, Pittsburgh. This was after Golden had sent a telegram to T. M. Girdler, Republic chairman, stating that unless a contract was signed "we shall be obliged to disavow all responsibility union members in your mills remaining at work."

"The policy of this company has been, and is now, that it is willing to meet wih anyone to bargain for whomsoever he represents," Voss' wire further stated. "In conformity with this general policy, the proper representatives of this company will meet with you at any time mutually convenient for collective bargaining purposes."

Mr. Voss suggested May 11 as the meeting date. To this suggestion Golden replied that he would consider such a meeting as "a futile waste of time."

SWOC publicly accused Pittsburgh Steel Co. of "bad faith" in asking circuit court in Philadelphia for a continuance of the stay to prevent an election under the labor board at its Monessen and Allenport mills.

"All this leads us to believe," it stated, "Pittsburgh Steel has entered into the unholy alliance of independent steel operators who are inviting industrial warfare."

577,000 on Steel Payrolls; Expenditures Expand

AN INCREASE of 21,000 employes during March brought the total number of employes on payrolls of the steel industry to 577,000 a new high record, according to the American Iron and Steel institute. Total payments in wages and salaries, and average hourly earnings of steel workers, also rose sharply to the highest levels.

Employment in March showed a gain of 119,000 persons, or 26 per cent over 458,000 employed in 1929, and the same increase over March, 1936, when employment equaled the level of 1929. In the first three months this year employment increased 40,000, or over 7 per cent.

Partly as a result of the general increase in wages and salaries which became effective March 16, total payrolls for March rose to $90,863,000, a gain of 67 per cent over March last year. The March payrolls represented a gain of $16,585,000, or 22 per cent, over the $74,278,000 paid in February, although the higher pay schedules were in effect for only approximately one-half of March.

Average hourly earnings of the 520,500 wage-earning employes in March was 79.3 cents, against 72.8 cents in February, 1937; 65.6 cents in March, 1936; and 65.4 cents in 1929.

Wage-earners worked an average of 42.5 hours a week in March, the same number as in the preceding month. They worked 37.2 hours a week in March, 1936, and 55 hours in 1929.

Average weekly wages in March amounted to $33.70, against close to $31 a week in the preceding month, and $24.40 in March, 1936.

World Moves Forward With Steel, Exhibit Theme

New research and control programs will be featured in the United States Steel Corp. subsidiaries' exhibit at the National Association of Purchasing Agents convention in the William Penn hotel, Pittsburgh, May 24-27. Theme of the exhibit is "The World Moves Forward with Steel."

On eight symbolic figures, each representing a major industry, will be photomontages showing applications of steel products in these eight markets. A slide film and diorama designed to represent complete operation of the Heroult electric furnace will be shown.

Corporation's stainless steel will be represented by a diorama. At top is a colored, illuminated view of a bakery truck with stainless steel panels. Below is a view of a girl looking down at a stainless steel sheet in which she clearly sees her own reflection. Other Steel corporation products will be displayed on about 60 sample boards. Exhibit will be in space 18, lower lobby, main exhibition hall.

Financial

AMERICAN ROLLING MILL'S NET TRIPLES 1936 PERIOD

AMERICAN Rolling Mill Co., Middletown, O., reported a first quarter net of $2,320,816 compared with $743,904 last year. If the earnings for the quarter can be taken as an indicator, 1937 will be the best in the company's history.

EASTERN ROLLING MILL SHOWS MARKED GAIN

Eastern Rolling Mill Co., Baltimore, Md., had first quarter earnings of $62,759 against $8420 in the comparable period last year. For the 12 months ending March 31 a net of $126,414 was reported.

BLAW-KNOX VOLUME DOUBLES 1936 FOR FIRST FOUR MONTHS

Business booked by the Blaw-Knox Co., Pittsburgh, and subsidiaries in the first four months of 1937 was twice that of the corresponding period of 1936, according to William P. Witherow, president. Volume of business was the greatest for this period of any year since 1930.

EARNINGS STATEMENTS

Pittsburgh Steel Co., Pittsburgh, reports first quarter, net profit of $489,743, equal to 86 cents a share. This compares with $261,870, or 22 cents a common share, in the December, 1936, quarter.

* * *

Superior Steel Corp., Pittsburgh, reports March quarter net profit of $86,120 after charges and federal income taxes, compared to $29,088 in the period in 1936.

DIVIDENDS DECLARED

United Engineering & Foundry Co., Pittsburgh, declared the regular dividend of $1.75 on the preferred stock and a quarterly dividend of 50 cents on the common stock, both payable May 18 to record May 8. The common dividend is the same as in the previous quarter. Directors were re-elected. R. C. Detwiler was appointed comp-

troller, and Carl T. Zinsmeister was elected assistant secretary and assistant treasurer.

* * *

Directors of Allegheny Steel Co. declared a regular quarterly dividend of $1.75 per share on preferred stock, payable June 1 to holders of record May 15, and a dividend of 40 cents a share on the common stock, payable June 16 to holders of record June 1.

Great Lakes Steel To Erect New Ore Bridge

Contract to erect a 10-ton capacity ore bridge at the Great Lakes Steel Corp. Hanna furnace plant dock at Zug Island, Detroit, has been awarded to Dravo Corp., Pittsburgh. The bridge will be able to operate over a length of 307 feet and will have a central span of 187 feet. Truss has been designed to permit moving shear leg at furnace end 16 feet, making possible a 203 foot span.

General Electric Co. and Westinghouse Electric & Mfg. Co. will supply motors. Cutler-Hammer Inc., Milwaukee, and Electric Controller & Mfg. Co., Cleveland, controls and brakes.

More Goods for More People? Jobbers Hear How Steel Aids

NATIONAL Association of Sheet Metal Distributors, an affiliate of the National Wholesale Hardware association, at its twenty-sixth annual meeting in Cleveland last week reported labor conditions in member plants as peaceful. This was attributed to the general practice of paying good wages, with reasonable hours of labor, and profit sharing on quarterly or annual basis.

This was the first session in five years held independently of the parent association. Lifting of the depression has made it possible to resume the former practice of holding a separate meeting.

E. L. Shaner, Cleveland, president, Penton Publishing Co., and editor of STEEL, addressed the members on significant trends in distribution of finished steel. Going back 50 years and interpreting statistics of the American Iron and Steel institute and distribution figures compiled each year by STEEL, he pointed out the decided trend from heavy to light forms, largely sheets, strip and tin plate. He said in part:

"It is easy to segregate all rolled steel products into two classes—flat rolled steel and other rolled steel. Flat rolled steel would include plates, sheets, tin plate and strip. Please remember these four products and try to grasp the significance of the following:

"In 1887 flat rolled products accounted for 11 per cent of the total output of rolled iron and steel. In 1900 they accounted for 18 per cent of the output. In 1914 they accounted for 26.3 per cent; in 1929 for 36.4 per cent; in 1935 for 47.4 per cent, and in 1936 for 50 per cent.

"Here is a rise in flat rolled steel from a mere tenth of total output in 1887 to a half of the total in 1936. How can we account for this spectacular record? What does it portend in the future?"

Analyzing the distribution statistics he said:

"From 1922 to 1926 the consumers ranked: 1. Railroads, 2. buildings, 3. automotive, 4. oil, gas and water, 5. exports, 6. metal containers, 7. machinery, tools and equipment, and 8. agriculture.

"During the last five year period, 1932-1936, the rating was: 1. Automotive, 2. buildings, 3. containers, 4. railroads, 5. oil, gas and water, 6. machinery, tools and equipment, 7. exports, and 8. agriculture.

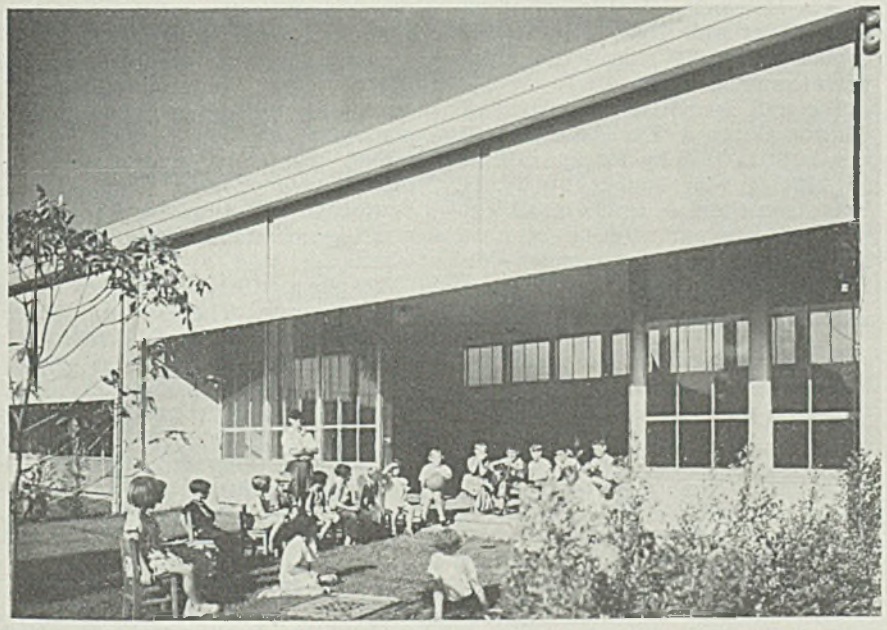
"Note that automotive leaped from third to first; containers from sixth to third; and machinery, tools and equipment from seventh to sixth. Buildings remained unchanged in second place and agriculture did not budge from eighth place. However, railroads slumped from first to fourth ranking; oil, gas and water receded from fourth to fifth; and exports dropped from fifth to seventh.

Jobber Tonnage Swells

"Now the significance of this is that in general consumption for durable or capital goods has declined . . . whereas consumption for consumers goods has gained.

"Beginning with the analysis for 1926, we received reports of the tonnage distributed through jobbers and warehouses. You will be interested to know that the general trend in tonnage thus distributed is upward. From 1926 to and including 1931, the proportion of finished steel handled by jobbers fluctuated between a low of 10.52 per cent and a high of 12.82 per cent. From 1932 to and including 1936 the range has been between a low of 14.02 per cent and a high of 16.12 per cent. The percentage of steel

Life Begins—In a Little Steel School House



THIS structure, in which the architect, Richard J. Neutra, and associated designers, Los Angeles, have cleverly combined indoor and outdoor school rooms, has been erected as an experiment by the Los Angeles board of education. Light and airy, combining the use of enameled sheets and structural steel members, the building is attracting much favorable comment. Wide, sliding glass partitions open into garden space, providing in fair weather additional health advantages

distributed by jobbers was slightly higher during the depression years.

"But the most noticeable shift in galvanized is in the proportion distributed through jobbers. In 1929 and 1930, about 30 to 33 per cent of the total was handled by jobbers. In 1935 the proportion was 49 per cent and in 1936 it was 50.21 per cent. Here is a marked gain of considerable significance to you.

"We have seen that consumption for automobiles, tin cans, refrigerators, stoves, household appliances of all kinds, etc. has increased. These are products particularly adapted to mass production methods. Also, the steel products best adapted to use in the manufacture of these products—namely tin plate, strip, and sheets—are produced in the steel mill by continuous methods, which is the steel industry's nearest approach to mass production technique.

"The double application of mass production—first to the production of the material and then to its fabrication, manufacture and assembly in the finished article—makes for volume and low price. In other words, this synchronization of effort all along the line from mine to finished product means that industry is geared to a technique which conforms to the general policy of 'more goods for more people.'

Urges Acceptance of Policy

"This, I believe, is the principle by which industry will solve its economic and social problems of the near future. You, as distributors, will do well to study this phase of the business. If you can key yourselves into the spirit of the 'more goods for more people' idea, you will get in on the ground floor of a movement which I am confident will sweep the American nation in the next decade."

Congressman Wright Patman, Texas, one of the authors of the Robinson-Patman bill, presented an exhaustive explanation of the measure and answered numerous questions as to its application in specific instances.

He explained that the intent of the law was to eliminate irregularities in business practices, as the interstate commerce law 50 years ago did away with rebates and irregular freight rates, which benefited some shippers at the expense of others. He suggested that when the provisions of the law are well understood they will be welcomed by business men as aiding them in their legitimate dealings, and will remove many present abuses.

This bill, he said, is an amendment to the Clayton act and as such is subject to all the provisions of that law, extending it to cover broader conditions.

F. H. Ramage, Republic Steel Corp., spoke on possibilities in sales training, stressing the necessity for planning ahead in building a sales force, taking into account the rapidly changing field in steel products, which creates a new problem in selling.

While manufacturers of new steels do the groundwork in advertising their materials the distributor, who is on the firing line, must train definitely and carefully to present the case of steels designed for various uses. He outlined the methods used by Republic Steel Corp. in choosing, training and placing salesmen. Once trained and placed in a selling position the problem remains of keeping the salesman in close touch with new developments and the advance of the industry in meeting new conditions.

The association went on record as favoring a request to the bureau of standards that a standard be established for rolls of terne plate for roofing, to consist of 28 sheets of material and of valley flashings of 50 and 100 lineal feet. The tin plate and terne plate committee reported that warehouses now sell little tin plate, as manufacturers of heating pipe and elbows now cover most of this field with their finished product, buying material direct from mills in quantity.

Discussion of social security and other taxes brought out an almost unanimous opinion that social security taxes amount to about 0.1 per cent of gross sales, other "social" taxes bring this to a maximum of about 0.25 per cent and all taxes, city, county, state and federal to about 1.5 to 2 per cent of gross sales.

A. W. Howe, J. M. & L. A. Osborn Co., Cleveland, was re-elected president.

Ohio Sheet and Tin Plate Mill Ready To Start

OFFICERS of the newly organized Ohio Sheet & Tin Plate Corp., Marietta, O., were announced last Friday after a meeting in Marietta, as follows:

President, Daniel T. Haddock, formerly of Pittsburgh; vice president, G. Raymond Steen; secretary and treasurer, Leonard M. Harper; assistant secretary and treasurer, Ralph L. Jones.

Daniel T. Haddock

The plant, which has a maximum annual capacity of around 500,000 base boxes, will employ 22 persons. Operations are scheduled to start June 15. Raw material supplies have been arranged, and prospects for business are bright, according to Mr. Haddock. Articles of incorporation provide for an authorized capital of 500,000 shares of $1 par value common stock.

The mill formerly was owned by Hudson Sheet & Tin Plate Co. It was built in 1918 by foreign capital. In 1924 it was bought by W. S. Robertson Steel & Iron Co., Cincinnati. The plant will be manned by an experienced personnel, Mr. Haddock said.

Additional news of the steel and metal-working industries will be found on pages 116-119.

Metal Finishing Exhibit Will Be Held June 12-19

Metal finishing equipment and processes will be exhibited June 12 to 19 by the Metals and Plastics bureau, Rockefeller Center, New York, concurrently with the silver anniversary convention of the American Electro-Platers' society.

Motion pictures will form part of the program, Wednesday, June 16, having been set aside by both exhibit committee and A. E. S. convention management as metal finishing movie evening. Bell Telephone laboratories will present a film demonstrating new methods for testing finishes.

Displays will include many recent developments. The Evaporated Metal Co., Ithaca, N.Y., will demonstrate the evaporated film process of plating by which metal is disbursed through vacuum from source to surface to be plated. Other displays will show cleaning and plating equipment and recent applications of synthetic enamels and others coatings.

Freight Restriction Eased

Conditional authority to establish and maintain rates on iron and steel between official and southern territories without observing long and short haul provisions of section 4, interstate commerce act, was granted by the interstate commerce commission decision last week.

Production

STEADINESS in the national steelworks operating rate again was manifest last week when the average held at 91 per cent. Pittsburgh came back strongly following flood conditions and eastern Pennsylvania also was up, but declines were noted at Chicago and Youngstown.

Cleveland-Lorain — Continued at 79½ per cent, with 31 furnaces melting.

Central eastern seaboard — Advanced 3 points to 73½ per cent, reflecting a disposition on the part of producers to be more strongly competitive in making deliveries.

Chicago—Declined 2½ points to 83 per cent, the result of lighter schedules at one plant. While pressure for delivery has eased, mills anticipate a continuation of output around present levels through remainder of the quarter. Blast furnace operations are unchanged.

Pittsburgh—Up 3 points to 93 per cent, following complete recovery from the precautionary measures arising from the flood. Carnegie-Illinois Steel Corp. has lighted at Rankin a blast furnace idle since September, 1933, making five of seven stacks in operation there.

Wheeling—Up 6 points to 94 per cent, following speedy recovery from the precautionary measures necessitated because of high water.

New England—Down three points to 90 per cent, due to minor repairs on two small open hearths. Tentative schedules indicate this loss will be regained this week, as two steelworks are planning to operate at 100 per cent.

St. Louis—Ingot production was unchanged at 94 per cent.

Youngstown—Off 4 points to 83 per cent, as Youngstown Sheet & Tube Co. dropped two units each at its Brier Hill and Campbell plants. Seventy open hearths and three bessemers are active.

Birmingham—Held at 83 per cent for the second week.

Buffalo—Down 1 point to 92 per cent. Forty open hearths were in production at the beginning of the week, with only three units idle in the district. These latter are undergoing repairs.

Detroit — Continued at 100 per cent.

Cincinnati—With only two open hearths idle in the district, steelmaking operations rose to 94 per cent, a 4-point gain.

District Steel Rate

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended May 8	Change	Same week 1936	Same week 1935
Pittsburgh ..	93	+ 3	62	36
Chicago	83	— 2½	71	52½
Eastern Pa...	73½	+ 3	44½	28
Youngstown..	83	— 4	76	50
Wheeling	94	+ 6	92	81
Cleveland	79½	None	75½	51
Buffalo	92	— 1	73	30
Birmingham..	83	None	69	54½
New England.	90	— 3	78	46
Detroit	100	None	94	82
Cincinnati ...	94	+ 4	84	†
St. Louis.....	94	None	†	†
Average....	91	None	68½	44½

†Not reported.

April Ingot Rate Makes New High

PRODUCTION of steel ingots in April has been exceeded in only two previous months, March, 1937, and May, 1929. Because of one less working day it fell slightly below the March total, but the April figure represented 90.27 per cent of capacity, compared with 89.91 per cent in March. The average weekly production in April was 1,182,255 tons, which also was larger than the 1,177,577 tons weekly average in March, reports the American Iron and Steel institute.

Production for four months totaled 19,427,312 tons, which is nearly 50 per cent greater than total production for all of 1932. It compares with 13,263,153 tons in four months of 1936. Production in April of this year was nearly 30 per cent larger than in the same month of 1936.

In the accompanying table the institute has revised and readjusted figures for both years.

Steel Ingot Statistics

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

1937	—Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	—Total— Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
Jan.....	4,433,145	84.20	291,794	54.30	4,724,939	81.43	1,066,578	4.43
Feb.....	4,082,163	85.87	331,669	68.35	4,413,832	84.25	1,103,458	4.00
March.....	4,812,879	91.42	403,787	75.14	5,216,666	89.91	1,177,577	4.43
April.....	4,681,677	91.83	390,198	74.98	5,071,875	90.27	1,182,255	4.29
4 mos.....	18,009,864	.....	1,417,448	.....	19,427,312	.....	1,132,788	17.15
1936								
Jan.....	2,843,415	54.76	196,389	32.21	3,039,804	52.39	686,186	4.43
Feb.....	2,754,446	56.76	202,445	35.55	2,956,891	54.53	714,225	4.14
March.....	3,148,813	60.64	185,040	30.33	3,333,853	57.46	752,563	4.43
April.....	3,627,830	72.14	304,775	51.62	3,932,605	69.99	914,593	4.29
4 mos.....	12,374,504	.....	888,649	.....	13,263,153	.....	767,099	17.29
May.....	3,735,283	71.93	302,092	49,55	4,037,375	69.58	911,371	4.43
June.....	3,640,672	72.40	334,897	56.72	3,975,569	70.75	926,706	4.29
July.....	3,587,764	69.25	326,606	53.69	3,914,370	67.61	885,604	4.42
Aug.....	3,833,727	73.83	350,560	57.50	4,184,287	72.11	944,534	4.43
Sept.....	3,848,340	76.71	303,048	51.45	4,151,388	74.05	969,950	4.28
Oct.....	4,216,536	81.20	317,710	52.11	4,534,246	78.15	1,023,532	4.43
Nov.....	3,993,472	79.42	329,553	55.82	4,323,025	76.94	1,007,698	4.29
Dec.....	4,119,025	79.50	305,342	50.20	4,424,367	76.42	1,000,988	4.42
Total....	43,349,323	70.74	3,458,457	48.07	46,807,780	68.36	895,329	52.28

Percentages of capacity for 1937 are calculated on weekly capacities of 1,188,452 gross tons for open-hearth ingots, 121,308 tons for bessemer and 1,309,760 tons total, based on annual capacities as of Dec. 31, 1936, as follows: Open-hearth ingots, 61,965,862 gross tons; bessemer, 6,325,000 tons; for 1936, on weekly capacities of 1,172,160 gross tons open-hearth ingots, 137,624 tons bessemer, 1,309,784 tons total, based on annual capacities as of Dec. 31, 1935, as follows: Open-hearth ingots 61,280,509 gross tons, bessemer 7,195,000 gross tons.

Actual Pig Iron Figures For April Little Changed

Complete figures tabulating coke pig iron production in the United States for April were little changed from the preliminary figures presented in STEEL, May 3, page 23. The latter involved producers' estimates for the last two or three days of the month.

Average daily production for April was 113,354 gross tons, a gain of 1403 tons, or 1.25 per cent, from the March rate of 111,951 tons. Total output was 3,400,636 tons, against 3,470,470 tons in March, a loss of 69,834 tons, or 2.0 per cent.

Blast furnaces operating on April 30, remained as previously reported at a total of 186, compared with 182 on March 31. In addition to the stack changes tabulated, however, Carnegie-Illinois Steel Corp. blew in its Edgar Thomson E stack in Pennsylvania and Bethlehem Steel Co. took out its Maryland C furnace in Maryland. The Everett, Mass., stack of the Mystic Iron Works went into blast May 1.

1936 Steel Ingot and Casting Output

American Iron and Steel Institute Official Figures Show 40 Per Cent Rise from 1935
Largest Total Since 1929, at 85 Per Cent of 1929 Record

ANNUAL STEEL PRODUCTION (Ingots and Steel for Castings)

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
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	44,079	515,872	44,943,696
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
*1936	43,114,826	421,302	43,536,128	3,458,457	816	772,455	47,767,856

ANNUAL STEEL INGOT PRODUCTION

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	34,568,418
1923	34,090,711	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	141,228	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
1936	43,070,917	278,406	43,349,323	3,458,457	816	704,213	47,512,809

PRODUCTION OF DUPLEX STEEL

Years	Gross tons	Years	Gross tons	Years	Gross tons
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
1926	2,815,980	1931	945,844	1936	2,099,102

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1921	769,293	40,255	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
1928	3,045,225	169,684	3,214,909	*1536	2,780,100	95,522	2,883,622

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES

Processes	1933	*1934	*1935	*1936
Open hearth steel—basic	1,169,255	1,278,343	1,633,541	2,239,885
Open hearth steel—acid	57,097	34,540	73,400	115,766
Bessemer steel	24,519	53	.....	.....
Crucible steel	102	103	154	209
Electric steel	296,210	299,236	412,563	527,762
Total	1,547,183	1,612,275	2,119,658	2,883,622

*The figures for 1934, 1935 and 1936 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	1932	1933	1934	1935	1936
Maine, Mass., Rhode Island, Conn.	110,050	175,506	158,559	198,790	246,916
New York	473,952	646,923	800,338	959,095	1,440,034
New Jersey	51,585	73,199	86,466	94,097	111,047
Pennsylvania	3,269,548	5,059,366	5,619,410	6,521,515	10,032,035
Delaware, Md., Va.	416,754	711,862	788,824	977,361	1,367,012
West Virginia	445,369	779,914	797,039	1,045,051	1,191,403
Kentucky, Tenn., Ga., Texas	269,859	366,553	401,305	571,732	658,761
Alabama	367,902	567,819	628,409	728,390	1,087,414
Ohio	2,311,419	3,974,493	4,301,239	5,401,948	7,697,296
Indiana	1,126,275	1,984,423	2,446,052	3,276,717	4,431,090
Illinois	737,803	1,150,087	1,311,243	1,890,251	2,510,249
Michigan, Wis., Minn.	456,964	686,760	923,724	1,467,362	1,708,914
Missouri, Okla.	142,080	149,014	167,112	201,360	315,691
Colorado, Wash.	146,980	166,180	246,999	283,793	534,533
California, Canal Zone	124,548	242,987	292,787	347,090	468,980
Total	10,451,088	16,735,086	18,969,506	23,964,552	33,801,379

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS IN 1936

	Gross tons
FLAT ROLLED PRODUCTS:	
Plates (sheared and universal)	2,526,741
Sheets	6,995,905
Strip	3,224,916
Hoops	109,279
Cotton ties and baling bands	37,781
Black plate	2,629,671
Total	15,524,293
BARS:	
Merchant	5,062,948
Concrete reinforcement	1,028,563
Total Bars	6,091,511
Structural shapes	2,897,631
Sheet piling	117,157
Rails	1,219,846
Long splice bars, tie plate bars, etc.	471,521
Skelp	2,156,602
Blanks or pierced billets for seamless tubes	1,615,963
Wire rods	2,997,880
Car wheels (rolled steel)	128,728
Cross ties	13,700
Rolled forging blooms, billets and axle blanks	473,199
Blooms, billets, slabs and sheet bars for export	16,030
All other fin. hot rolled products	77,318
Total	12,185,575
Grand total	33,801,379

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	
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
1936	2,103,153	127,056	125,352	252,408	2,355,561

In Substantial Gain over Previous Year

Flat-Rolled Lines Increase 35.5 Per Cent—Most Steel Products Make About Parallel Gain—Pennsylvania, Ohio, Indiana and Illinois Lead in Tonnage

PRODUCTION OF SEAMLESS, LAP-WELD, BUTT-WELD, AND ELECTRIC-WELD PIPE AND TUBES IN 1936

SEAMLESS PIPE AND TUBES*

	Standard pipe	Line pipe	Oil country goods	Boiler tubes	Mechanical tubes	Miscellaneous	Total
Hot finished†	32,665	328,833	750,679	96,908	75,946	17,787	1,302,818
Cold drawn	2,556	593	1,131	20,548	84,278	2,799	111,905
Total	35,221	329,426	751,810	117,456	160,224	20,586	1,414,723

LAP-WELD, BUTT-WELD AND ELECTIC-WELD PIPE AND TUBES*

Lap-weld and Butt-weld¶	1,122,467	168,945	134,056	19,996		34,148	1,483,612
Electric-weld¶	77,802	56,200	106,223	‡	56,362	59,452	355,039

*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.

¶Includes Iron and Steel.

PRODUCTION OF IRON AND STEEL CONCRETE REINFORCEMENT BARS

Years	Rolled from new steel	Rolled from old material	Total
1927	*	*	816,013
1928	*	*	951,888
1929	*	*	963,600
1930	682,681	167,470	850,151
1931	500,055	143,578	643,633
1932	275,115	110,490	385,605
1933	294,349	75,924	370,273
1934	383,627	103,377	487,004
1935	405,313	152,047	557,360
1936	820,523	208,040	1,028,563

*Data not available.

PRODUCTION OF FLAT ROLLED PRODUCTS BY CLASSES

	1932	1933	1934	1935	1936
PLATES:					
Universal	309,653	311,747	534,784	439,362	676,799
Sheared	520,177	848,635	902,995	1,015,983	1,849,942
Total	829,830	1,160,382	1,437,779	1,455,345	2,526,741
SHEETS:					
Hot rolled	1,471,532	727,442	1,036,244	1,555,034	2,734,760
Hot rol. ann.		2,364,968	2,166,361	3,620,523	4,261,145
Strip	1,185,184	1,830,106	2,196,840	2,647,589	3,224,916
Hoops	42,697	48,344	48,808	89,852	109,279
Cotton ties & baling bands	37,725	51,081	28,300	24,719	37,781
Total	2,737,138	5,021,941	5,476,553	7,937,717	10,367,881
BLACK PLATE:					
For tinning	999,528	1,676,701	1,499,877	1,794,718	2,283,378
All other	142,418	287,157	235,554	265,516	346,293
Total	1,141,946	1,963,858	1,735,431	2,060,234	2,629,671
Grand total	4,708,914	8,146,181	8,649,763	11,453,296	15,524,293

PRODUCTION OF PLATES, SHEETS AND STRIP BY SIZES

	1933	1934	1935	1936
	a	a	a	a
UNIVERSAL PLATES:				
6 1/16" to 48" wide—1/4" & thicker	290,232	476,430	385,326	601,134
48 1/16" & wider—.1875" & thicker	21,515	58,354	54,036	75,665
Total	311,747	534,784	439,362	676,799
SHEARED PLATES:				
6 1/16" to 48" wide—1/4" & thicker	424,084	436,623	366,680	678,348
48 1/16" & wider—.1875" & thicker	424,551	466,372	649,303	1,171,594
Total	848,635	902,995	1,015,983	1,849,942
BLACK SHEETS:				
Hot rolled—16 ga. & heavier (b)	727,442	1,036,244	1,555,034	2,734,760
Hot rolled ann.—17 ga. & lighter (c)	2,364,968	2,166,361	3,620,523	4,261,145
Total	3,092,410	3,202,605	5,175,557	6,995,905
STRIP (d):				
To and incl. 6" in width	669,389	672,997	852,856	1,009,472
Over 6" to and incl. 23 1/8" in width	b1,160,717	1,523,843	1,794,733	2,215,444
Total	1,830,106	2,196,840	2,647,589	3,224,916

(a) New classification adopted January 1, 1933.

(b) Hot rolled sheets—24" to 48" in width by .249" to .059" in thickness; 48 1/16" and over in width by .1874" to .059" in thickness.

(c) Hot rolled annealed sheets—3 1/16" and less in width by .024" and less in thickness; 3 1/16" to 6" in width by .034" and less in thickness; 6 1/16" to 23 1/8" in width by .058" and less in thickness; 24" to 48" in width by .058" and less in thickness; 48 1/16" and over in width by .058" and less in thickness.

(d) Hot rolled strip—flats 3 1/2" and under in width by .249" to .025" in thickness; 3 1/8" to 6" in width by .219" to .035" in thickness; 6 1/16" to 23 1/8" in width by .249" to .059" in thickness.

PRODUCTION OF IRON AND STEEL MERCHANT BARS

Years	Total	Years	Total
1927	4,870,247	1932	1,313,896
1928	6,277,835	1933	2,284,776
1929	6,459,896	*1934	2,802,427
1930	4,131,973	*1935	3,699,057
1931	2,440,363	*1936	5,062,948

*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 (a)	Blanks or pierced billets
1927	3,418,852	889,336
1928	3,368,973	1,190,658
1929	3,517,238	1,382,171
1930	2,682,046	1,248,156
1931	1,499,280	732,569
1932	607,599	370,270
1933	994,515	588,998
1934	1,120,217	824,542
1935	1,352,079	953,371
1936	2,156,602	1,615,963

(a) Includes Iron and Steel.

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES

Years	Heavy shapes	Light shapes	Total	Years	Heavy shapes	Light shapes	Total
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	1,131,133	293,907	1,425,040
1930	3,010,847	501,626	3,512,473	1935	1,303,613	446,127	1,749,740
1931	1,768,374	294,484	2,062,858	1936	2,216,319	681,312	2,897,631

Scrap Exports At Record High

EXPORTS of steel and iron products from the United States in March, excluding scrap, totaled 208,327 gross tons valued at $13,784,606, the highest monthly level since July, 1929, when 222,602 tons valued at

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1937		1936	
	Imports	Exports	Imports	Exports
Jan.	43,063	201,692	50,489	241,564
Feb.	41,628	290,987	43,358	213,802
March	51,805	570,576	56,720	264,337
3 Mos.	136,496	1,063,255	150,567	719,703
April	.....	.....	49,621	301,987
May	.....	.....	59,391	314,950
June	.....	.....	59,910	294,951
July	.....	.....	47,490	296,738
Aug.	.....	.....	60,697	295,341
Sept.	.....	.....	59,993	235,571
Oct.	.....	.....	64,509	261,882
Nov.	.....	.....	61,970	203,297
Dec.	.....	.....	52,584	244,156
Total	.....	.....	666,838	3,162,694

$16,750,541 were exported, according to the metals and minerals division of the department of commerce.

Scrap exports reached the highest total of all time, with 362,249 tons, valued at $6,735,381. This compares with 151,271 tons in February and 167,453 tons in March, 1936. During first quarter 586,369 tons were exported, compared with 466,531 tons in first quarter, 1936.

The total, excluding scrap, compares with 139,716 tons valued at $9,835,664 in February, a gain of 59 per cent in quantity and 40 per cent in value. Compared with 96,884 tons valued at $6,632,236 exported in March, 1936, gain is 118 per cent in quantity and 92 per cent in value.

Shipments other than scrap during first quarter of this year totaled 476,886 tons valued at $32,948,019, against 248,267 tons valued at $18,486,298 in the corresponding period of 1936, a gain of 91.5 per cent in quantity and 78.5 per cent in value. In the first quarter of 1929, 695,674 tons valued at $54,637,741 were exported.

Although imports of steel and iron products, excluding scrap, totaled 49,898 gross tons, valued at $2,420,136, and were 26 per cent larger in quantity and 45 per cent in value than those of February the first quarter aggregate of 129,697 tons valued at $5,807,729 compared favorably with the 128,299 tons valued at $5,124,574 shipped to the United States during the first quarter of 1936.

Pig iron led March imports with 10,720 tons, compared with 11,340 tons in February and 23,743 tons in March, 1936. Ferromanganese imports in March were 258 tons larger than in February and 1763 tons larger than in March, 1936.

ORIGIN OF MARCH IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	34,117	.....	.....	3,457
U. S. S. R.	5,100	.....	14,358	.....
United Kingdom	49	50	.....	.....
Canada	867	1,488	.....	319
Cuba	45,000	.....	9,072	.....
Chile	128,700	.....	.....	.....
British India	845	4,542	3,408	.....
Mexico	357	.....	.....	.....
Germany	.....	60	19	.....
Netherlands	.....	4,580	.....	.....
Czechoslovakia	.....	.....	9	.....
France	.....	.....	14	196
Gold Coast	.....	.....	14,025	.....
Japan	.....	.....	.....	105
Poland	.....	.....	.....	31
Total	215,035	10,720	40,905	4,108

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	15	8	121	71
Belgium	1,315	7,095	3,219	1,791
Czechoslovakia	50	.....	9	.....
France	138	1,463	1,309	628
Germany	50	84	244	96
Sweden	11	.....	510	.....
Japan	12	.....	.....	.....
Austria	.....	.....	1	.....
Total	1,591	8,650	5,413	2,586

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Mar. 1937	Feb. 1937	Jan. thru Mar. '37
Pig iron	10,720	11,340	34,494
Sponge iron	59	1,117	1,455
Ferromanganese (1)	4,108	1,550	8,028
Spiegeleisen	2,720	1,230	4,610
Ferrochrome (2)	56	16	125
Ferrosilicon (3)	42	119	275
Other ferroalloys (4)	.....	50	52
Steel ingots, blooms	14	1	124
Billets	220	185	456
Concrete rein. bars	1,183	98	2,053
Hollow bar, drill steel	255	199	618
Bars, solid or hollow	5,413	3,480	13,997
Iron slabs	1	.....	1
Iron bars	157	128	422
Wire rods	1,631	974	4,231
Boiler, other plate	11	8	39
Sheets, skelp, saw pl.	1,591	945	4,032
Die blocks or blanks	22	11	35
Tin plate, taggers' tin and terne plate	16	2	59
Structural shapes	8,650	6,762	23,331
Sashes and frames (5)	.....	.....	.....
Sheet, piling	341	512	854
Rails, fastenings	847	1,477	2,504
Cast iron pipe, fitgs.	303	227	707
Mal. iron pipe fittings	26	34	89
Welded pipe	1,422	137	1,808
Other pipe	2,041	1,568	4,084
Cotton ties	.....	349	349
Hoops and bands	2,586	2,407	7,134
Barbed wire	1,297	920	3,802
Iron and steel wire	595	453	1,373
Teleg. and tele. wire	2	.....	8
Flat wire and strips	332	225	839
Wire rope and strand	334	197	758
Other wire	410	279	967
Nails, tacks, staples	1,991	1,704	4,866
Bolts, nuts, rivets	92	91	207
Horse, mule shoes	6	22	52
Castings, forgings	404	340	859
Total gross tons	49,898	39,157	129,697
Iron and steel scrap	1,907	2,471	6,799
GRAND TOTAL	51,805	41,628	136,496

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content; (5) formerly included in "Structural shapes."

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Mar. 1937	Feb. 1937	Jan. thru Mar. '37
Pig iron	14,435	17,118	44,882
Ferromanganese and spiegeleisen	59	16	150
Other ferroalloys	133	335	561
*Ingots, blooms, etc.			
Not cont. alloy	3,557	6,808	12,155
Alloy, incl. stainless	525	63	632
Bars, iron	294	79	463
Bars, concrete	819	812	2,522
*Other steel bars			
Not cont. alloy	8,868	5,824	19,077
Stainless steel	11	8	66
Alloy, not stainless	523	572	1,430
Wire rods	3,057	1,680	8,016
Boiler plate	324	109	650
*Other pl. not fab.			
Not cont. alloy	26,589	11,315	44,978
Stainless steel	6	3	11
Alloy, not stainless	96	98	207
Skelp	5,964	2,777	10,272
Sheets, galv. iron	509	116	1,619
Sheets, galv. steel	5,441	3,734	14,671
*Sheets, black steel			
Not cont. alloy	18,303	13,123	44,722
Stainless steel	47	46	139
Alloy, not stainless	18	49	81
Sheets, black iron	833	270	1,807
*Strip steel, cold-rolled			
Not cont. alloy	2,689	2,586	7,551
Stainless steel	19	32	90
Alloy, not stainless	44	117	190
*Strip steel, hot-rolled			
Not cont. alloy	5,691	4,058	15,683
Stainless steel	37	2	64
Alloy, not stainless	80	43	230
Tin plate and taggers' tin	23,484	19,032	67,748
Terne plate	831	427	1,899
Tanks, except lined	4,781	957	6,291
Shapes, not fab.	16,169	6,544	27,225
Shapes, fabricated	3,941	3,244	8,715
Plates, fabricated	335	3,365	3,827
Metal lath	135	169	407
Frames and sashes	50	85	208
Sheet piling	667	234	1,748
Rails, 60 lb.	15,581	705	20,121
Rails, under 60 lb.	576	1,428	2,725
†Rails, relaying	2,386	695	4,599
Rail fastenings	1,146	499	1,931
Switches, frogs, etc.	146	98	362
Railroad spikes	135	198	567
R. R. bolts, nuts, etc.	70	79	207
Boiler tubes, seamless	1,155	904	2,793
Do. welded	61	80	165
Pipe			
Smls. casing, oil-line	9,035	6,586	18,772
Do. welded	1,390	800	2,976
Do. seamless blk., except casing	1,355	1,272	3,890
Pipe fittings			
Mal. iron screwed	423	307	1,013
Cast iron screwed	272	276	705
Pipe and fittings for			
Cast iron pressure	1,744	2,867	6,412
Cast iron soil	844	494	1,951
Pipe			
Welded black steel	1,742	1,480	4,641
Welded blk. wrt. iron	104	224	488
Welded galv. steel	966	844	4,760
Wld. galv. wrt. iron	214	302	527
Pipe and fittings			
Rivet'd iron or steel	45	31	123
Wire			
Plain iron or steel	3,907	2,265	8,719
Galvanized	2,272	1,489	5,414
Barbed	3,480	2,570	9,394
Woven wire fencing	305	386	870
*Woven wire screen			
Insect	27	30	80
Other	92	122	317
†Wire rope	648	477	1,340
‡Wire strand	56	68	160
†Card clothing	2	3	6
Other wire mfrs.	702	524	1,765
Wire nails	2,653	1,432	5,172
Horseshoe nails	76	91	240
Tacks	26	33	82
Other nails, staples	411	293	907
Bolts, etc.	1,002	895	2,595
Castings			
* Gray iron, semi-steel	566	608	1,682
Malleable iron	627	400	1,342
* Steel, not alloy	161	212	485
Alloy, incl. stainless	128	106	371
Car wheels, tires, axles	1,884	1,064	3,576
Horseshoes, calks	28	54	84
*Forgings, n. e. s.			
Not alloy	420	557	1,325
Alloy incl. stainless	90	21	245
Total I. & S. prod.	208,327	139,716	476,886
Scrap, iron, steel	355,979	143,197	568,060
Scrap, tin plate	1,181	1,548	3,228
†Tin plate circles, strips, cobbles	1,415	1,505	3,710
Waste-waste tin plate	3,674	5,021	11,371
Total scrap	362,249	151,271	586,369
GRAND TOTAL	570,576	290,987	1,063,255
Iron ore	66	179	2,794

*No comparable breakdown for previous year. †New class. No comparable figures available for previous year. ‡Previously carried under one heading—"Wire rope."

Activities of Steel Users and Makers

THOMPSON PRODUCTS INC., Cleveland, maker of automotive engine valves, has purchased Jadson Motor Products Co., Bell, Calif., which has done business in airplane engine valves. Basis of acquisition was an exchange of stock. Management personnel of the Jadson organization remains unchanged, with C. V. Dachtler as manager and A. E. Robb, vice president in charge of engineering and sales. F. C. Crawford, president of Thompson Products, also becomes president of Jadson, while L. M. Clegg and J. D. Wright, respectively senior vice president and secretary of Thompson, become vice presidents of Jadson. The company will be operated as a wholly-owned subsidiary.

♦ ♦ ♦

American Brake Shoe & Foundry Co. of California has established general offices at 1010 Russ building, San Francisco.

♦ ♦ ♦

Strickland Foundry & Machine Works Inc., is now located at 581-583 Eleventh avenue, between Forty-third and Forty-fourth streets, New York.

♦ ♦ ♦

Mehler Inc., Pittsburgh, successor to Mehler Research & Engineering Inc., has recently been organized to manufacture precision valves. Dr. C. J. Mehler is president and V. R. Shattuck is general manager.

♦ ♦ ♦

Westinghouse Elevator Co., East Pittsburgh, Pa., has booked an order covering equipment for 20 elevators from the Monecatini Co., chemical firm, Milan, Italy, to be installed in a 15-story building.

♦ ♦ ♦

Marshall Supply & Equipment Co., Tulsa, Okla., and Cornell Supply Co., Toledo, O., have added the complete line of Stanley electric tools to their stocks of supplies, tools and equipment for the industrial trade.

♦ ♦ ♦

Greer Steel Co., Dover, O., which is establishing a large strip mill at Anderson, Ind., is to begin work immediately on a 60 x 300 foot steel stock building. Large 80-ton mills also are being installed.

♦ ♦ ♦

Ideal Commutator Dresser Co., Sycamore, Ill., has purchased the patents of Marshall Electric Co., Elkhart, Ind., and will engage in the manufacture of voltage, current and speed control regulators, in addition to its regular line of products.

♦ ♦ ♦

Pfaudler Co., Rochester, N. Y., recently purchased a large box-type furnace for porcelain enameling tanks from the Ferro Enamel Corp., Cleveland. The new furnace is to be equipped with Surface Combustion Co.'s gas-fired alloy radiant tubes.

♦ ♦ ♦

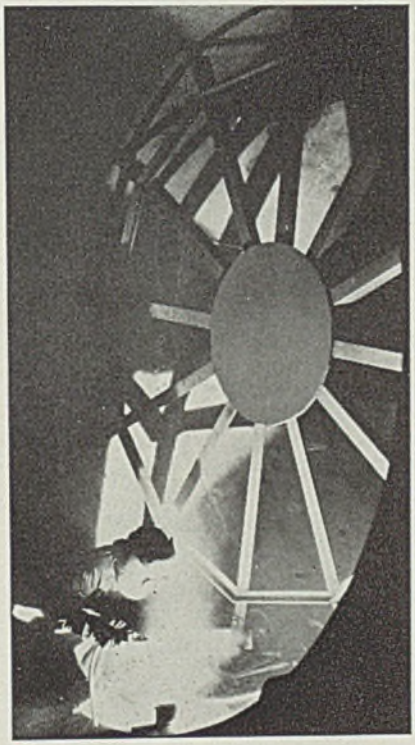
Independent Air Filter Co., Chicago, maker of automatic air filters, has located its general offices in the Builders building, 228 North LaSalle street. A considerable increase in manufacturing floor space has been leased on the north side of Chicago, necessitated by steady increase in volume of the company's business.

♦ ♦ ♦

National Steel Co., Chicago, has taken over an additional 10,000 square feet of warehouse space adjacent to its present location and is also erecting new offices at 831 West Evergreen avenue. This expansion program has been made necessary due to increased business and the carrying of more tonnage as well as a greater number of steel items.

♦ ♦ ♦

Hypressure Jenny division of Homestead Valve Mfg. Co., Coraopolis, Pa., has appointed the following distributors for handling its line of chemical vapor spray cleaning machines: Toledo Equipment & Supply Co., Toledo, O.; Oil Burner Equipment Co., Tampa, Fla.; Merkel & Roberts, Painesville, O.; Gleasner Corp., Buffalo.



STEEL is fused to steel to make this 11-foot water-cooled shell of an automatic gas producer at Wellman Engineering Co., Cleveland. Shell is high tensile, corrosion-resisting steel, "Cor-ten," made by United States Steel Corp. subsidiaries. Photo courtesy James F. Lincoln Arc Welding Foundation, Cleveland

Gregg Comments On Steel Prices

ROBERT GREGG, vice president in charge of sales, United States Steel Corp., addressing the Concrete Reinforcing Steel institute in thirteenth annual convention at Hot Springs, Va., April 30-May 1, congratulated the industry on its standardization program, but warned against a breakdown of this policy. He also warned against making lump sum bids on projects, declaring he knew no greater menace to the industry's welfare than continuation of the practice.

Mr. Gregg pointed out that present steel prices are lower in comparison with costs and quality than in similar times in the past.

"If we turn to 1926 for comparison, we find that steel rail prices are lower now by 50 cents per ton than they were then, yet the quality of steel rails today is better than ever before," he stated. "Steel merchant bars today are in reality only $1 a ton higher than they were in 1926, when you consider the extra for quality then as opposed to no such extra today, and give effect to the discount for quantity available now but not available then. Galvanized sheet prices are $3 per ton lower today, and strip prices are $2 per ton lower.

"When we turn to a comparison of costs between 1926 and today, we find a wholly different picture. Our base labor rate in 1926 was 44 cents per hour, whereas today it is 62½ cents per hour, or an increase of about 42 per cent. If the labor element of the total cost of steel should average, say, 65 per cent, then we find an actual increase in cost of our products of more than 27 per cent, and in no case can you find a price that has increased in any such proportion.

"I think you will agree that there can be no justifiable criticism of current steel prices, unless it be that they do not return a fair reward on the capital invested."

Kenneth D. Mann, Truscon Steel Co., Youngstown, O., was elected institute president. He succeeds E. W. Langdon, Joseph T. Ryerson & Son Inc., Chicago. Other officers are: Vice presidents, J. F. Curley, Concrete Steel Co., New York, and A. C. Weihl, Pollak Steel Co., Cincinnati.

Directors elected include: Charles M. Gunn, Gunn-Carle & Co., San Francisco; James D. Maitland, Colorado Builders' Supply Co., Denver; C. Louis Meyer, Concrete Engineering Co., Omaha, Nebr.; E. W. Langdon, Joseph T. Ryerson & Son Inc.

Men of Industry

JAMES M. HILL, formerly vice president in charge of operations and general manager, Empire Sheet & Tin Plate Co., Mansfield, O., has been elected president and general manager. Mr. Hill has been identified with the steel industry for almost 25 years, resigning as assistant manager in the Canton-Massillon district of Republic Steel Corp. to join Empire last August.

Ralph R. Jenkins, associated with Empire for approximately ten years in various capacities, has been named assistant to Mr. Hill. His early work and training was with Western Reserve Steel Co., Niles, O., later absorbed by the Brier Hill Steel Co.

William Lake has been appointed general superintendent of all plants. He joined Empire about a year ago. Formerly he had been associated for 32 years with Follansbee Bros. Co., Follansbee, W. Va., where he had worked up through the ranks to the position of general superintendent in charge of operations.

♦ ♦ ♦

John Christensen, president, Cincinnati Gear Co., Cincinnati, sailed for England May 3. After the coronation he will visit Denmark.

♦ ♦ ♦

Robert Liles, New Orleans, has been appointed representative in Alabama, Louisiana and Mississippi by La Salle Steel Co., Chicago.

♦ ♦ ♦

John M. Kiefer, 701 Investment building, Pittsburgh, has been appointed Pittsburgh representative for the Sheet Metal Mfg. Co., Youngstown, O.

♦ ♦ ♦

George W. Connors Sr. has been elected chairman of the board, Connors Steel Co., Birmingham, Ala., and George W. Connors Jr. succeeds him as president.

♦ ♦ ♦

E. A. Turner, formerly manager, Canton, O., plant of Milcor Steel Co., Milwaukee, has been appointed executive vice president, with headquarters in Milwaukee.

♦ ♦ ♦

E. H. Koenig, formerly chief engineer, Republic Steel Corp., Youngstown, O., has been appointed sales engineer with Freyn Engineering Co., Chicago. He previously had been identified with the latter company.

♦ ♦ ♦

Warner S. Hays has been appointed manager, American Welding society, New York. He brings to the society an unusual combination of experience and background in engineering, sales, publishing,

Warner S. Hays

membership development and association management. For 18 years he has maintained his own consulting, engineering and association executive offices in Philadelphia. He is a past president, American Trade Association Executives and also a former officer, National Industrial Advertisers association.

♦ ♦ ♦

E. D. LeMay has been appointed director of public relations, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Through a typographical error recently it was stated in these columns that he had been appointed director of personal relations.

♦ ♦ ♦

Charles H. Elliott, manager of the Youngstown-Warren district, Republic Steel Corp., Cleveland, has been promoted to assistant vice president in charge of operations. Mr. Elliott was assistant superintendent of blast furnace and steel plant, Youngstown Sheet & Tube Co. in 1911. In 1919 he was made manager of the steelworks, Weirton Steel Co., and in 1924 general superintendent, South Side plant, Jones & Laughlin Steel Corp. In 1926 he became vice president in charge of operations, Trumbull Steel Co. at Warren, O., and has been with Republic ever since the merger.

Charles H. Elliott

With Mr. Elliott's appointment, the Youngstown-Warren district is divided with F. E. Flynn as manager of Warren-Niles operations and R. L. Leventry, manager of Youngstown operations. Both have been general superintendents in charge of these respective operations under Mr. Elliott.

E. M. Richards, assistant to vice president in charge of operations, in addition to his other duties, will continue general direction of the operation of Republic's subsidiaries.

♦ ♦ ♦

James E. Watson, associated with the Elliott Co., Pittsburgh, for 26 years, has been elected president, succeeding G. F. Elliott, who has been made chairman of the board and of a newly created executive committee. Mr. Watson previously was executive vice president.

♦ ♦ ♦

Stanley T. Scofield, since 1932 engaged in sales research for the United States Steel Corp., New York, has been appointed assistant to the vice president in charge of sales. He formerly was identified with the Penton Publishing Co. in a market research capacity.

♦ ♦ ♦

Robert W. Reno has been appointed sales manager, Soule Steel Co., Los Angeles, covering all operations in southern California and Arizona. He has been with the company since 1928, and before that was structural designer, job engineer and superintendent, Trewhitt-Shields Co., Los Angeles.

♦ ♦ ♦

Cal Sivright has been elected president, Oliver Farm Equipment Co., Chicago, succeeding C. R. Messinger, chairman of the board. A. King McCord, recently assistant to the president, and J. M. Tucker, general sales manager, have been elected vice presidents.

♦ ♦ ♦

Alfred Iddles has become identified with Babcock & Wilcox Co., New York. He will assist E. G. Bailey, vice president in charge of engineering, and will be in charge of application engineering and service work. Until recently he was executive vice president, United Engineers & Constructors Inc., Philadelphia.

♦ ♦ ♦

Achille Brizon, Ingenieur des Arts et Manufactures, managing director of Fonderies A. Brizon, has been elected president, Association Technique de Fonderie for the year 1937-38. Henri Sandre, president and

managing director, Societe Metallurgique du Perigord, has been elected senior vice president of the association.

♦ ♦ ♦

Glenn M. Rumsey has recently been appointed district manager for New York state, with the exception of New York city, for the Shepard Niles Crane & Hoist Corp. He formerly was in Chicago and Philadelphia for the above company. His headquarters will be at Montour Falls, N. Y.

♦ ♦ ♦

William Ong, recently in charge of the Cleveland branch, *Wall Street Journal,* will direct the public relations department, American Steel & Wire Co., Cleveland. Mr. Ong, well known in Cleveland industrial and financial circles, is a graduate of DePauw university. After graduation he worked for the *Wall Street Journal* in New York and Montreal.

♦ ♦ ♦

Theodore S. See has been elected vice president in charge of operations, LaSalle Steel Co., Chicago. Since September, 1930, he has been works manager and from 1928 to 1930 served as an industrial engineer. He headed his own engineering company from 1921 to 1930, and before that was assistant general superintendent, Jones & Laughlin Steel Corp.

♦ ♦ ♦

H. E. Cook resigned May 1 as assistant superintendent of coke ovens, Portsmouth works, Wheeling Steel Corp., to become superintendent of the Detroit coke plant of Semet-Solvay Co. H. E. Baughman, who for several years has been service engineer to the foundry coke trade at the Portsmouth works of Wheeling Steel, has been named assistant superintendent of coke ovens. He will, however, continue to serve the foundry trade.

♦ ♦ ♦

Frank J. Quinn, Lamson Co., Syracuse, N. Y., was elected president of the Purchasing Agents' Association of Syracuse and Central New York at its annual meeting April 27 for the 1937-38 term. Other new officers are: First vice president, Harold C. Brown, Syracuse Lighting Co., Syracuse; second vice president; C. H. Kissel, Gould's Pumps Inc., Seneca Falls, N. Y.; secretary, E. E. Thompson, Syracuse university, Syracuse; treasurer, James H. Merritt, Remington Typewriter Co., Syracuse. R. W. Appleton, Morse Chain Co., Ithaca, N. Y., was named national director.

♦ ♦ ♦

C. H. Hunt, consulting engineer, who has had wide experience in the steel industry, has opened an office at 1213 First National Bank building, Pittsburgh. From 1902 until 1916 he was engaged in various capacities with the William Tod Co., Youngstown, O., Morgan Engineering Co., Alliance, O.; Buckeye Engine Co., Salem, O.; Carnegie Steel Co.; Youngstown Sheet & Tube Co. In 1916 he went with Weirton Steel Co. as chief engineer in charge of design and construction of all plant developments, and in 1932 was appointed assistant to the president, in charge of design and construction of all projects, and consultant for National Steel Co. plants in Detroit and Buffalo.

♦ ♦ ♦

W. T. Hugus has been appointed superintendent, American works, Carnegie-Illinois Steel Corp. at Elwood, Ind. He succeeds John Buyus, retired. Mr. Hugus has been connected with United States Steel Corp. subsidiaries and their predecessors all his working life. He started as a clerical worker and hot

W. T. Hugus

mill catcher at the LaBelle Iron Works. In 1900 he went to American Tin Plate Co.'s Laughlin works as assistant manager. Later he served successively as hot mill superintendent, Chester, Pa., works; assistant manager, Farrell works; manager, Crescent works; manager. Laughlin works; assistant manager, Gary tin mill; assistant to vice president, and after American Sheet & Tin Plate Co. became part of Carnegie-Illinois, as assistant manager of industrial relations for Pittsburgh district.

♦ ♦ ♦

Hayward Niedringhaus, president, Granite City Steel Co., Granite City, Ill.; Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., and C. F. Stone, president, Atlantic Steel Co., Atlanta, Ga., were elected directors, American Iron and Steel institute, New York, at the annual business meeting, May 3.

Directors re-elected for a three-year term were H. G. Dalton, chairman, Youngstown Sheet & Tube Co., Cleveland; B. F. Fairless, president, Carnegie-Illinois Steel Corp., Pittsburgh; W. W. Holloway, president, Wheeling Steel Corp., Wheeling, W. Va.; Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, O.; E. L. Parker, president, Columbia Steel & Shafting Co., Pittsburgh, and W. F. Detwiler, president, Allegheny Steel Co., Brackenridge, Pa.

♦ ♦ ♦

J. H. James, purchasing agent, Pittsburgh & Lake Erie railroad, will assume office July 1 as president, Purchasing Agents' Association of Pittsburgh, replacing Thomas D. Jolly, purchasing agent, Aluminum Co. of America, for the coming fiscal year. J. M. Knowles, purchasing agent, Consolidated Coal Co., will assume the position of vice president. C. H. Rindfuss, purchasing agent, Pittsburgh Screw & Bolt Corp., will continue as secretary, and E. C. Buerkle, purchasing agent, National Metal Bearings Co., as treasurer.

Mr. Jolly has been named a national director for the coming year, and the following directors have been named for a two-year term: E. C. Briner, McKay Co.; Walter Brubach, Gulf Oil Corp.; A. N. Johnston, Jones & Laughlin Steel Corp.; H. R. Michel, Westinghouse Electric & Mfg. Co.; and L. M. Potter, Vanadium-Alloys Steel Co.

Died:

HOMER J. FORSYTHE, 53, general manager, Hyatt Bearings division, General Motors Corp., Harrison, N. J., while on a visit to Pinehurst, N. C., April 29. From an executive position with E. I. du Pont de Nemours Co., Wilmington, Del., Mr. Forsythe joined the Hyatt division in 1921 as assistant general manager.

♦ ♦ ♦

William Aylward, 75, owner, Aylward Sons Co. foundry, Neenah, Wis., in that city, April 29.

♦ ♦ ♦

Charles E. Nordfeldt, works manager and a founder, Massillon Steel Casting Co., Massillon, O., at St. Petersburg, Fla., April 30.

♦ ♦ ♦

Charles T. Scannell, 54, manufacturing manager, Buick division of General Motors Corp., in Chicago, May 2. He had been associated with the company since 1906.

♦ ♦ ♦

William N. Kratzer, 81, president, W. N. Kratzer Co., Pittsburgh, manufacturer of structural iron and steel, May 2 at his home in Ben Avon, Pittsburgh suburb.

♦ ♦ ♦

J. Bernard Farish, 57, managing director, York Shipley Ltd., London, England, and a leading figure in the refrigeration and air conditioning field for 30 years, in London, March 24.

THE NEW TYPE "D" MULT-AU-MATIC

LOW COST PRODUCTION

Anti-Friction bearings provide long maintained Accuracy and assure low maintenance costs.

Individual Independent feeds and speeds at each station permit proper settings for individual requirements of machining operations.

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- **EFFICIENT**
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Inbuilt Power Operated Chucking on order.

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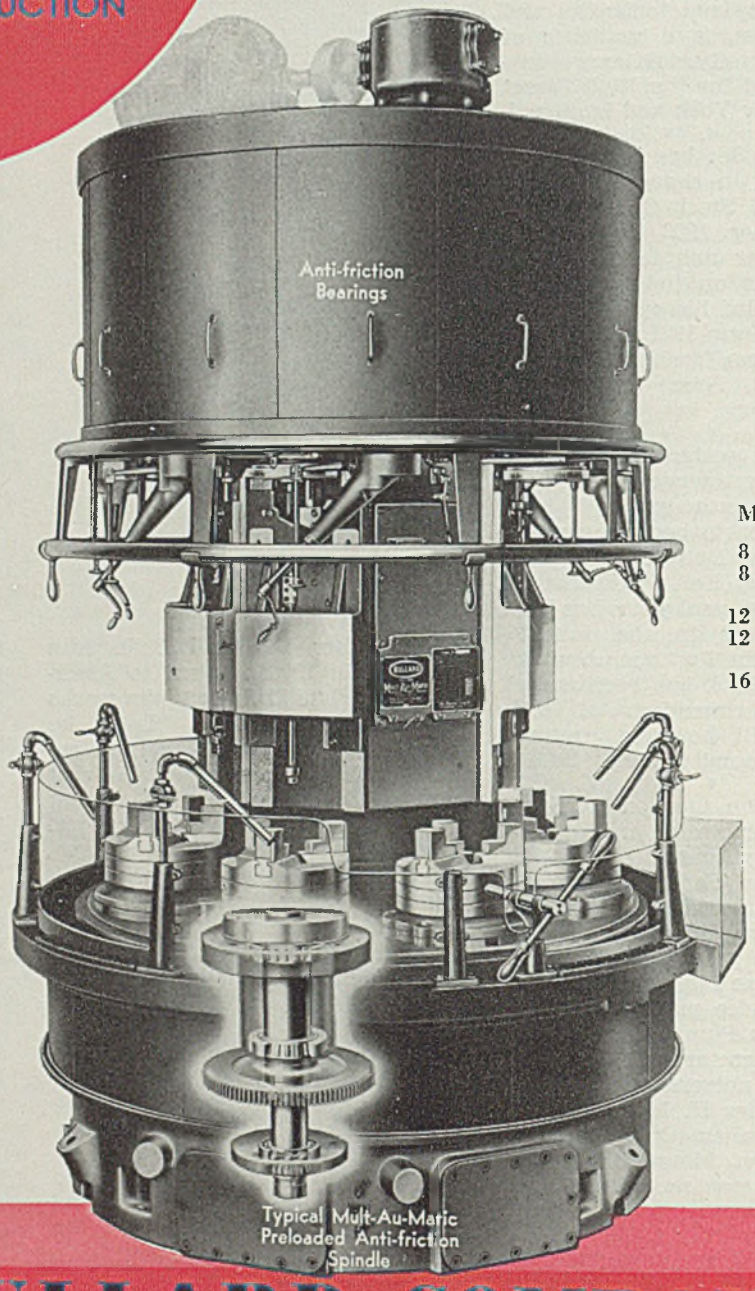


Typical Mult-Au-Matic Preloaded Anti-friction Spindle

MACHINE SIZES

8 inch—6 Spindle
8 inch—8 Spindle

12 inch—6 Spindle
12 inch—8 Spindle

16 inch—8 Spindle

THE BULLARD COMPANY

BRIDGEPORT CONNECTICUT

MIRRORS OF MOTORDOM

DETROIT

INSPIRED by the recent promise of Henry Ford to demonstrate "some real competition", automobile companies are pulling their belts another notch tighter and drawing up the battle lines to meet the onslaught of their Dearborn adversary. There is plenty of evidence they do not intend to be caught napping in the impending race.

For example, the giant General Motors Corp. has turned the powerful light of introspection upon itself and decided to refine its administrative setup better to cope with today's problems. As predicted in this department Feb. 22, "Bill" Knudsen moves up to the presidency and Alfred P. Sloan Jr. to chairman of the board, with two Detroit executives in the operating end—Marvin E. Coyle and Floyd O. Tanner—named to the board.

Knudsen's hard hitting in the strike conferences, his suavity with the press, his close relations with the manufacturing side of the business, and his ability to organize work efficiently brought him to the top seat in the corporation in which he began work 15 years ago. Coyle heads up the Chevrolet division, while Tanner, director of manufacturing, since April 1 has had labor relations under his wing. He will continue to direct the latter work. They are the first Detroit executives to be named to such posts since 1929, and the change may mark the ascendancy of the star of the Detroit crowd in General Motors over eastern interests.

Mr. Sloan pointed out the changes serve to "finalize, in concrete form, a procedure which has been in process of evolution for some years past." He will continue to be the chief executive officer of the corporation, but primarily will be concerned with the financial side. Finance and executive committees have been dissolved and in their stead policy and administration committees have been formed. Viewed broadly, it is felt the corporation stands to gain much from both public relations and labor relations angles by the rearrangement—which in the end means more cars sold.

Turning for the moment from personnel to plants, Mr. Knudsen's first statement after his return here as president revealed the corporation in the midst of a $40,000,000 expansion program which will carry through to the spring of next year. Already announced is the new Chevrolet motor and axle plant in Tonawanda, N. Y., and in a general way the diesel engine division in west Detroit. A new Ternstedt hardware manufacturing plant has all been laid out on paper, even to the last conveyor, and is now awaiting executive approval. This plant will not be located in Michigan.

Chevrolet also is understood to have completed arrangements for purchase of a tract of land at Lafayette, Ind., adjacent to the site of the new extrusion plant which Aluminum Co. of America is building there. No information is available as to what type of plant will be located here, although it might logically be another assembly plant.

Buys for Engine Plant

Meanwhile Chrysler, too, is looking over its armor to discern any weak spots which might need touching up. The much discussed Canadian engine plant will be taking form soon and will be under the direction of L. L. Roberts, former mechanical superintendent for Packard and later with the Packard Canadian division. It was finally decided to buy mostly new machinery for this plant across the line and at the present moment practically 80 per cent of the equipment has been placed.

Chrysler management is reported giving serious consideration to the matter of decentralizing operations to a greater extent and has negotiated for property near the Chevrolet motor and axle plant in the Buffalo territory. No decision is believed to have been made as to the disposal of this land, but a recent protracted conference of Plymouth executives, attended also by K. T. Keller, president of the corporation, gave rise to speculation over the possibility of Plymouth setting up an assembly plant there preparatory to expanding production.

The present Plymouth plant on Mt. Elliott avenue is operating near capacity and it is understood officials prefer adding to facilities outside Detroit, rather than expanding the plant here.

Ford continues to move ahead quietly and is drawing up ambitious plans for next year's models. This year the preliminary schedule called for 1,000,000 cars. Just recently this was revised to include an additional 125,000 units, and now it is reported consideration is being given to scheduling 2,000,000 cars for 1938. Such a program would entail additional assembly line space and present thinking is along the lines of two more assembly lines at the Rouge plant.

Should Ford proceed with these plans, it is considered more than likely the new car will feature a reduction in price, even though only a small amount. And along with this probably would come new wage standards, and possibly the 30-hour week.

On the matter of price, the industry generally has stood pat in the face of higher material and labor costs. However, one of the lower-priced cars is reported to have effected a $35 increase in price by raising the charges on certain accessories. Such an increase is not generally noticed by the car buyer who is used to having extras tacked on for this accessory and that gadget, federal tax, state sales tax and what not. Despite this hidden increase, the above builder is reported faced with the necessity of finding some means to obtain an additional $75 on 1938 models to keep within cost limits.

LABOR troubles for the time being are few, although a 2-hour sitdown strike in the motor block department at Hudson interrupted production briefly Tuesday afternoon. The trouble, later reported to be an outgrowth of a misunderstand-

MIRRORS OF MOTORDOM

ing, originated when UAW members objected to the remarks of a non-union worker.

Hudson has effected a rapid recovery from the recent shutdown and production is currently at the rate of about 100 cars per hour, or practically 4000 per week. A bank of unfilled orders is on hand to insure steady production.

The UAW has signed agreements with four local tool and die shops—Koestlin, Richard Bros., Lamb and Star Tool & Die—providing a basic increase of 20 cents an hour over Jan. 1 wages, recognition of the UAW as bargaining agency for its members, seniority provisions, grievance committee, and minimum hourly wage of $1.20 for diemakers, $1.10 for machine men and 75 cents for common labor.

Generally speaking, however, tool and die shops are unusually slack at the present time. A considerable volume of die work has been placed out of town, and some new programs have been revised to preclude extensive changes, or postponed.

Unions at Sixes and Sevens

The independent labor union movement is gaining headway and occasionally members of these new organizations run afoul of the UAW which has not hesitated to resort to terrorist tactics against them. Newest of the independent groups are the Independent Automobile Employes association and the American Labor League. Others include the Society of Tool and Die Craftsmen, and Society of Designing Engineers.

Lopsided result of the vote at Packard on preference for collective bargaining is interpreted variously. One explanation is that workers for days before the election were approached by UAW members and "impressed" with the necessity of "voting the right way." One press operator was thus accosted on three separate occasions. Another version is that out of the 15,000-odd who voted in the election, not more than 3000 can be considered old-time Packard employes. The rest are recently hired employes whose loyalty to their emotions may surpass their loyalty to their jobs. It is true that since Packard introduced the 120 model and embarked upon an extensive expansion program, the working force has been enlarged many fold.

Furthermore, the fact that some 11,000 voted preference for the UAW as collective bargaining agency by no means signifies this many UAW members in the plant. Thousands may have preferred just to "play it safe."

Governor Murphy's "little Wagner Act" which he has introduced in the state legislature and which would throw some semblance of responsibility upon labor unions calling strikes, immediately was pounced on by the UAW and branded as a "vicious piece of legislation." Homer Martin, president of the United Automobile Workers, hurled a tirade against the bill, claiming that it undermined the right to strike and was designed as a union-busting implement.

The American Federation of Labor, under the leadership of F. J. Dillon, appears to be coming back into the picture more strongly, especially in plants on the fringe of the industry, such as parts manufacturers and tool and die shops. Dillon, former head of the UAW, has established offices at Toledo, and is prepared to grant A. F. of L. charters to groups applying for them. Some believe it possible the above-mentioned independent organizations eventually may drift into the A. F. of L. fold because of their mutual animosity toward the UAW.

Automobile Production

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

	1935	1936	1937
Jan.	300,335	377,306	399,426
Feb.	350,346	300,874	383,540
March	447,894	438,992	518,715
April	477,059	527,726	†558,320
4 Mos.	1,575,624	1,644,898	†1,860,001
May	381,809	480,571	.....
June	372,085	469,355	.....
July	345,297	451,474	.....
Aug.	245,075	275,951	.....
Sept.	92,728	139,785	.....
Oct.	280,316	229,989	.....
Nov.	408,550	405,702	.....
Dec.	418,317	519,132	.....
Year	4,119,811	4,616,857	.....

Calculated by *Cram's Reports*

Week ended:	
April 10	99,196
April 17	125,472
April 24	*133,164
May 1	139,475
May 8	141,525

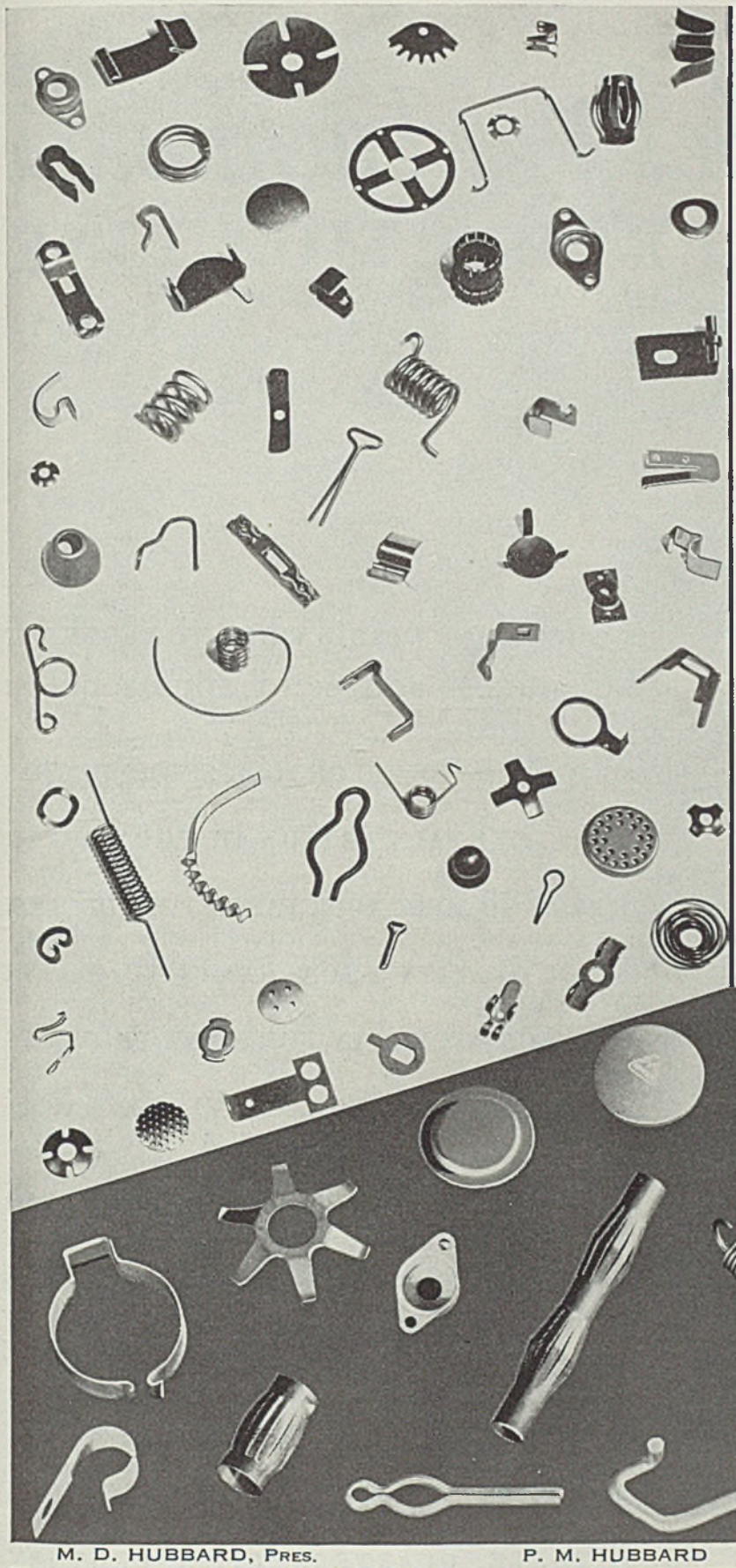
*Revised. †Estimated.

	Week ending May 8	May 1
General Motors	56,550	55,455
Ford	35,875	35,875
Chrysler	32,000	31,000
All others	17,100	17,145

SAILING along under the new radio slogan, "Buy a Willys and watch the gas stations go by," and under the expert direction of Dave R. Wilson, president, Willys-Overland Motors Inc., Toledo, has come back into the automotive picture with a rush. After a three-year receivership, the company was given permission to resume operations and in four months of this year has turned out nearly 34,500 cars, nearly half of the 70,000 scheduled for the entire year. April total was 9815, a gain of 4½ per cent over March. The company has lined up over 1200 dealers and has established a west coast assembly plant at Los Angeles which is currently producing well over 500 cars.

Dave Wilson is former head of the Wilson Foundry & Machine Co. in Pontiac and became associated with the late John Willys in the production of the sleeve-valve Knight engine used in the old Willys-Knight. He has managed to pull the company up out of a deep rut into which it slipped in recent years. At one time his brother, C. B. Wilson, was associated with him in the business. The present model, designed by the late Amos Northrup, is claimed to provide upward of 30 miles to the gallon of gasoline.

ARMY air corps is putting the new 12-cylinder 1000-horsepower Allison aircraft engine through rigid tests at Dayton, O. Developed in General Motors research laboratories in Detroit, the new unit is built by the Allison Engineering division of GM. It weighs only 1275 pounds, is cooled by ethylene glycol, is a V-type engine with frontal area of only some 6 square feet compared with the 16 square feet of present less powerful radial engines. . . . Eaton Mfg. Co. has let contracts for immediate construction of a research and engineering laboratory adjacent to its office building and plant on French road. Particular emphasis will be placed upon experimental engineering in connection with the valves, tappets and valve seat inserts manufactured by the company's Wilcox-Rich division . . . .New labor contract signed by a Toledo company provides for the employes sharing one third of the company's profits. . . .Electric Auto-Lite in the same city reports net earnings of $1,149,629 for first quarter, 48 per cent ahead of last year . . . .Pontiac has organized a used car department patterned on the same lines as its new car selling organization.



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Estimates made on any quantity .. any material

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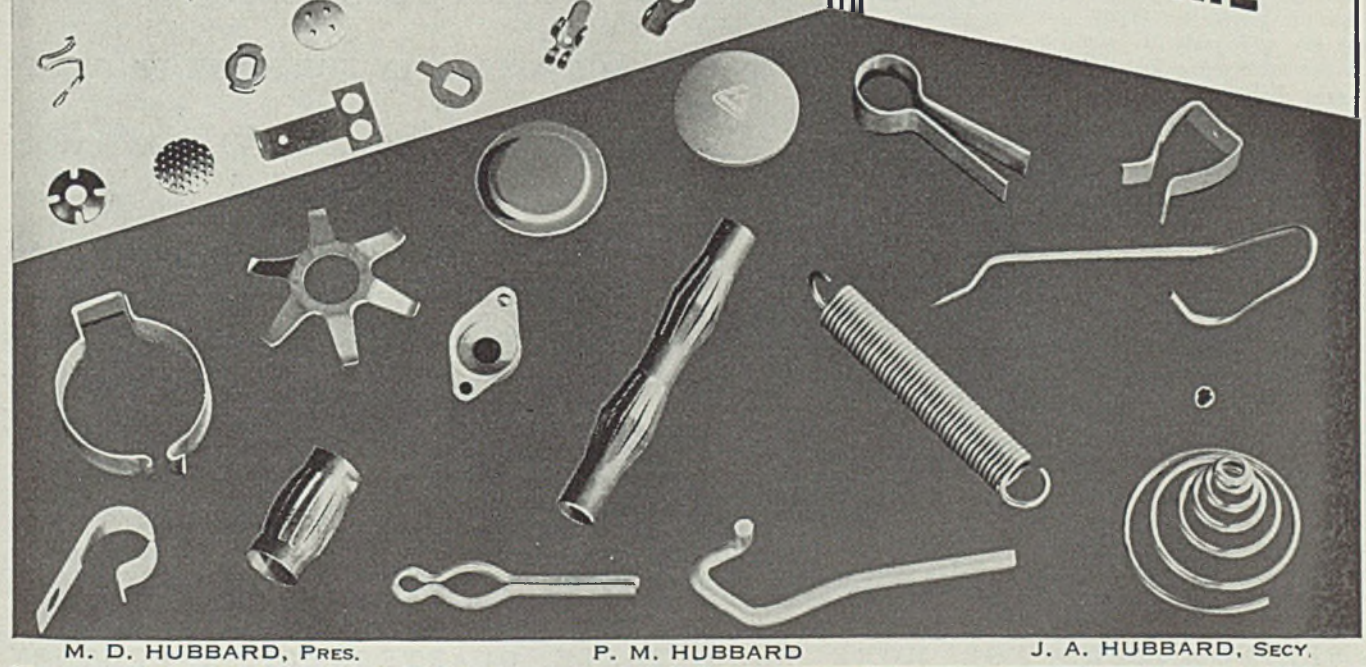

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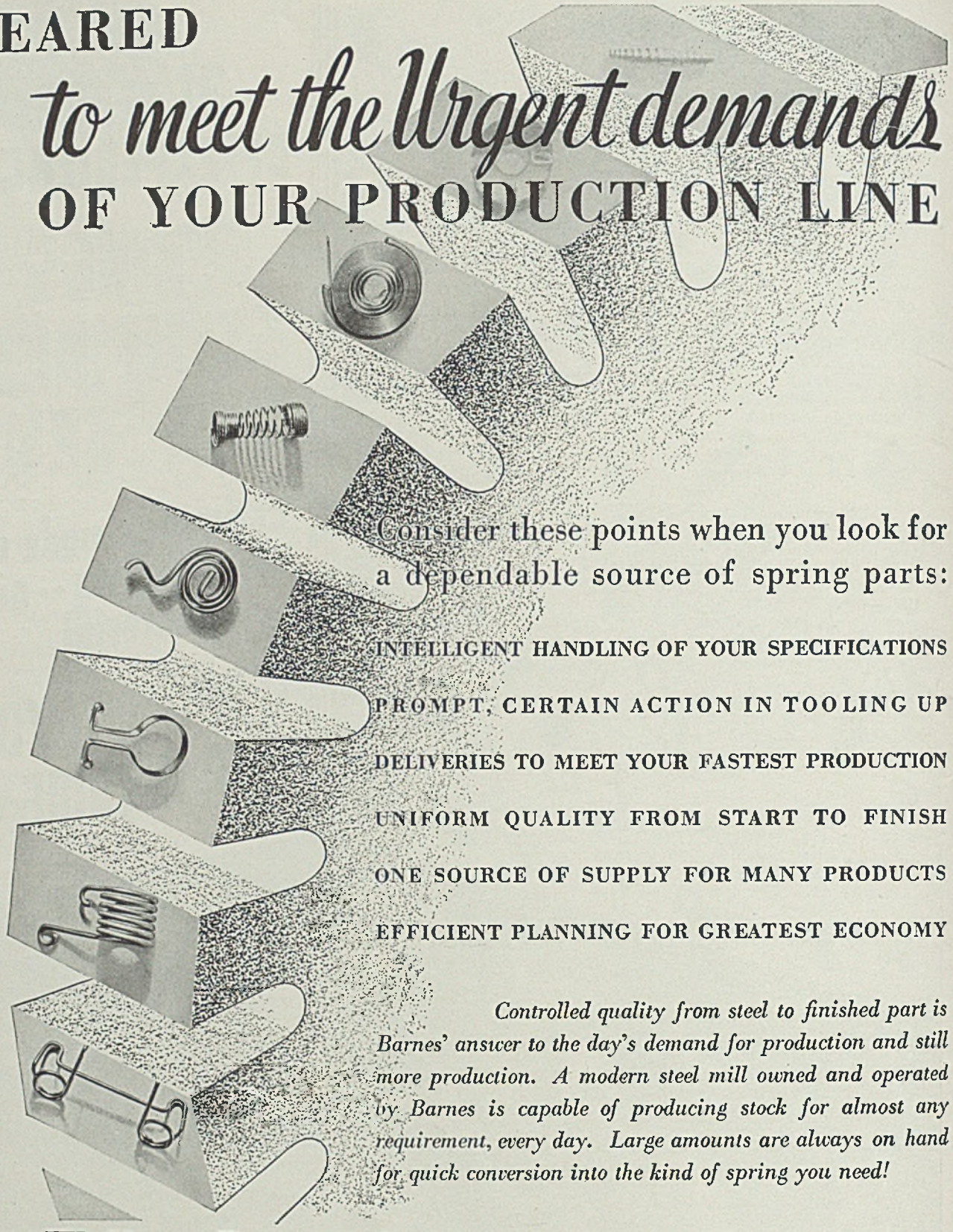
M. D. Hubbard Spring Company

613 CENTRAL AVE., PONTIAC, MICH.

GEARED *to meet the Urgent demands* OF YOUR PRODUCTION LINE



Consider these points when you look for a dependable source of spring parts:

INTELLIGENT HANDLING OF YOUR SPECIFICATIONS

PROMPT, CERTAIN ACTION IN TOOLING UP

DELIVERIES TO MEET YOUR FASTEST PRODUCTION

UNIFORM QUALITY FROM START TO FINISH

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Controlled quality from steel to finished part is Barnes' answer to the day's demand for production and still more production. A modern steel mill owned and operated by Barnes is capable of producing stock for almost any requirement, every day. Large amounts are always on hand for quick conversion into the kind of spring you need!

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SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

Barnes-made SPRINGS

WINDOWS OF WASHINGTON

WASHINGTON

WHILE many news stories went out of Washington when the attorney general made his report to the President on alleged collusive steel bidding to the effect that the federal trade commission would begin proceedings in this matter, nothing has been seen or heard about such a plan during the past couple of weeks. This leads to the conclusion that officials of the commission were correct in their first snap judgment decision, that nothing would be done by the commission unless and until it heard something suggesting a move either by the President or the attorney general.

There were no developments in this particular matter during the past week as far as surface information is concerned and apparently nothing going on behind the scenes. However, the steel industry is well aware how the commission feels about the basing point and, if given half a chance, that it will certainly take the matter up. However, the commission apparently means to make a precedent on the basing point in the cast iron soil pipe case, before trying to tackle the steel industry as a whole. Officials of the commission have a feeling that the steel industry is going to take more than passing interest in this pipe case.

More Conferences Planned

Secretary Perkins of the labor department had her second industrial-labor get-together conference here last week. The report is to the effect that other similar conferences will be called in the future but no date has yet been set.

Increased mediation facilities in the state labor departments and assignment of experienced conciliators of the Perkins department to cooperate with the states when industrial differences arise were suggested by Miss Perkins, as a means of helping to stabilize industrial conditions.

She told the meeting that her department has available a list of persons with some experience from which can be selected special mediators when the federal department is called upon to make use of such devices in disputes which are not susceptible to adjustment by ordinary means, or when the regular conciliators have exhausted their capacity.

Miss Perkins has used special mediators and boards on a number of occasions in the past four years when the usual methods of conciliation failed to bring about a prompt settlement of differences.

"The first of these conferences on the stabilization of industrial relations, held two weeks ago," Miss Perkins told the meeting, "brought about the understanding that it will be the purpose of management and labor to practice collective bargaining as it is defined in the national labor relations act, now the law of the land under the recent Supreme Court decisions.

Lack Bargaining Experience

"Many employers and workers, however," she said, "lack experience in collective bargaining and because of this there will be need for co-operation among state and federal agencies engaged in conciliation work and representatives of labor and management so as to minimize stoppages of work through misunderstandings by either workers or employers.

"Federal and state conciliators can perform a highly useful service in the public interest with the co-operation I am sure they will receive from labor and management in coming months. When differences arise and a conference fails to make headway toward an adjustment, a conciliator should be summoned. Negotiations should not be broken off without calling upon the services of such an expert. Very often his ideas and advice will be helpful in finding a solution or limiting the points of disagreement."

One resolution was passed commending "similar free and frank consideration by all parties interested, of practices and policies that will promote peaceful and constructive improvement in industrial relations."

Miss Perkins is also said to have stated at the conference that she does not believe any changes should be made in the Walsh-Healey government contract act at this time but the department should be allowed another year or two to try out the act and see how it works.

Berry Asks $1,500,000 From T.V.A.

Major George L. Berry, the President's co-ordinator for industry, broke into the front page last week on several counts. First, there has been considerable talk in Washington recently that when and if anything is done about trade practices, as was attempted in the NRA, that Berry will make an effort to have the functions turned over to his council for industrial co-operation.

Again, Major Berry was prominently mentioned as a successor to the late Senator Bachman, Tennessee, from which state Berry also hails. He was in politics there, too, for a long time and ran for governor once.

On the third and last count attention was called last week on the floor of the house to a mixup between Berry and some of his associates and the T.V.A. relative to an area owned by Berry and some others, flooded by the backwater of the Norris dam. He claimed that there is a deposit of marble, zinc and lead on the land and he is asking T.V.A. for a settlement of some $1,500,000 although those in a position to know believe that he would take much less.

The opinion was expressed in the house that it would be a grand idea if the T.V.A. stood by its guns and refused to make any payment, or if it must be something, that it be a small amount. T.V.A. officials say that the Berry claim is ridiculous. It is said that at one time Berry was actually quarrying some mar-

ble there but nothing has been done with the lead and zinc deposits said to be on the land.

QUIET ENVELOPS SCRAP EXPORT REGULATION BILLS

In connection with recent discussion about iron and steel scrap and the bills now pending on Capitol Hill, it is interesting to note that figures made public last week by the department of commerce show that 362,249 tons of scrap were exported during March, the highest monthly total ever exported from the United States. This tonnage was valued at some $6,735,000.

Curiously enough there has been little activity for the past couple of weeks in connection with the scrap bills now pending in congress. Of course, there has been much quiet activity but those in charge of this work, either for or against the proposed embargo, are keeping quiet about it.

Apparently congress does not intend to do anything about this matter until after it has a report from the special economic committee composed of government experts, to whom it has been referred. There is every indication the report will not be in sympathy with the bill as introduced.

PLENTY OF LAW TO CURB MONOPOLY, SAYS BORAH

It is not believed in well informed circles that the administration will have any recommendations ready for the present session of congress, under which the antitrust laws could be revised. This was suggested by Attorney General Cummings in a report to the President on the steel collusive bidding report.

There is side talk here that Donald Richberg may be asked by the President to look into this whole matter, possibly with some associates.

In this connection it has been announced that on July 1, the beginning of the government's fiscal year, nine new attorneys will be attached to the antitrust unit of the justice department.

It is well known that Senator Borah, Idaho, has been much interested in the antitrust laws for many years and he is fully conversant with them. After the statement of the attorney general on this subject, asking for revision of the laws, Borah said: "There is a vast amount of power to end monopolies in the law which has never been used. The trouble has not been want of law, but want of purpose."

The Borah statement further expressed the hope: "We are now to deal in thorough fashion with monopoly all along the line, playing no favorites and having no pets.

"Every one realizes," he continued, "that this thing we call recovery is in a jittery, shaky condition. There can be no permanent recovery, no solid rebuilding of the economic system for at least 50,000,000 American people so long as private price fixing continues."

There is a feeling that the administration will rely on the cease and desist orders of the federal trade commission for the time being.

WAR PROFIT CURB SOUGHT

There has been much propaganda during the present session of congress to take profiteering out of war. This has led to a number of anti-profiteering bills.

The military affairs committee of the house has just reported a bill which is rather drastic in its effort to take the profits out of war. As the bill was reported it assigns powers to the President for the mobilization of industry and capital.

Before reporting the bill the committee deleted a section which called for a 95 per cent tax on all profits in excess of the average for a three-year period preceding the outbreak of war. The committee recommended a wartime taxation system which would absorb all surplus profits above a fair normal return.

The bill contained a provision for conscription of men between 21 and 31 years of age, in the event of war, but this was stricken from the bill before it was reported.

CHANGE IN CORPORATION SURTAX IS SUGGESTED

During the closing hours of the annual convention of the United States chamber of commerce resolutions were passed reflecting the attitude of a large portion of the important business interests of the country.

Among other subjects taken up were the corporate surtax, government contracts, the Robinson-Patman act, antitrust laws and a number of similarly important questions.

Dealing with the corporate surtax the chamber went on record declaring that "there is a growing accumulation of evidence that the tax on undistributed corporate earnings in its actual operation produces unevenness in taxation, restricts normal business development, limits the growth of small enterprises, and retards increase in employment.

"If this tax is to be retained, congress should at once give consideration to alleviating some of the outstanding hardships and inequalities which are apparent. Alleviating measures should include allowances not now permissible for losses and reasonable reserves actually established to the end that taxable income and true income may correspond more closely; allowance for reasonable amounts actually expended for improvements and necessary expansion; amounts set aside to meet contractural obligations or restore depleted capital, and provisions to carry losses forward a reasonable number of years."

Dealing with government contracts the national chamber went on record that "the federal government should return to its long established policy of competitive bidding in its purchases of manufactured goods with only such restrictions on purchases made from private enterprises as may be necessary to assure faithful performance of contracts.

"Experience under the present public contracts act has demonstrated the impracticability and impropriety of this form of federal regulation of working conditions. Pending proposals for extension of this statute, both as to the enterprises affected and as to the working conditions to be regulated, would increase rather than lessen the objectionable features of legislation of this character."

NAVY TO FOLLOW WAGNER LAW LABOR PROVISIONS

Assistant Secretary of the Navy Charles Edison has announced that he is having a study made of the labor policy of the navy, in view of the decision of the Supreme Court in the Wagner cases.

The secretary sent a letter on this subject to Senator Gerry, Rhode Island, a member of the senate naval affairs committee, in which he states: "Recent events have made it evident to me that this subject should be carefully gone into and I am giving it most earnest study. It is my opinion that the navy department's attitude toward employes should reflect present day conditions and the highest modern ideals, and I am prepared to recommend to the secretary any changes that I may find necessary to accomplish this result."

ASK BIDS ON SUBMARINES

Bids will be received by the navy department June 16 for two new submarines, each of which will take about 1000 tons of steel. When awards are made two more submarines will be built, the latter at navy yards.

ARMOR PLATE CALLED "ARMS"

In the proclamation issued by the President last week under the new neutrality law armor plate for "vessels of war" is considered "arms, ammunition and implements of war for the purposes of section 5 of the joint resolution of congress."

Editorial

Must Practice Moderation To Promote Stability

THE man who coined the expression to the effect that the steel industry is either a prince or a pauper would smile if he were in a position to observe the sharp contrast between conditions today and those of 1932. It is almost inconceivable that fluctuations could be so violent in a brief span of five years.

Consider the shipments of iron ore on the Great Lakes in the month of April. According to the Lake Superior Iron Ore association, the tonnage of ore moved in April, 1937, was 3,770,555. This is not only the greatest ore movement ever recorded in the fourth month, but it also exceeds the total volume of ore shipped in the entire year of 1932. With this spectacular start, shipments for the entire 1937 season may well equal or exceed the total of 65,000,000 tons estimated by many ore and lake men.

Steel ingot output in one or two weeks of April was at an all-time peak, and it is not unlikely that the monthly record established in 1929 may be broken in 1937. Automobile production—now temporarily released from the grip of strikes—is mounting and may set a new weekly record during the current quarter. Production of tin plate in the United States in March established a new all-time high and the output of strip steel has been breaking records consistently since early in 1935.

Excessive Fluctuations in Activity Need Curb But Current Practices Work Exactly Opposite

These and other statistics testify to the recuperative powers of the nation's economic system, but they also emphasize the great distance between the peaks and valleys of the trend line of activity. Everybody is in agreement that it is desirable to reduce the severity of the fluctuations in the business cycle. Stability seems to be an objective upon which economists, industrialists, politicians, labor leaders, professors and social workers can agree. Perhaps it is one of the few things which all of them can support with enthusiasm and unity of purpose.

Unfortunately, however, the goal of even a reasonable degree of stability is still far from achievement. In spite of the fact that all of us say that we desire greater stability, most of us persist in indulging in practices which promote instability.

Regular, steady employment, which would ensue if business could be stabilized, would be a godsend to wage earners, yet the majority of professional union leaders—while giving generous lip service to stability—actually are placing obstacles in the path of its accomplishment. By insisting upon unduly high unit wage rates and restrictive conditions of employment, they are creating a top-heavy situation which will hasten the day of the inevitable adjustment—and that adjustment means a violent shock to the business trend line.

Some employers make the same mistake in connection with the prices of their products. They insist upon taking a disproportionate share of income in the form of quick profits, and in doing so they help to erect a shaky economic structure which is too vulnerable to shock.

Government administrations are equally or even more inclined to promote instability at the very time they are preaching the doctrine of stability. This applies to all governments, whether it be a conservative or liberal party in Europe or a Republican, Democratic or New Deal administration at home.

"Planned Economy" Hailed as Cure but Loads Economic Resources with Too Heavy Burden

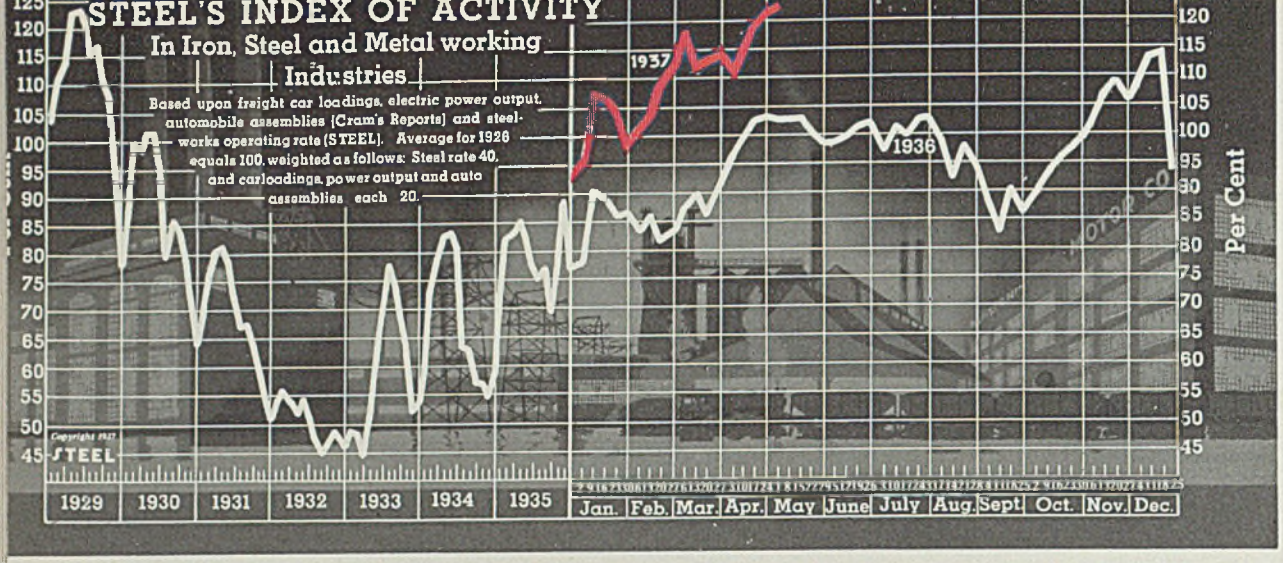
Each of the recent administrations at Washington made a great point of smoothing the fluctuations in the economic trend line. Prior to 1933, the Republican administrations were not able to shear off the peaks or to fill up the valleys to any appreciable extent.

Since the advent of the new deal in 1933, the Roosevelt administration has reiterated its resolve to promote stability by means of a "planned economy"—a push-button control of economic forces operated from the White House. The new deal system has become so involved and so intricate that if it fails, it will affect business more violently than if the "planned economy" had never been attempted.

The chief obstruction to stability in the new deal program is the attempt of the government to saddle an excessive burden of alleged social reform upon the nation's economic resources. That burden, applied too suddenly, is reflected in the national debt, now exceeding $35,000,000,000 for the first time in the nation's history.

It behooves all of us to be more moderate in our demands for immediate returns from the present surge of prosperity. If we insist upon taking out more than our rightful share, we simply hasten the day of reckoning.

In the case of employers, employes and the public, the degree of moderation will depend largely upon the traits of human nature possessed by the individuals concerned. In the case of the government, its responsibility to the public should be sufficient incentive to cause it to really work for stability, in addition to giving lip service to it as a desirable objective.



STEEL'S index of activity gained 1.9 points to 123.7 in the week ending May 1:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
March 6	117.9	87.7	82.0	78.6	43.4	54.1	79.2	93.8
March 13	112.7	89.7	84.0	79.9	42.7	54.8	80.6	97.5
March 20	113.1	86.0	84.0	79.7	44.6	54.4	81.3	98.1
March 27	114.0	91.2	84.3	79.3	45.2	53.5	80.6	99.6
April 3	112.0	86.8	83.4	79.6	49.1	53.4	81.5	97.6
April 10	112.8	99.6	85.4	82.2	52.6	52.6	80.9	102.3
April 17	119.6	103.1	86.3	85.0	55.8	53.4	81.1	103.1
April 24	121.8†	103.6	84.9	87.5	59.5	52.3	80.6	103.7
May 1	123.7*	103.2	84.6	86.0	60.3	52.5	80.7	103.3

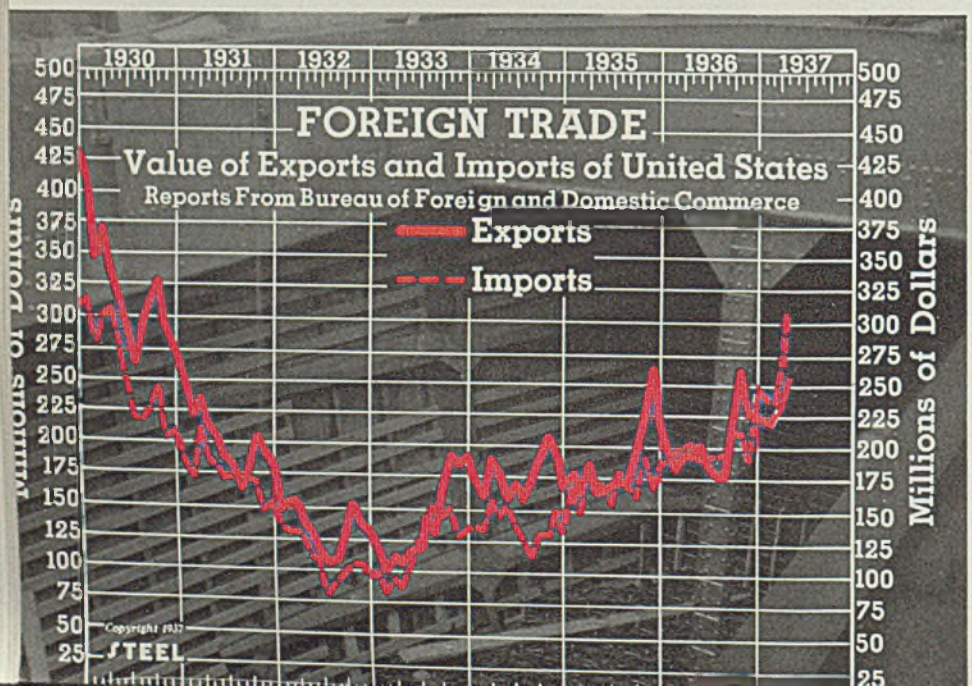
*Preliminary. †Revised.

Index of Industrial Activity Highest Since 1929 Peak

SUCCESSFULLY weathering the storm of labor discord during the past few weeks, the ship of business is steadily pointing to higher levels and is nearing the peak of 1929. STEEL'S index of industrial activity in the iron, steel and metalworking industry advanced from 121.8 to 123.7 in the week ending May 1. The current figure is the highest recorded since the peak of 1929, which was 125.3 during the week ending April 27.

This gain of nearly two points is due to the continued steadiness in automobile production, electric power output and freight car loadings. The only barometer showing a recession was steelworks operations, which declined ½ point to 91 per cent. This was due mainly to temporary interruptions caused by the flood in the Pittsburgh and Wheeling districts. Automobile assemblies for the week ending May 1 totaled 139,475, highest since the week ending May 18, 1929, and close to the all time high of 140,822 units assembled in the week ending April 13, 1929.

Electric power output was reported at 2,193,779,000 kilowatt-hours in the week ending May 1. Due to the high rate of activity in the automobile and textile industries power output is expected to hold close to the 2,200,000,000-mark for the next several weeks. Revenue freight car loadings were estimated slightly in excess of 772,000 cars.



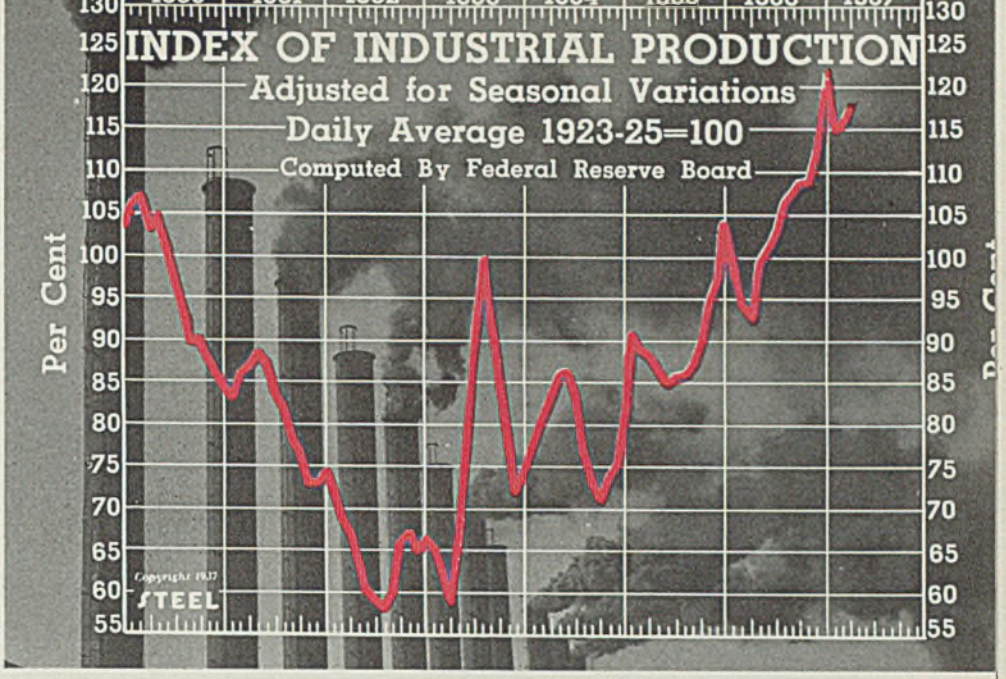
Dollars (000 omitted)

	1937		1936	
	Exports	Imports	Exports	Imports
Jan.	221,550	240,396	198,654	187,482
Feb.	232,504	277,805	182,024	192,774
March	256,390	306,699	194,790	198,686
April	.....	.....	193,490	202,437
May	.....	.....	201,042	191,110
June	.....	.....	185,188	192,233
July	.....	.....	178,324	193,409
Aug.	.....	.....	178,249	195,016
Sept.	.....	.....	219,976	215,525
Oct.	.....	.....	264,708	212,001
Nov.	.....	.....	225,766	196,423
Dec.	.....	.....	229,739	244,321

BUSINESS TREND

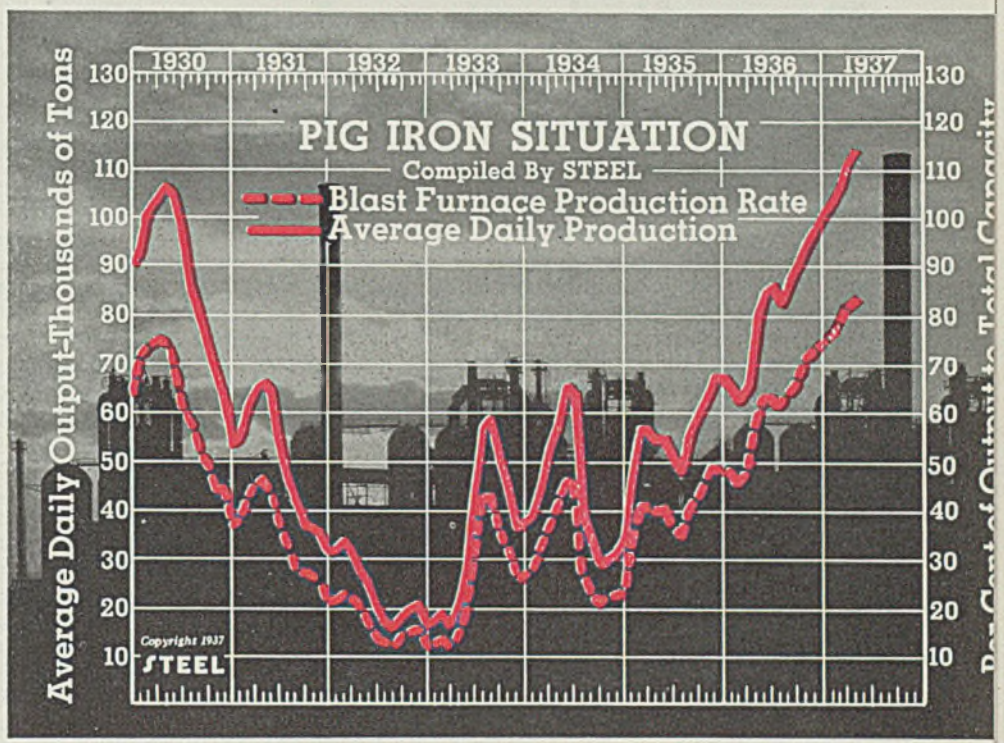
Index of Industrial Production Continues Upward in March

	1937	1936	1935	1934
January	115	98	91	78
February	116	94	89	81
March	118	93	88	84
April	...	100	86	85
May	...	101	85	86
June	...	103	86	84
July	...	107	86	75
August	...	108	87	73
September	...	109	89	71
October	...	109	95	73
November	...	114	98	74
December	...	121	104	86



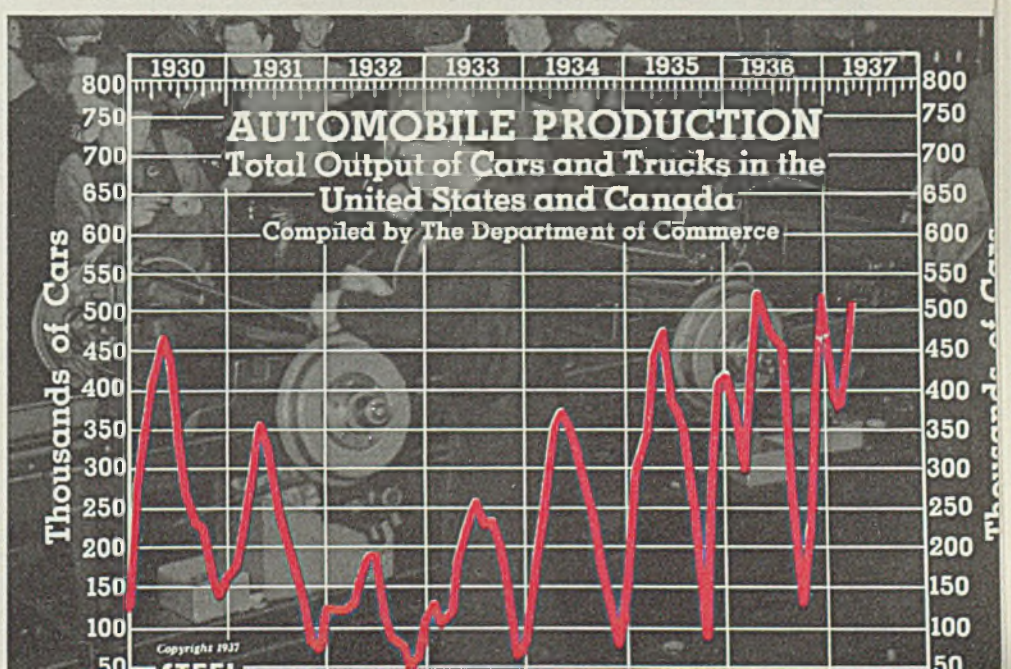
April Pig Iron Production Highest Since October, 1929

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1937	1936	1937	1936
Jan.	103,863	65,461	76.6	48.2
Feb.	107,857	63,411	79.5	46.6
March	111,951	66,004	82.5	48.5
April	113,469	80,316	83.7	59.1
May	.....	85,795	....	63.1
June	.....	86,551	....	63.6
July	.....	83,735	....	61.5
Aug.	.....	87,475	....	64.3
Sept.	.....	90,942	....	66.9
Oct.	.....	96,509	....	71.0
Nov.	.....	98,331	....	72.3
Dec.	.....	100,813	....	74.2



Automobile Output Registers Sharp Gain in March

	1937	1936
January	399.426	377,306
February	383,540	300,874
March	518,715	438,945
April	.....	527,726
May	.....	480,571
June	.....	470,887
July	.....	451,474
August	.....	275,951
September	.....	159,785
October	.....	229,989
November	.....	405,702
December	.....	519,132



BY E. W. DAVIS
Superintendent, Mines Experiment Station
University of Minnesota

First magnetic roasting plant indicates possibility of extending Minnesota iron mining operations for hundreds of years

Beneficiating Low-Grade Iron Ores

IF THE tonnage of merchantable iron ore remaining in the Lake Superior district is divided by the average of the annual shipments for the past 20 years, it will be found that this ore supply will be exhausted in approximately 35 years. This computed exhaustion period would be an indication of the future activities of the iron mining industry if it were not for the fact that merchantable ore is being manufactured from low-grade ore, of which there is an almost inexhaustible supply in the Lake Superior district.

It is true that at present only the simplest of these low-grade ores are being concentrated to any considerable extent, but progress is being made with the treatment of the more complex ores, and now, in addition to 20 washing plants on the Mesabi range, three plants are equipped with jigs for the treatment of ore that cannot be concentrated simply by washing.

The latest addition to the ore-treating plants of the Mesabi range is a magnetic roasting and concentration plant at Cooley, Minn., in which ore that cannot be concentrated either by washing or by jigging is roasted to the magnetic state and concentrated on magnetic separators. This plant has operated three seasons and while it is too soon to make definite predictions, there are strong indications that this new process may make commercially possible the manufacture of high-grade, merchantable iron ore from large quantities of low-grade ore now considered worthless.

After the iron oxide contained in an ore has been converted to magnetite, almost any desired grade of concentrate can be produced, using magnetic concentration equipment of the types now in general use for the concentration of the natural magnetites of New York, New Jersey and Pennsylvania. The conversion of hematite (Fe_2O_3) to magnetite (Fe_3O_4) is easily accomplished by heating the ore to a dull red temperature in a reducing atmosphere. The reaction is slightly endothermic, and while it require 200 B.t.u. to heat to 900 degrees Fahr. one pound of hematite ore containing 45 per cent iron (Fe), it requires only 100 B.t.u. to convert the oxide into magnetite.

In the laboratory, using small quantities of ore, this conversion is very simple, but large furnaces suitable for commercial use are not available, and several years ago the mines experiment station of the University of Minnesota undertook the development of a magnetic roasting furnace that would be specifically applicable to the treatment of the low-grade ores of the Lake Superior district.

THIS is part I of Mr. Davis' article describing the first magnetic ore roasting furnace to be operated commercially in the Lake Superior iron ore district. Part II will appear in an early issue of STEEL

It was desired to roast the ore at a comparatively coarse size to produce concentrate of as large a size as possible, and therefore the investigation of shaft-type furnaces was undertaken, because this type handles coarse ore satisfactorily and possesses other advantages such as simplicity of construction, freedom from moving parts and efficiency of heat transfer. Shaft-type furnaces of several sizes and kinds were constructed and studied, and early in 1934 it appeared that the results secured warranted the construction of a larger furnace for commercial use.

Accordingly, an arrangement was made with Butler Brothers, St. Paul, whereby the University of Minnesota erected a 250-ton roasting furnace at Cooley, Minn., and Butler Brothers constructed the ore-handling equipment and the magnetic concentration plant. The roasting furnace and concentration plant were operated during the 1934 and 1935 ore shipping seasons as an experimental unit under the direction of the staff of the mines experiment station, and during this period 29,074 tons of tailings rejected from two near-by jigging plants were roasted and concentrated magnetically, resulting in the production of 15,870 tons of merchantable ore. The

university's interest in this plant was then sold to Butler Brothers, who put the plant into commercial operation in the spring of 1936.

During the two years the Cooley roasting and concentration plant was operated under the direction of the mines experiment station, many changes were made in the details of construction and in the operating procedure to learn as much as possible about the process. For this reason, the data secured during the greater part of this period are of interest only to those persons intimately acquainted with all the details of the operation. However, during the month of September, 1935, which was the last full month the plant operated as an experimental unit, the attempt was made to operate the entire plant continuously and uniformly and with as little interference as possible by the test engineers. The month of Sept., 1935, is, therefore, the only full month during which operating conditions were not changed, and for this reason the records for this month most nearly represent commercial operating conditions. While some of the records of the furnace operation for this month have already been reported, more detailed information regarding the metallurgy of the entire operation may be of interest.

The accompanying flow sheet of the entire plant shows representative weights and assays of the important products. It may be observed the loss in weight during roasting amounts to 6.23 per cent, which loss is accounted for as follows: Ignition loss, 4.24 per cent; dust loss, 1.07 cent; oxygen loss, 1.54 per cent; carbon gain, 0.62 per cent. In addition to this, 29.47 per cent of the weight of the original ore is rejected as plant tailing assaying 21.43 per cent iron. The total concentrate amounts to 64.30 per cent of the weight of the original ore and assays 62.25 per cent iron. The dust in the steam, amounting to 105 pounds per ton of furnace feed, is not a loss, since it enters the quenching tank and is discharged with the furnace product. Table I shows the complete analyses of the original crude ore, the furnace product, and the final concentrate.

Table I

Complete Analyses Of Principal Products

	Crude Ore	Furnace Product	Total Concentrate
	Per Cent		
Total iron....	46.78	49.42	62.25
Metallic iron.	0.00	0.49	0.60
Ferrous iron..	0.15	12.85	16.81
Ferric iron ..	46.63	36.08	44.84
Magnetic iron	2.34	44.48	.....
Manganese ..	0.32	0.47	0.40
Silica	25.75	27.07	11.25
Alumina	0.87	0.95	0.54
Carbon	.....	0.62	0.60
Ignition loss.	4.24	0.78*	0.87*
Moisture	7.45	.....	8.07

*Gain.

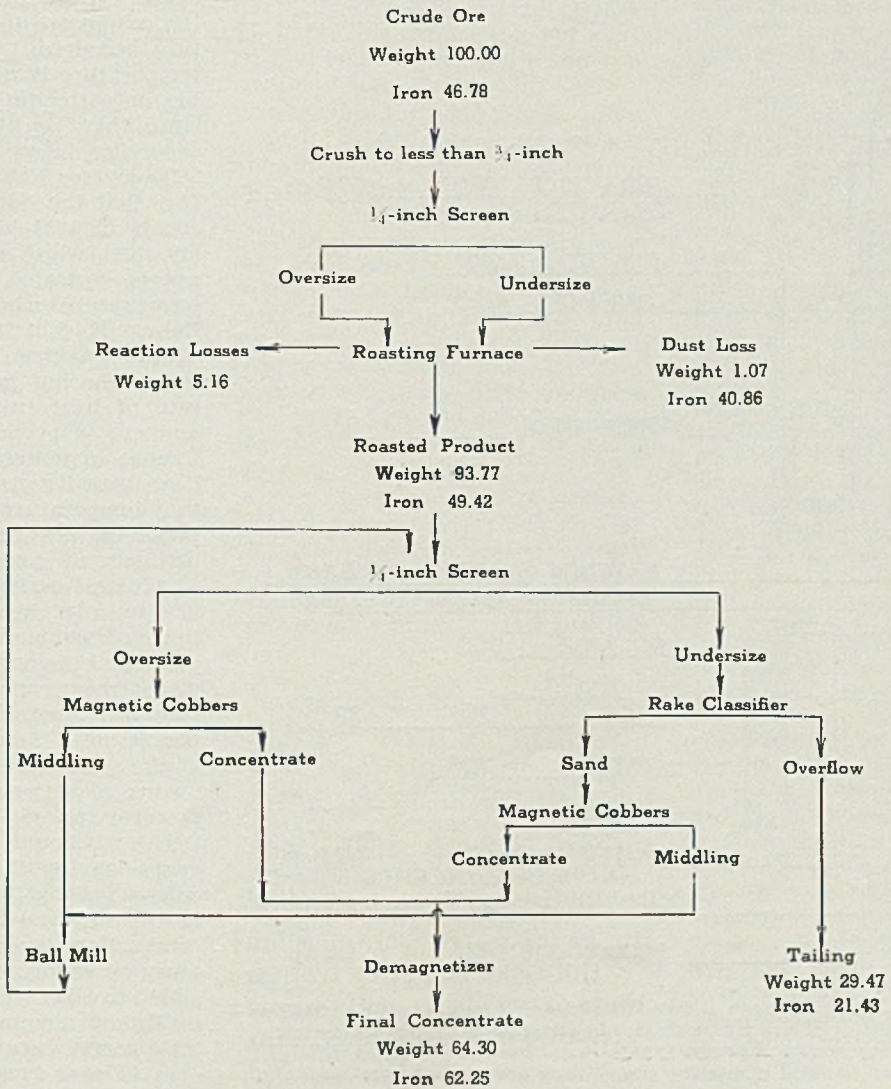
The Cooley furnace in its present form is shown in diagramatic cross section. The ore to be roasted is crushed to —¾-inch and then screened at 4 mesh, the oversize going into the two coarse-ore bins and the undersize into the fine-ore bin. The three bins together have a capacity of 10 tons of ore, in the proportion of 8 tons of coarse ore and 2 tons of fine ore. During the operation of the furnace, these bins are not allowed to become entirely empty, thus keeping the entire shaft of the furnace filled with ore at all times. The ore is discharged from the bottom of the furnace by a rotary feeder, and the rate at which the ore is drawn from the bins at the top of the furnace is regulated by the rate at which the feeder is operated.

From the coarse-ore bins, the ore passes through pipes of restricted cross-section, the purpose of which will be explained later. It then passes into the hood, the purpose of which is to spread the ore out to the full size of the furnace shaft. The angle of the sides of the hood to the horizontal is 60 degrees, which is greater than the angle of repose of the ore, and since the ore is pressed against the surface of the hood at all times, no rolling of the individual particles is possible. The ore next enters the heating chamber of the furnace. In its descent through this chamber, it passes the exhaust ports and then the hot ports.

The exhaust ports are tubular members, open at the bottom and extend-

Flow Sheet of Cooley Plant

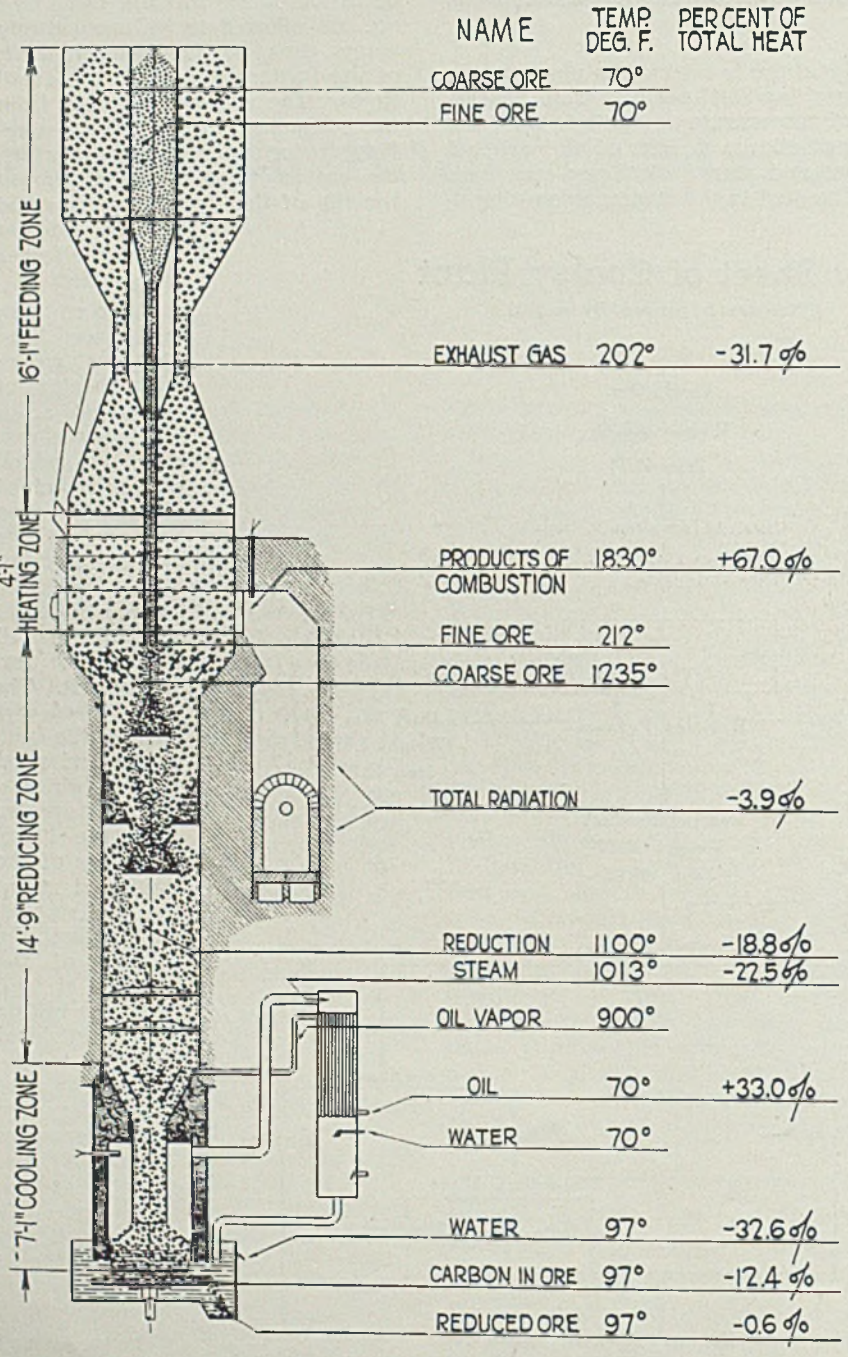
(All figures in per cent by weight)



ing completely across the heating chamber.

Hot gases, the products of combustion from the oil burners in the combustion chamber, are drawn into the hot ports and pass into the ore through the openings under the roof. The hot gases pass upward through the ore and escape through the exhaust ports into the dust catcher and fan. The resistance in the system is such that for the quantity of hot gases required, a suction at the fan of 10 inches of water is necessary. The contraction in area at the bottom of the coarse-ore bins referred to above is necessary to prevent excessive leakage of air downward through the ore bins and hood and into the exhaust ports. With the construction shown, the leakage amounts to only about 5 per cent.

After passing the hot ports, the coarse ore passes into the reducing chamber, where it meets the reducing gases. The fine ore, which has been shunted around the heating zone, is allowed to mix with the coarse ore at this point. Had the fine ore not been removed from the coarse ore before it passed through the heating zone, the power required by the fan would have been materially increased and the dust losses would have been excessive. Because the fine ore is not heated directly, it is necessary to make the coarse ore hotter than would otherwise be necessary, in order that it may give up part of its heat to the fine ore and still be sufficiently hot for rapid reduction.



This diagram of the Cooley furnace shows the present arrangement of baffles to obtain uniform motion of ore through the heating zone. Temperatures at various points in the furnace and percentage of total heat removed at different points under normal operating conditions are also shown

The temperature to which the coarse ore must be heated for the resulting mixture of coarse and fine ore to have the required temperature may be computed when the proportion of coarse to fine ore is known and the resulting temperature is determined. In the Cooley furnace, the desired temperature of the mixture is about 1100 degrees Fahr., and since the ratio of coarse ore to fine is about 5:1, it is necessary to heat the coarse ore to a temperature of about 1270 degrees Fahr. If the ratio is 4:1, it will be necessary to heat the coarse ore to 1310 degrees Fahr.; and if the ratio is 3:1, a temperature of 1370 degrees Fahr.

Temperature Is Limited

It is doubtful whether this type of furnace can be operated satisfactorily with a ratio of coarse to fine ore of much less than 3:1, because of the difficulty of heating the coarse ore to the high temperature required. This limitation in temperature is not due to the melting or softening of the coarse ore, since there is little danger of this occurring below a temperature of 2000 degrees Fahr., but is due to the fact that the hot port castings are constructed of high-temperature alloy steel, which for long life should not be operated continuously at a temperature above 1800 degrees Fahr. This limits the temperature of the products of combustion entering the hot ports, and since the rate of heat transfer between gas and ore is proportional to the difference in temperature, the rate of heat transfer decreases rapidly as the temperature of the ore approaches the temperature of the products of combustion.

If it is necessary to heat the coarse ore to a higher temperature, the time of contact between the hot gases and the ore must be increased, which means either a slower feed rate and, therefore, a reduced capacity, or a longer path of travel of the gases through the ore, which means a material increase in the power required by the fan.

The minimum temperature of the gases leaving the exhaust ports is determined by the amount of water in the ore and in the products of combustion the gases must carry away as vapor. Since it is not possible to determine definitely the maximum amount of water the ore may carry, because of rain, snow,

(*Please turn to Page* 88)

Opportunities in Fuel Engineering

BY J. E. TOBEY

THE importance of fuel engineering for some strange reason has been underestimated in the United States. It is lamentable but true that the bulk of the coal tonnage in this country is being consumed with but little regard for good fuel engineering practice. Much confusion and unnecessary expense could be avoided were there greater appreciation of the many variables involved in the selection and application of coals.

Coal is perhaps the most complex mineral with which man has to deal and occurs in great variety. Several hundred different seams are involved. All coals differ in some degree. This applies even to coals from the same seam which may vary widely from one district to another in the same field, and sometimes noticeably in the same district. When the question arises as to what are good coals and what are poor coals, one with little experience is likely to classify coals as being good or poor according to their analytical value, calling those of high heat and low ash content good and those having opposite qualities poor. In other words, it might be said that they refer to the apparent scientific value of coal.

All Coals Have Value

However, particularly in combustion practice, this basis does not necessarily hold. If one works long enough with a large variety of coals, he will at some time hear the so-rated best coals condemned and the poorest praised. Why is this so? It is because practically every coal has some outstanding virtue. Coals of low analytical value sometimes may be redeemed by certain other properties when used in certain equipment and under specific conditions. Some coals are flashy, fast igniting and fast burning; others ignite and burn slowly. This is irrespective of heat value; in fact, coals of lower heat value tend to be flashy.

To illustrate, engineers often find cases of hard worked boilers equipped with stokers having limited live grate area. Much of this equipment is of old vintage. If these units are using standard screenings, for example, the flashy type coals may carry the load better than other coals, even though the latter are of higher heat value. In such instances it is not a question of the heat value of the coal, or how much water a pound of coal will evaporate, but instead is a matter of the rate or speed of heat liberation. In other words, how fast can the coal release its heat units?

The experienced engineer makes a distinction between the scientific value and the use value of coals and, in the end, if these two values differ, he casts his lot on the side of the use value. It should be mentioned here that the fuel engineer has several means at his disposal for improving the use value of a given coal and his services in this connection are invaluable.

Referring to fuel-burning equipment in general, here again variety appears to dominate. Those familiar with power plants know that they are highly unstandardized, and that no two power plants are alike in every respect. Even when the equipment is exactly the same in two plants, the load conditions never are the same. Therefore, their fuel requirements vary more or less. The same varieties and differences also obtain to some degree in heating plants of all classes, including domestic.

Considering such factors as these, is it not plainly evident that the lack of standardization in equipment, methods and fuels emphasizes the need for that specialized branch known as fuel engineering which embraces part of the art and science of mechanical, chemical and mining engineering plus a generous portion of broad experience?

The number of full time fuel engineers in this country is very small and inadequate. There being poor definition and no census, it is difficult to tell how many such engineers are engaged by all industries and agencies interested in fuels. Several reliable sources have estimated the number of fuel engineers to be around 300. Of this number perhaps not over 100 are engaged in the direct application of coals. The others are accounted for by the gas and oil industries and various public and private research agencies. It is interesting to consider this small number of engineers in relation to the bituminous coal tonnage. In 1936, the production was 434,070,000 tons. Dividing this figure by the number of engineers directly engaged in coal application it is found that the proportion is one fuel engineer for approximately 4,350,000 tons. It is obvious that one man cannot adequately supervise the application and use of such a tremendous tonnage. A monetary comparison also is helpful here. The delivered value of this tonnage was approximately $1,750,000,000. This indicates that there is one engineer for every $17,500,000 worth of product. A rough calculation reveals that for every dollar invested in this type of fuel engineering, $3500 or more is spent for the product.

Fuel Engineers Are Few

These figures are only approximate and cannot be readily substantiated. Possibly, they should not be used with such great abandon. Also, it is hoped no one will get the impression that these few fuel engineers represent the only technical supervision over this gigantic tonnage, for it is true that engineers in other capacities give some attention to fuels. However questionable the figures may be, they at least serve to focus attention on the fact that very few engineers give their undivided attention to the proper application and utilization of coals. In this respect, it is well known that the expensive competi-

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MR. TOBEY, manager fuel engineering division, Appalachian Coals Inc., Cincinnati, delivered this address April 13 before the Institute on Coal Utilization, Ann Arbor, Mich., sponsored by the College of Engineering and Extension Service, University of Michigan and the Michigan Retail Coal Merchants association

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tive fuels are more effectively serviced than coal. This accounts in many instances for the loss of coal tonnages to these fuels. It perhaps should be mentioned here that those engaged in the promotion of competitive fuels display an amazing facility in uncovering new accounts. Their fuel engineers prepare such comprehensive and convincing reports that the new customer usually is sold on the proposition and has a closed mind before the coal interests find out about the potential business. Coal must meet this challenge.

The coal industry has entered a new era. The greatest period of change coal has ever known will occur during the next ten or fifteen years. Coal and allied interests have progressed slowly but consistently in the past but now they face changes of revolutionary proportions. Attempts to modernize coal burning and coal preparation have been more or less experimental and sporadic to date, with the usual successes and failures which attend such efforts. More than 20 per cent of industrial coal is still hand-fired and much of the balance is being rather poorly mechanically fired.

Great strides recently have been made in the design of mechanical firing equipment and furnaces for power plants. Therefore, with the upswing in industrial activity, a nation wide program of power plant modernization will be set in motion. In fact, this program is already started and power equipment manufacturers are so swamped right now with orders that buyers are forced to accept late delivery dates. New boiler equipment is so flexible that it greatly enlarges the coal selectivity range the new plants can enjoy. This will have a pronounced effect upon the status of all coals and coal sizes.

In the domestic field, the efforts to furnish automatic coal heat have just been preliminary skirmishes compared with what is to follow. Progress in the development of residential stokers has been commendable and they are about to emerge from the adolescent period. To date, these stokers have been promoted principally as conversion units for existing boilers and furnaces in existing homes, but in the immediate future a concerted effort must be made to capture the new homes market with stokers specifically engineered as stoker-boiler or stoker-furnace combination units. This must be done to combat the inroads of fuel oil and natural gas. Great advances are assured in automatic coal heating by the research work now being done by stoker companies, Bituminous Coal Research Inc. and other public and private agencies, plus the influence of hundreds of inventive minds which are now focused on this most attractive problem. With automatic heat a reality, public acceptance of coal for domestic purposes will be sweeping.

The manufacture of coke and gas is being given more attention than ever before. New processes for coke manufacture are being developed. The manufacture of low temperature coke for domestic consumption is now a reality. Coal briquetting now is here to stay and is being expanded. Processes for the hydrogenation of coal for the manufacture of motor fuel, first successfully developed and commercialized in Europe, are now being studied in American research institutions in preparation for the time when economics dictate their use here.

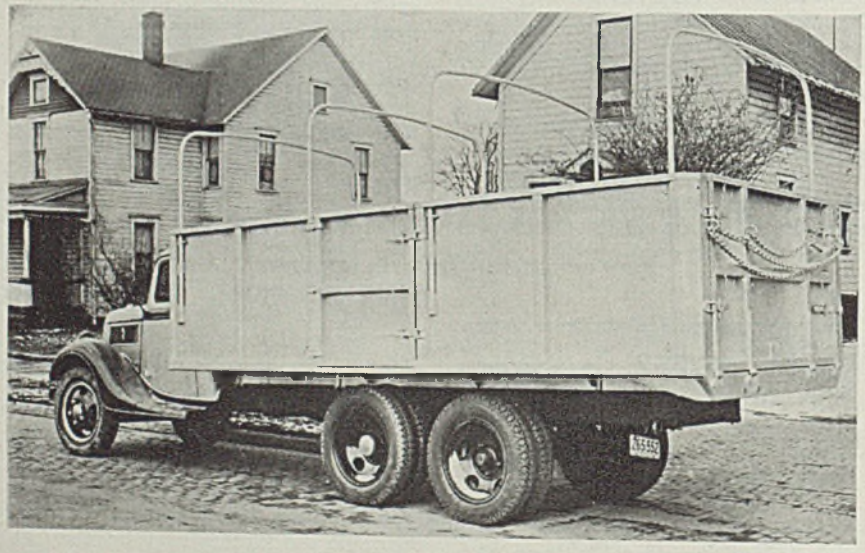
The preparation of coal, including cleaning, sizing, and dustproofing to meet the most exacting requirements of its various uses, is rapidly becoming the order of the day. Coal tipples are being transformed into huge factories which clean and screen the product into any desired assortment of sizes. This is far removed from the day when all mines shipped the product as straight run-of-mine.

It would be well to ponder as to what the situation with reference to steam coals will be as the time approaches when all power plants have been modernized to permit the burning of any coal in any state while at the same time all mines also have modernized their equipment in order to prepare coal to meet the most exacting conditions imaginable. Such conditions would then only exist in the imaginary form and all steam coals would be burdened by the heavy capital investment on the equipment. The additional cost might result in loss of coal tonnage to competitive fuels or other forms of energy. This is a problem whose solution demands the finest fuel engineering talent, for these engineers are acquainted with both ends of the business and understand the economics involved.

Interest Is Greater

At present there are more organizations taking an interest in coal and fuel engineering than ever before and this augurs well for the future of coal. Such organizations include: Bituminous Coal Research, Inc., Carnegie Institute of Technology, University of Michigan, University of Illinois, Pennsylvania state college, Massachusetts Institute of Technology, University of West Virginia, University of Wisconsin, Virginia Polytechnic institute, Purdue university, University of Iowa, Iowa state college, and other schools, the United States bureau of mines, Battelle memorial institute, and Appalachian Coals Inc. In addition, excellent research and design work is being done by power and heating plant equipment manufacturers. Appalachian Coals Inc. has accomplished a great deal to advance fuel engineering. This organization, being responsible for marketing approximately 40,000,000 tons of coal annually from more than 80 different seams, felt a definite responsibility to its producers and the public along research and educational lines. This effort is proceeding both directly and

Grain Truck of High Tensile Steel



ELIMINATION of dead weight and a high degree of impact resistance are features of this new grain truck made of Armco H. T. 50, a product of American Rolling Mill Co., Middletown, Ohio. The truck was fabricated by Perfection Steel Body Co., Galion, Ohio. Twelve gage Armco high tensile steel is used throughout for the truck body

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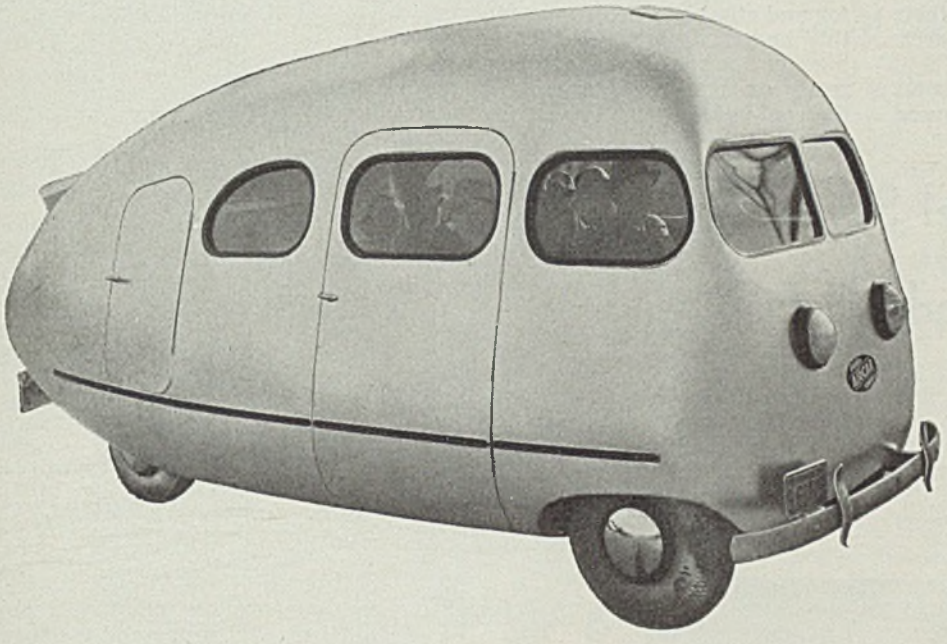

Pribil Safety Aircar, designed and built by Saginaw Stamping & Tool Company. Weight has been kept to the minimum, without sacrifice of safety, by the use of Vanadium Steels in truss members, axle shafts, gears, transmission shafts and other vital parts.

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indirectly, directly, through fuel engineering meetings and publications; indirectly, through Bituminous Coal Research, Inc., the national engineering societies, and the United States bureau of mines.

In this new era, with developments so revolutionary as to cause a veritable upheaval of the whole coal pattern, when values are being completely changed and in some cases reversed, there is definite need for the expansion of fuel engineering facilities. The interest of engineering schools is heartening, but their interest usually concerns research activities. Unfortunately, very few schools offer special courses in solid fuel engineering. More courses should be developed in which engineers can be trained along these lines. Split courses, including mechanical, chemical and mining engineering may be the answer. These might be either post-graduate or co-operative. The latter has one distinct advantage in that the student would receive some practical experience, one of the most important requisites.

It is hoped the foregoing discussion of the fuel engineering field will in some way increase appreciation for and stimulate greater interest in this important branch of engineering, for its benefits to everyone directly or indirectly associated with the coal industry are legion.

Nickel Clad Steel Saves Cargo and Reduces Ice Needs of Fishermen

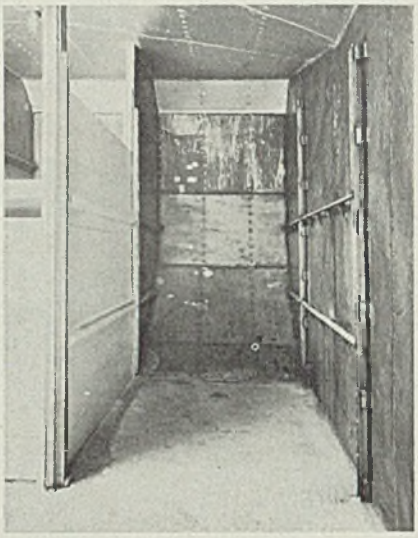
FOR 30 years the model for fishing trawlers has been the Grimsby model sent down the ways of British builders shortly after the turn of the century. Except for the adoption of Diesel power, few improvements have been added to this model.

Of no ordinary interest, then, are the three new Diesel trawlers just completed for the Forty Fathom Fisheries, Boston. Greatest importance from a cost standpoint is attached to a new type sanitary refrigerated hold lined with Lukens nickel clad steel, which cuts ice requirements from 60 to 20 tons per voyage while maintaining a constant temperature of from 32 to 36 degrees Fahr., thus landing midsummer catches in prime condition.

Spoilage due to weather, to bacteria infected holds, to introduction of melted ice and bilgewater accounted for past losses mounting as high as 20 per cent in hot weather. Stainless holds have corrected this, have increased carrying capacity by decreasing ice requirements.

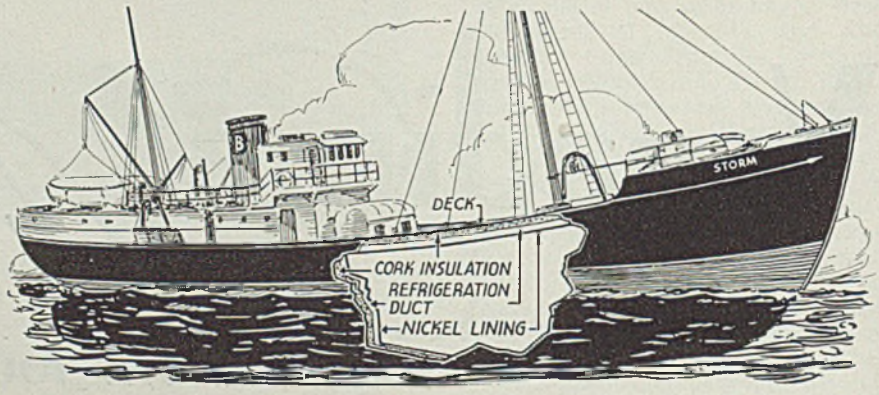
Fish hold of the vessels is separated from the plates of the hull and the deck by an inner lining of cork and space for air ducts, which provide the means of refrigeration. Through these ducts dry air, cooled to a predetermined temperature, circulates constantly. Refrigerating air is dehumidified before circulation to prevent oxidation in the ducts. Underneath the concrete floor of the hold is a two-foot wall of cork insulation.

Another important feature of the new construction eliminates objectionable bilge water and melted ice, by means of a drainage canal leading to a pump in the engine room, where it is pumped overboard. In the construction of the new nickel clad holds, pure nickel welding wires were used for all seams as an overlay where the hold material was riveted to supporting members. Nickel, because of its anticorrosive properties, is easy to clean and presents in the new holds an unbroken metal expanse which is easily sterilized in contrast to the older wooden types. Wood has been used for grating over the floor drain and for pen gates.

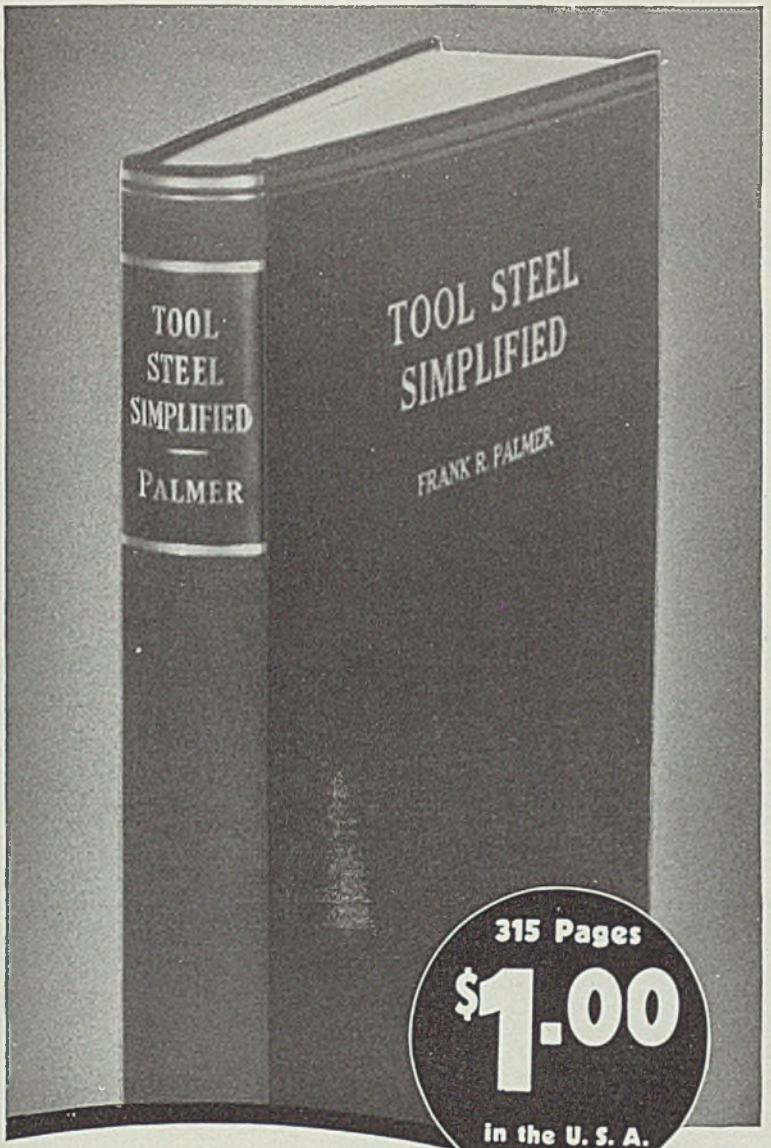


ALL metal surfaces which will come in contact with the fish are covered with nickel clad steel. Only the removable pen gates are of wood

NICKEL'S cleanness is extended to the galley, where Monel covered working surfaces make life easier for the cook



DRAWING of one of the new trawlers with section cut away to show the various layers in the wall construction



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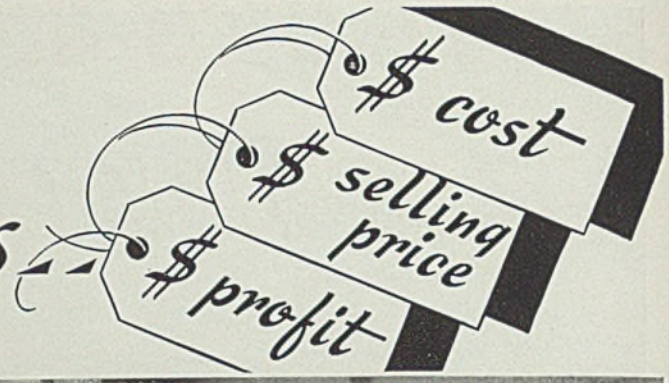

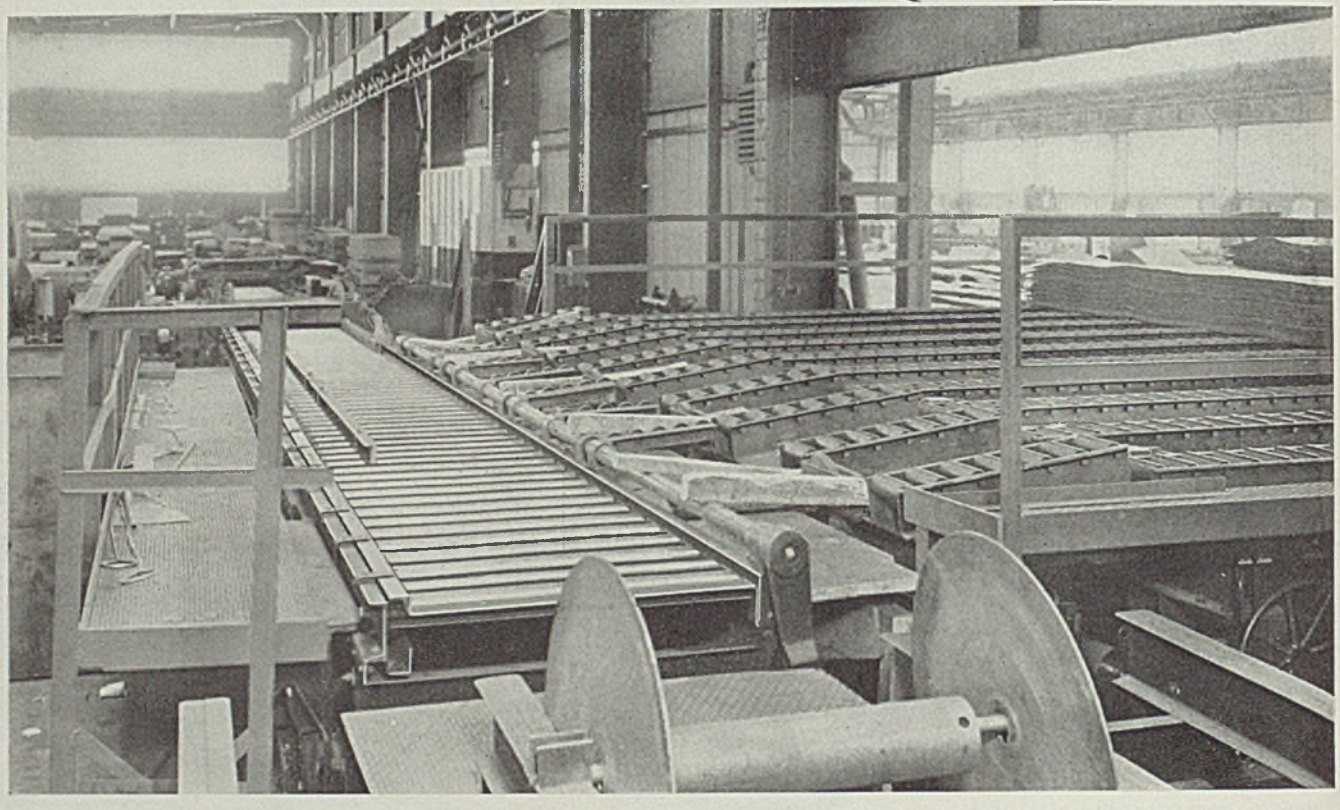

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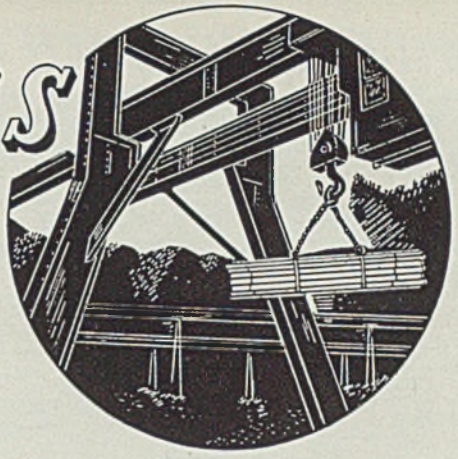


Unit Driven Roller Tables Improve Strip Mill Operating Efficiency

BY W. A. JAMES
Chief Engineer Lackawanna Plant, Bethlehem Steel Co., Bethlehem, Pa.

ROLLS driven either individually or in pairs by electric motors are used on more than 3000 feet of roller tables in the continuous strip-sheet and plate mill of the Bethlehem Steel Co., Lackawanna, N. Y. The motors are driven by motor-generator sets and through their control effective synchronization of roll speeds is obtained. Simplicity of this type of installation has resulted in superior performance and economies in maintenance.

Until a few years ago, the practice was to drive a number of rolls, frequently as many as 18, through a lineshaft and miter gears.

With tables equipped with unit drive, the only moving parts are the roll and its gear and the motor and its pinion, consequently momentum or flywheel effect is held at a minimum. Hence, the response of the unit drive to acceleration and deceleration is rapid and involves small stress and wear. Lubrication is simple and upkeep expense is low.

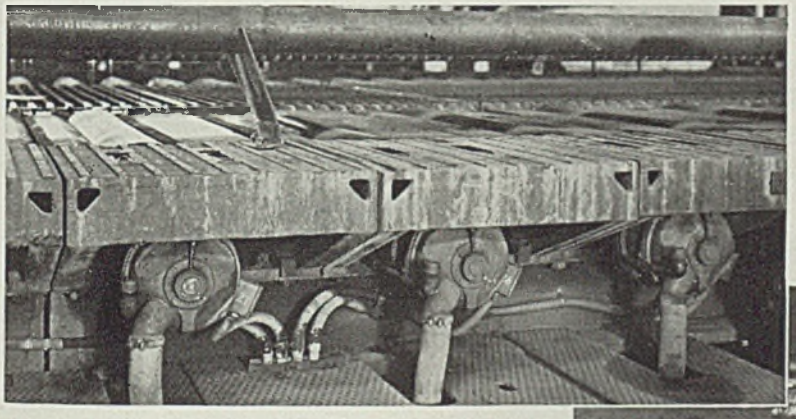
These same features of the unit drive also facilitate accurate control of speed, resulting in good operating efficiency, particularly in serving strip-sheet to the coilers. For example, the table which receives the material from the finishing stand of the mill must operate at times at a rate of 1400 feet per minute; when desired, however, speeds as low as 500 feet per minute can be maintained accurately. Accompanying illustrations show table and motor installations in the Lackawanna mill.

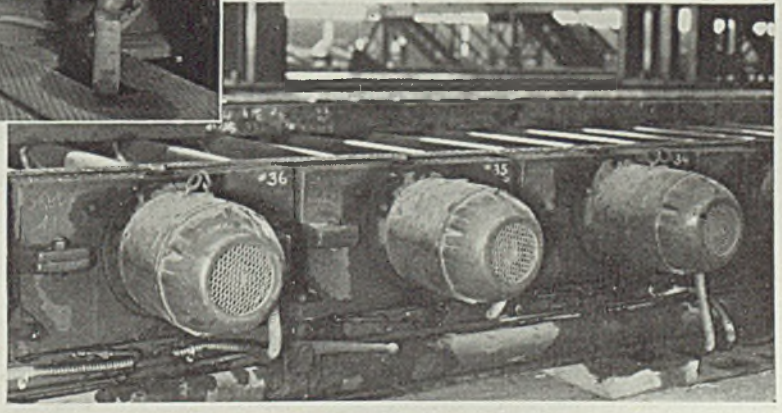
Several of the long roller tables—four of these tables are approximately 700 feet long—are divided into sections. Any group of rolls in a section can be operated at any speed required by conditions.

Quite as important as any of the foregoing advantages is the insurance against interruption that the unit roller tables, as installed in this mill, provide. Some sequences in operation on the hot mill are exceedingly long, a good example of this being the rolling and processing of plates. In this operation, long tables are employed at several stages to permit cooling without retarding the movement of the plates or interrupting the sequence.

Plate Handling Sequence

When plates are being rolled, the material is run out from the mill over a table approximately 300 feet long to a 250-foot chain transfer bed, which shifts it sideways to a second roller table approximately 700 feet long where the plate is roller leveled, cut into 100-foot lengths and passed over a chain transfer bed to a third 700-foot roller table. From the latter, the plate is either stored for stock, or carried by chain trans-





A CLOSE-UP of a unit roller drive used in the Bethlehem strip-sheet and plate mill is shown in the illustration above. At the right is a close-up of a dual roller drive on one of the long roller tables. These drives have demonstrated satisfactory performance for nearly a year

fer to the fourth 700-foot table, which is equipped with a leveler and rotary side trimming shear and end shear for trimming and cutting the plate for the market.

In case one motor in a table fails, and a table may consist of perhaps 150 rolls, the remaining rolls still provide sufficient traction so that the table can be continued in operation without interruption. Completely built-up spare units are kept on hand in readiness for immediate substitution should one unit break down.

Further to safeguard against delays in production from failures in roller table drives, the three circuits which motivate each table at the Lackawanna mill are staggered so that no two adjacent motors can be put out of operation by failure of any one circuit. Thus, mounts for rollers Nos. 1, 4, 7 and 10, and so on, in any given table take their power from circuit No. 1, while motors Nos. 2, 5, 8 and 11 take their power from circuit No. 2 and motors Nos. 3, 6, 9 and 12 take theirs from circuit No. 3. Hence, even if an entire circuit should fail, two-thirds of the table still is in operating condition and can continue to be used.

These tables in the Bethlehem mill have been in operation for approximately a year and the experience thus far indicates that they are entirely satisfactory from an operating standpoint, also from the viewpoint of maintenance upkeep.

Trolley in Crane Bay

PROVIDING power handling facilities for lifting medium-heavy work in space served by an overhead crane without interfering with the operation of or requiring the use of the crane is a common problem. This difficulty came up in a Chicago plant which uses part of the open crane bay for the welding and construction of the structural framework of its product.

Finished frames weigh from 200 to 400 pounds, too much for men to handle. The solution was to extend a series of parallel triangular trusses out from the building structure on one side of the bay but below the high crane runway. These are similar to a number of jib booms or halves of roof trusses. These booms are connected at the outer ends by a light channel and braced.

Instead of using these as jib cranes, as is often done, an I-beam extending lengthwise of the floor is attached to the lower members of the jibs. This I-beam serves as a trolley for electric hoists. The hoists lift, turn and hold parts of the framework in position for welding and assembly. Finished frames are carried out on the trolley where they can be transported by the overhead crane to the final assembly department.

This installation, which occupies about 10 x 30 feet of floor space, does not interfere with the operation of the crane in the remainder of the bay. However, the crane is relieved of this light work except for the final carrying away and delivering structural shapes to the section.

Holding Delicate Parts

IN A CHICAGO plant manufacturing business machines, delicate parts and partial assemblies which must be handled carefully to prevent bending are placed in special wooden boxes as worked on. These boxes have notches or slots in the bottom made just wide enough to hold the part separate and upright but with sufficient space between to permit ease in handling. These boxes are somewhat similar to those used for holding glass slides for projectors.

The boxes are designed for the different delicate parts and sub-assemblies, each box to hold 10, 25 or 100 parts for convenience in counting. When these parts have passed final inspection which includes any necessary straightening, they go to shelf storage or direct to final assembly.

Assembly is almost entirely completed by a single assembler because of the careful fitting of the parts and the opportunity definitely to establish responsibility for perfect operation.

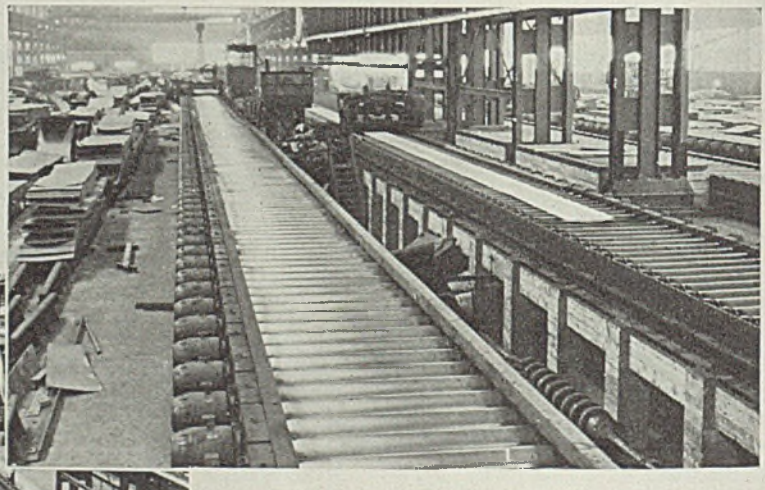
Workers Speed Conveyor

TODAY with so much talk about the speed-up in conveyor controlled production and assembly brings up a case where the workers unintentionally speeded themselves up almost beyond endurance, as related by the superintendent of a radio plant. Radios are assembled on an intermittently-operated conveyor with stops varying from about 1 to 4 minutes, according to the type and number of tubes in the units in work. This rate is set and controlled from a clock in the office.

One morning near noon the foreman complained to the superintendent about someone speeding up the conveyor. However, the output was 55 to 57 units per hour and the girls were getting restless and about ready to rebel.

A check on the conveyor indicated

(*Please turn to Page* 95)



AT the left is shown the mill runout table line and hot transfer table in the Lackawanna plant. The view is looking toward the coilers. Shown above is a view of the table between the coilers and piler on the mill line, looking toward the piler. Photos courtesy Bethlehem Steel Co.

Cleveland Tramrail Materials Handling Equipment

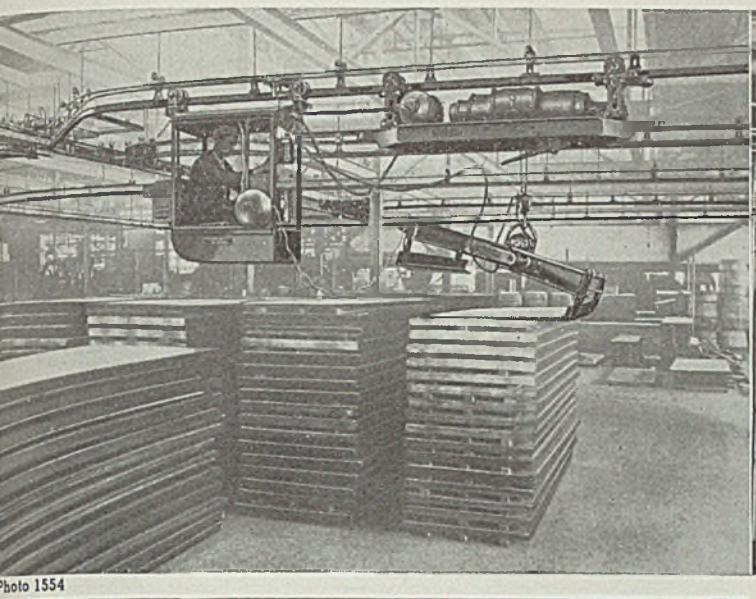


Photo 1554

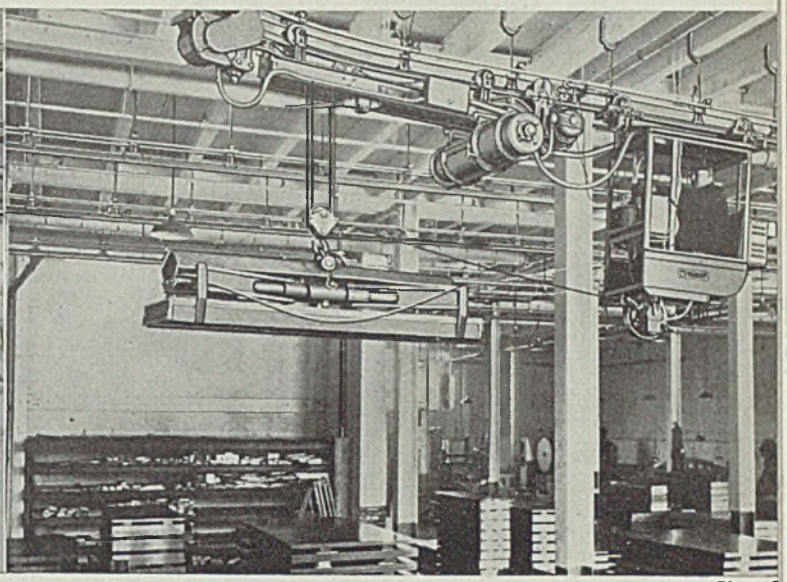


Photo 2

Cleveland Tramrail

Consult your 'phone directory under Cleveland Tramrail

● The ability of Cleveland Tramrail engineers to design equipment and to plan or lay out a materials handling system, that will safely and successfully handle the intended loads and become part of the production process, is well illustrated in these installations of Motor operated carrier, hoist and grab; all operations of which are controlled from the cab.

Photo 1554 shows what is possible to accomplish by a little practice —this operator can pick up one sheet or full capacity loads —no floor man needed.

Cleveland All Welded Cranes For Every Industry

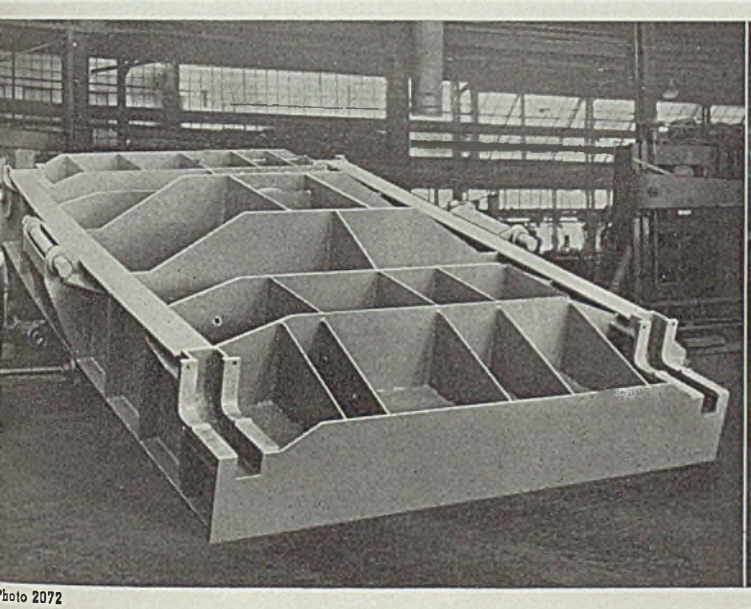


Photo 2072

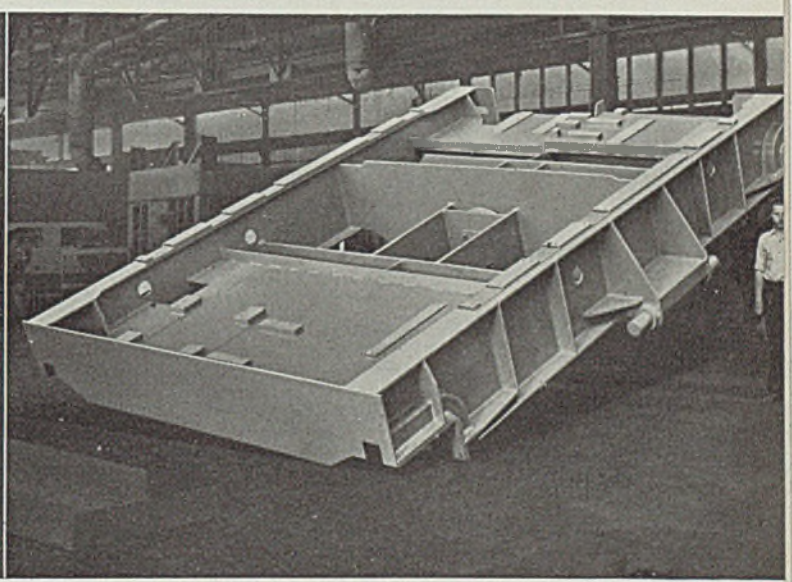


Photo 2

Cleveland Trolley Frames

All Welded — One piece of "worked" steel. Every pound rolled steel so placed as to be most effective. No excess eight — but greater strength, rigidity and reliability.

Cleveland Cranes

NEW YORK • DETROIT • PITTSBURG • CHICAGO

The Cleveland Crane & Engineering Co.

1125 Depot St.

Wickliffe Ohio

WELDING, ETC.

BY ROBERT E. KINKEAD

Welding Sections To Assist Society's Expansion Program

CODES which govern the application of welding to buildings, ships, railroads, power piping, boilers and other jobs are necessary in order that the public interest be served. The public is in no position to judge the safety of a welded building although considerable numbers of people must use it to gain a livelihood. It is therefore necessary for engineering bodies and public commissions to safeguard the use of welding under such circumstances. But the difficulty of making such codes produce safe results and at the same time be fair to all parties at interest is so great that it requires a practically continuous sitting body to revise the codes. The best example of such a code is the A.S.M.E. code for power boilers and unfored pressure vessels which is undergoing continual revision.

The disposition of some manufacturers to resist these codes has its roots in the economic struggle to which competitive industry is subjected. The resistance arises from the fact that the manufacturer who does a better job than the code requires gets his price leveled down by the buyer to the price of his competitor who will play both ends against the middle just to meet the minimum necessities of the code. In that respect, the codes discourage the conscientious manufacturer. Codes, for the most part, are a loose compromise between conflicting opinion and interests. The manufacturer who just meets the code is, in many cases, on the ragged edge of dangerous practices. The buyer has to learn how to buy the welding he wants in the same way as he has to learn how to buy anything else.

♦ ♦ ♦

Effect of Welding Heat Cycle and Cooling Rate

MARKED differences of grain structure in strip steel resulting from different rates of cooling in modern annealing furnaces are of interest to users of welding. The grain size increases roughly three times in changing from a cooling rate of 185 degrees Fahr. to a rate of 30 degrees Fahr. per minute, according to data recently published by T. F. Olt in *Transactions of the A.S.M.E.*

Metallurgical effects of the welding heat cycle are severe. The fact that the duration of the welding heat cycle is different for different processes makes possible a selection between processes in some cases with more favorable results. The range of duration of the welding heat cycle in different processes is well illustrated in the case of the latest high speed spot welding methods where the duration of the heating cycle may be of the order of 1/1000th of a second with a cooling rate of possibly 1000 degrees Fahr. per second through the critical range. In electric arc or gas welding, the cooling rate through the critical range may be anything from 100 to 1000 degrees Fahr. per second depending on a large number of factors. Where atomic hydrogen or multiple tip oxyacetylene flame is used for continuous seam welding, the cooling rate may be very low.

Even in material like automobile body stock the rate of cooling subsequent to the welding heat cycle affects the hardness of the metal to a considerable degree. In the low alloy group of metals the effect is of dominating importance.

♦ ♦ ♦

Labor Relations

AMONG all the discussion and speculation we have heard between our management and financial friends over the probable effect of the Wagner Act, surprisingly little of it is bitter or hysterical as has been the case with a great many of the administration's policies. In fact, we suspect that some managements are secretly relieved by the prospect of not having to deal with company unions exclusively. Company unions had a record of getting about everything they wanted whether it was good for the business as a whole or not. It seems to us that the CIO will presently become aware of the fact that it has an uncomfortable amount of responsibility and that the difficulties of maintaining discipline will take about all the energy the organization can muster. Workers will not take kindly to the regimentation necessary to the proper functioning of the Committee for Industrial Organization.

The youthful president of a large welding fabrication company which employs about 110 welding operators recently discussed with us some of his plans for making each man function as an individual to the end that the man would gain the mental satisfaction which every man should get from his job. The president was not worrying about how much more the men could earn; he wanted them to earn more by more intelligent work, not harder work; he was trying to enforce not only financial but also psychological justice.

Recognition of a man as a human being with need for individual treatment and understanding will be the job on which the idea of one big union will always fail.

♦ ♦ ♦

Welded Construction

NO WELDING enthusiast can complain that welded steel construction is not being used in steel mills now being built. Among common uses are parts of shears, run-out tables, gearcases and covers, pressure vessels, coilers and uncoilers, furnace and annealing box covers, and miscellaneous auxiliary equipment. Every new mill has more welded construction than the last one built.

Limitation on the use of welded steel construction does not come from the engineering departments of the mills. If welded steel costs less it is used. But it is an obvious fact a great deal more welded steel will be used when the country is better equipped to make it. A plant to make welded steel machinery at low cost is something different from a tank shop or a structural steel fabricating shop. Expensive equipment is required. Relatively few shops are equipped with metal forming presses and brakes needed.

Welding men look with longing eyes at the large cast steel mill housings. American Sheet & Tin Plate Co. at Gary has such a housing made of rolled slabs welded together. Excessive cost is all that stands in the way of welded construction for mill housings. New welding processes and methods of handling are narrowing the gap.

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

Album of Welding Progress

WELDING USER—U. S. Slicing Machine Company, La Porte, Indiana. Data from Mr. C. S. Casperson, General Manager.

APPLICATION—Manufacture of meat and bread slicer parts. Also plant maintenance.

WELDER USED—Lincoln "Shield-Arc SAE," 200 amp., motor driven type.

PROGRESS MADE—Lower production costs by changeover to "Shield-Arc" welded construction. 30% saved on slicer base shown. Finer control of arc, made possible by Dual Continuous Control, has broadened their use of arc welding to include chrome plated steel, stainless steel, copper, cast iron and aluminum. Welds made on their many chrome plated parts now have a perfect finish.

LINCOLN "SHIELD-ARC SAE"

THE NEW WELDER WITH DUAL *CONTINUOUS* CONTROL

GET THIS FREE BOOK TODAY

THE LINCOLN ELECTRIC CO.
Dept. Y-376, Cleveland, Ohio.

Please send a free copy of "The New Arc Welding Technique" which gives full particulars about the "*Shield-Arc SAE*" Welder.

Name _____ Position _____

Company _____

Address _____

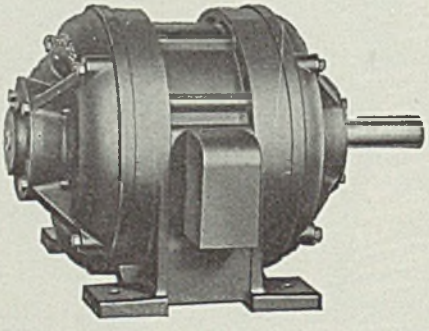
City _____ State _____

"HUMAN BLOOD IS ALL OF ONE *Color*"

• • • that's an old, old proverb; and true in so far as it goes, but its superficiality makes it a fundamental falsehood. For, though all blood is red, the microscope quickly reveals startling differences in its character.

Some people are inclined to think that all motors are "of one color," so to speak . . . dimensions and electrical characteristics identical—prices about the same. But put a microscope on them! Here is how an Allis-Chalmers Motor looks under the microscope: ample insulation, with a big added margin for mechanical durability . . . studied use of steel throughout . . . cast steel frames . . . rugged cast iron housings . . . heavy bearing enclosures. The sturdiest motor on the market—bar none; which means long life and maintenance costs reduced to the minimum.

And cast steel construction in motors is no innovation, no experiment with Allis-Chalmers. We have always recognized the value of cast steel parts, for inherent strength and rigidity, in motor construction and have used it in our motors for many years. Examine the Allis-Chalmers motor critically—and draw your own conclusion.



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

MOTOR DIVISION

ALLIS-CHALMERS

MILWAUKEE WISCONSIN

SURFACE TREATMENT AND FINISHING OF METALS

Electrolytic Process Produces Unusual Color Effects on Metal

COMMERCIAL applications on the new finishing process of electro-plating colors has been begun. United Chromium, Inc., 51 East Forty-Second Street, New York, exclusive licensee of Kansas City Testing Laboratory, Kansas City, under the patents, issued and pending, of Dr. Jesse E. Stareck, has made sub-licensing agreements under which a number of leading companies will use this process. "Electrocolor" is the trademark which has been registered in the U. S. Patent office to identify various classes of articles which have been finished in color by plating. The process of electroplating colors is applicable to a large number of metal products of which name plates, instrument panels, molding, hardware, interior decorative trim, giftware, flashlights, lighting fixtures, clocks, vanity cases, and similar articles, are only a few examples.

Equipment Is Simple

In this process, some of whose phases were outlined in STEEL of March 22, the range of colors is practically the range of the spectrum. The unique feature is that this range is obtained from a single bath. The equipment is simple and may be operated inexpensively. Cost of the electrolyte is low and the amount of current consumed relatively small. The coating can be applied on practically all base metals, either directly or over intermediate plated coatings.

With this process manufacturers of metal articles are able to attain color which has a metallic transparency. They can get shades and effects not previously attainable, as well as depth of tone and metallic luster. Color is obtained as a function of three things. One is the finish on the base metal on which the color is plated. The second is the color of the base metal. The third is the thickness of the deposited coating. The finish on the base metal may be of any desired character, including mirror, scratch brush, sandblasted or any other type of surface condition. With respect to shade of color, a base metal of light color such as a nickel plated surface finishes in a lighter shade than a base metal of darker color.

Color obtained with this process, which is the result of development and research work over a period of years, is absolutely light fast. The colors are produced electrochemically and are free of dyes. Control is such that any predetermined color may be obtained without deviation, thus permitting of standard finishes. By masking parts of the surface, two or more colors may be had on the same article. The process has unusual throwing power and plates into minute crevices. At the present time, United Chromium, Inc. recommends the color plating deposit obtained with the process be finished

Porcelain Enamel Solves Sign Makers' Problems

MANUFACTURE of relief type letters for use in outdoor neon signs has in the past caused a certain amount of trouble because of cracking, chipping and similar defects in the finish due to extremes in temperature and weather. By following the technique of refrigerator manufacturers in their work on the fabrication of porcelain enameled refrigerator linings, sign makers are now finding an answer to their problems.

Previous practice was to make this type of relief letter from ordinary galvanized sheet steel. The joints were soldered and the letters finished by painting. Refinishing and retouching were generally necessary at frequent intervals. The adoption of enameling stock steel and the use of a porcelain enamel finish has greatly improved the weather resistance of these sign letters.

The component parts of the letters are cut out of enameling stock, fitted together, tack welded and then all edges joined together with a butt type joint. No welding rod is necessary. The finished job gives a smooth and properly rounded joint for porcelain enameling. Since enamel adheres to the oxyacetylene welded joints, the porcelain does not crack or chip when hot or cold weather causes these letters to expand or contract.

with clear lacquer, particularly because of recent developments which have yielded lacquers highly resistant to perspiration, alcohol and other corrosive agencies, as well as abrasive wear. The company is in a position to furnish complete information on the process to interested manufacturers and to process sampies at its Waterbury, Conn., plant.

Color Matching Booth Is Constructed And Illuminated to Eliminate Shadows

THERE are as many degrees of whiteness as there are shades of blue. Many factors difficult to control in the manufacture of porcelain enamel ware enter into the whiteness of the product making unavoidable variations in color. Unless all the panels used on a refrigerator or range are carefully matched the difference in color is noticeable to the purchaser.

Many methods for inspection have been employed but the "Tunnel of Light" recently installed in the Westinghouse plant is the most effective yet used, according to Mr. R. F. Bisbee, chief inspector, Mansfield plant, Westinghouse Electric & Mfg. Co. This room has no corners, employs combination incandescent-mercury lighting with an effective intensity of 114 foot candles, and is shadowless so that even curved surfaces may be compared effectively against standard colors. This color matching booth has been termed one of the most efficient lighting systems for color matching in the world.

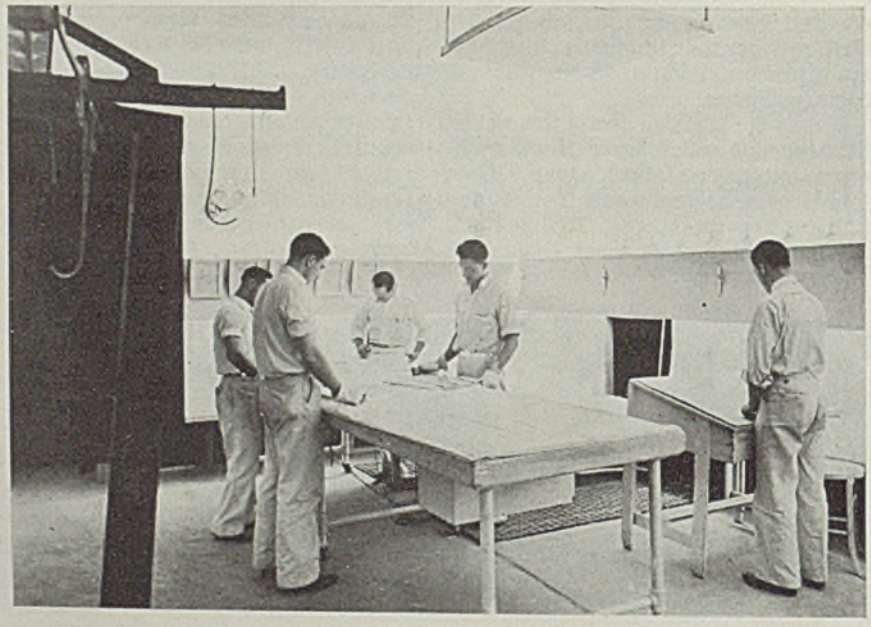
Previous to the installation of the "Tunnel of Light," rejects were at least 300 per cent higher. During the peak months of 1936, color rejects found on the assembly floor were less than 1 per cent.

The room is designed to eliminate shadows and provide a high intensity of diffused even lighting. If a pencil were placed anywhere in the room, there would be no visible shadow cast from it. None of the inspectors wear anything other than white uniforms. Thus every precaution against optical illusions is provided in this modern inspection booth.

The lighting is supplied by twenty-eight 300 watt incandescent lamps and eleven 400 watt mercury vapor lamps making a total of 12,800 watts with an average light intensity of 114 footcandles. The lamps are so alternated, spaced and shielded as to give the maximum light efficiency. As shown in the illustration, all pieces pass through the booth on conveyors and are compared with three commercial standards.

On flat ware the pieces are checked on the color matcher which is shown on the table. All panels with large radii, however, are checked with the color standards. The man at the end of the table on the right-hand side checks the enamel for thickness on an electromagnetic gage. The inspectors are all required to report to an eye specialist for eye tests periodically. On range parts any enamel over 0.018-inch thick is scrapped inasmuch as enamel over this thickness would chip readily not only in the assembly but in transportation and after it had been installed.

Porcelain enameled panels for refrigerators, ranges and other products are matched in this color matching booth of Westinghouse Electric & Mfg. Co., Mansfield, Ohio. Lighting intensity is 114 footcandles and illumination is so designed that there are no shadows or colors in the room to cause optical illusions and affect accuracy of inspection



Plating Solution Control Discussed in Bulletin

A brief review of electroplating, discussing the present need for scientific analytical control, is contained in a new service bulletin on "Solution Control of Electroplating" just issued by Grasselli Chemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del.

The bulletin describes the use of simplified tests which have been developed specifically for plants having no chemist. This company believes it has been successful in reducing the rather complicated and elaborate laboratory methods of analysis for plating solutions to a simplified form capable of giving satisfactorily accurate results in the hands of the layman.

Gummed Paper Adheres to Aluminum, Leaves No Stain

A gummed paper, known as Perfection 555 White Gummed Paper, developed especially to adhere to aluminum is now offered by Paper Manufacturers Co., Inc., Philadelphia. This gummed paper requires no special moistening solution and is applied with water in the usual manner. When applied to aluminum it is said this paper will leave no stain when the label is removed.

It is also claimed to adhere well to over-print varnish, spirit varnish, solid color printing ink and a few other surfaces to which regular gummed paper will not adhere.

This company also offers a special grade of paper, No. 402, for use on tin. Gummed papers of all kinds are stocked in sheets 20 x 25 inches. They are sold to printers through reliable paper merchants.

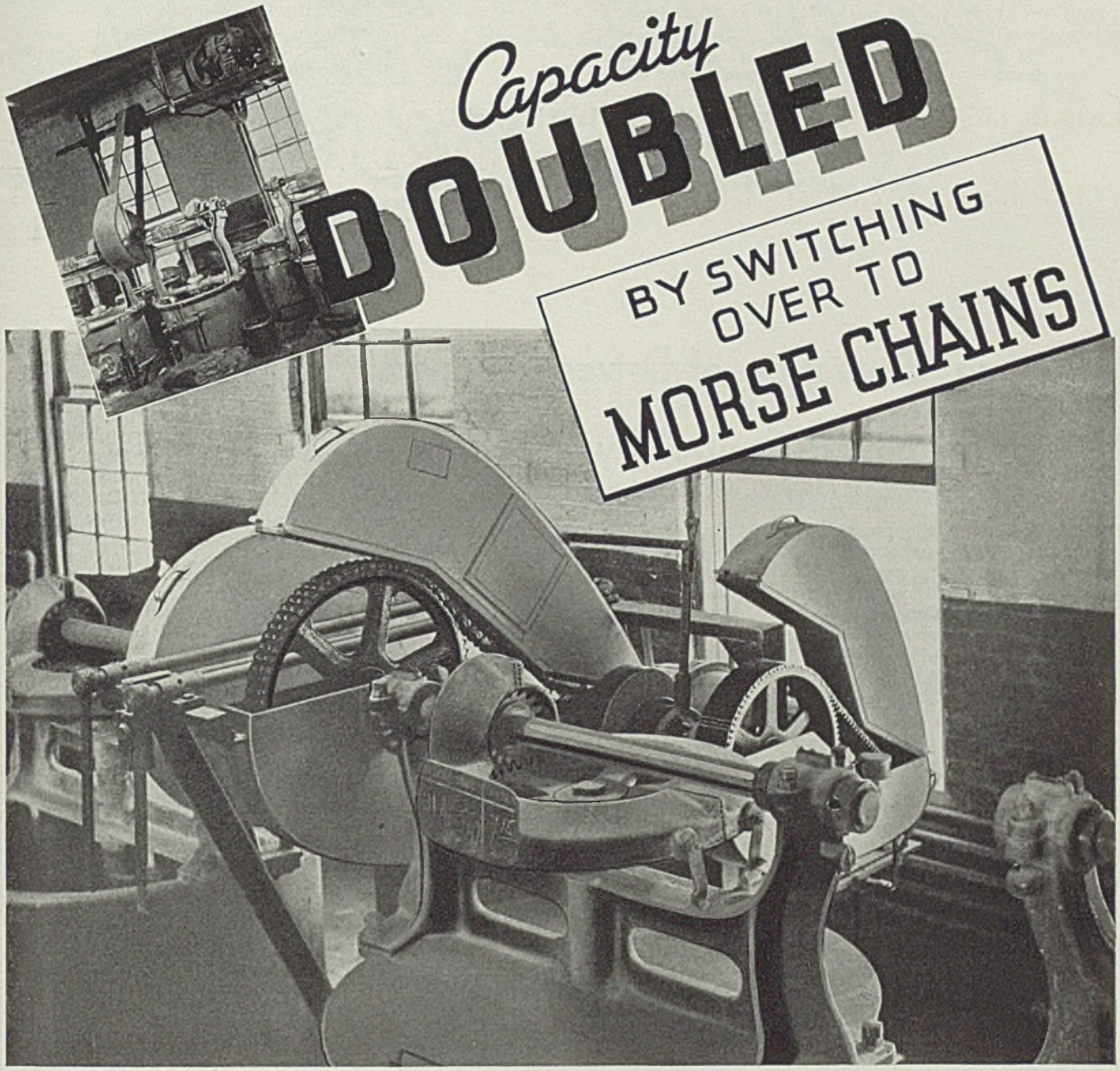
Resists Brine Solutions

Asphalt vehicle aluminum paints have been found superior to red lead linseed oil paint when tested under a refrigerating pump supplying brine to cold chambers.

SAME EQUIPMENT

Capacity DOUBLED

BY SWITCHING OVER TO MORSE CHAINS



"Doubling machine capacity" makes an interesting story in any plant. Here's how it was done, with the help of Morse Positive Drives, in the plant of a well-known paint manufacturer.

Former motor drives were V-belt to line shaft and tight and loose pulley drives to mixing machines. Morse silent chain drives to countershaft and Morse roller chains with friction clutches to mixers are now doing the job faster and better. Mixer capacity is doubled, due to uniform speed, without slippage, and to better action of mixing blades. The enclosed chain drives provide safety and protection for the operator and are also perfectly clean, throwing no dust or dirt into paint.

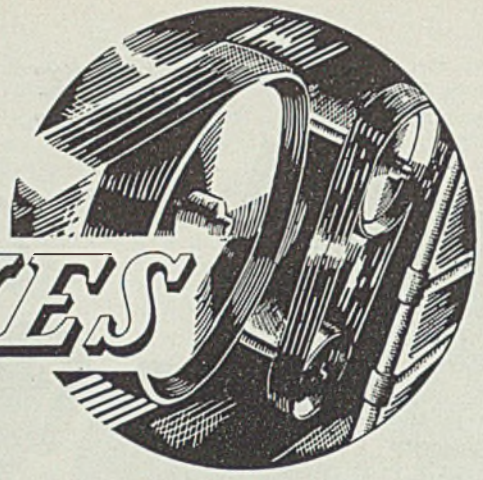
Whatever your drive problem may be, there is an answer to it in the comprehensive, performance-proven Morse line. Call in your local Morse engineer, or write us direct.

SILENT CHAINS ROLLER CHAINS FLEXIBLE COUPLINGS KELPO CLUTCHES

MORSE *positive* DRIVES

MORSE CHAIN COMPANY ITHACA N. Y. DIVISION BORG-WARNER CORP.

POWER DRIVES



Speeding Operation of Drives Through Use of Simplified Control System

TENDENCY in the operation of equipment is to simplify the control, either to make it automatic or to make it easier on the operator. Automatic control, which is applied to many operations, usually is also foolproof.

Wherever operations are to be performed in a fixed cycle with definite timing between sequential steps, seldom is it practicable to rely on the operator initiating each successive step. For example, in an automatic welding machine the steps in the welding operation are so timed and adjusted that when the two pieces of metal are inserted and clamped, pushing a button starts the machine and it stops when the weld is completed.

Timing Is Controlled

The current is turned on and off at the proper time, a step which could not possibly be controlled by the operator as the current is applied for considerably less than a second. Longer or shorter timing would result in a poor weld. Also, as the equipment operates automatically even to loosening the clamps and returning to the feeding position, the operator can get the next piece ready to insert when the completed weld is removed.

Similar automatic control of many conveyors traveling over a fixed route is designed to pick up a load, carry it to its destination, release it, and return automatically for the next load requiring only to be started and continuing until stopped unless something out of the routine interferes, whereupon it would stop automatically.

Machines operated by more than a single motor where the different steps or cycles are performed simultaneously or on a definite timed sequence increase production where a single control automatically handles the entire operation even to shutting off or stopping the unit when through.

An advantage of these controls is they operate neither too soon nor too late, without accidents nor delays. Also, the operator can go about other tasks while the machine is performing its cycle.

♦ ♦ ♦

Clutches at High Speeds

WITH high speeds clutch problems become increasingly difficult. In some cases clutches are installed on shafts operating at 400 revolutions per minute or more, whereas the clutch designer never had considered such speeds. Some types of clutches are better able to take such punishment than others. However, few clutch manufacturers welcome such applications for their equipment.

Whenever a clutch is to be operated at high speeds careful consideration must be given to the design, balance, bearings, evenness of application, friction surfaces, ease of adjustment and the opinion of the manufacturer of the clutch as to its ability to stand up under such services. Poor economy results from the use of anything but the best equipment available.

♦ ♦ ♦

Decreasing Vibration

VIBRATION due to unbalanced rotating machine or drive elements or to the shock of starting heavy cuts is often ignored, even though objectionable. However, when the machines or drives are located over office sections of a plant, serious complaints may arise.

For isolating such machines and drives numerous special insulations of lead, rubber and felt are available. If properly installed, according to the cause and direction of transmission of the vibration, these insulators operate very satisfactorily.

Sometimes the problem lies in eliminating the transmission of the shock or vibration back to the motor or driving mechanism. In such cases an extremely flexible connection, such as a V-belt, between the motor and the machine absorbs the shock.

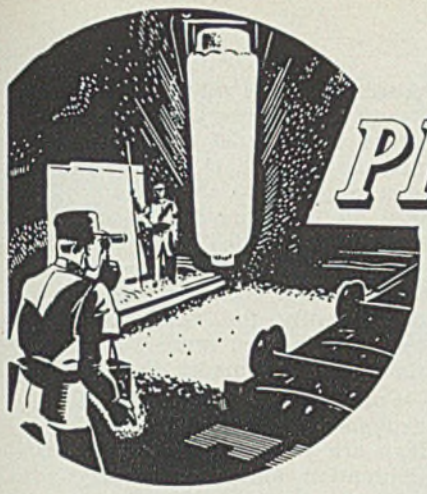
The number of multiple belts, however, should be increased above that required for a normal vibrationless drive to accommodate the extra shock loading. Generally such treatment also helps to decrease the amount of noise transmitted.

♦ ♦ ♦

Revisions Better Operation

MANY times a machine can be adapted to special work by slight modifications in the unit and in the application of power at lower cost than by having a special machine designed and built. For example, in one plant a profiling machine had been lineshaft driven. Both spindles were provided with individual motors, thus enabling the operator to use either or both spindles at any time. Convenient button switches permit reversing the motors so that either spindle can operate in either direction.

In another case a part requires three simultaneous machining operations to assure perfect alignment. For this three hollow mills are driven by separate fractional horsepower motors and the special chuck for holding the part is driven from the lineshaft. This provides four applications of power to a machine to complete three simultaneous operations and drive the work as well.



PROGRESS IN STEELMAKING

Electrogalvanizing Round Wire with Heavy Coatings—A Recent Development

ALTHOUGH electrogalvanizing of wire has been done extensively in Europe for a number of years, it is only recently that this process has been developed in this country to a point where it is commercially practical.

Before the World War, there were about 35 electrogalvanizing units for round wire operating in Europe which applied only light weights of coating up to about 0.30-ounce per square foot. By 1930 there were well over 50 units. Some of these were designed to coat wire with 1.0 ounce per square foot but most of the plants produce coatings of less than 0.50-ounce per square foot.

In the United States electrogalvanizing has been used extensively for a great many years for coating flat wire and narrow strip. The galvanizing on these products has been limited to light weights of coating.

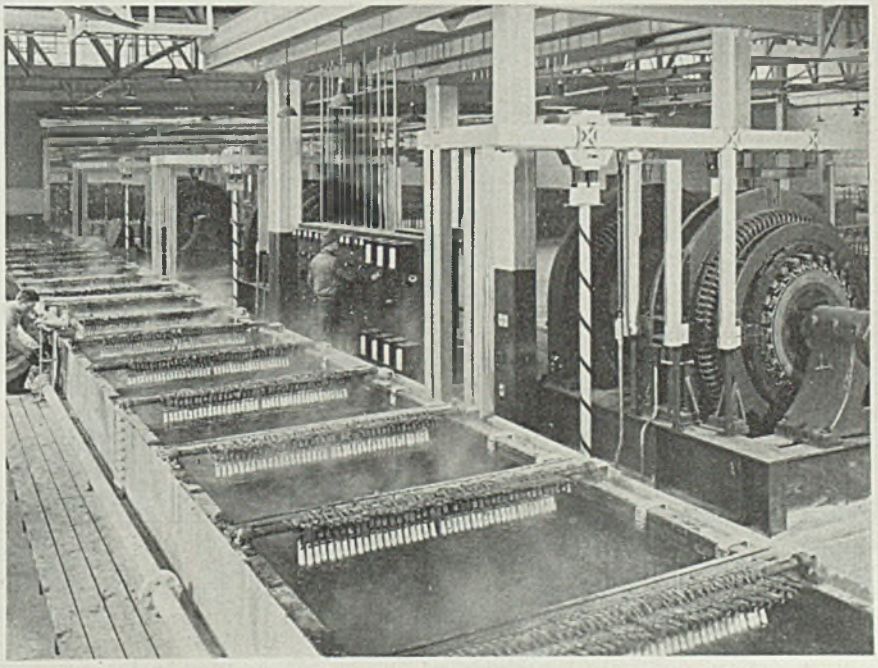
Ideal For Round Wire

Electrogalvanizing has long been regarded as the ideal way of galvanizing round wire. The coating thus applied is considered superior to hot galvanized because of its better adherence, greater uniformity, and purity. Certain difficulties have retarded the development of electrogalvanized round wire. These difficulties have been known for years and have only recently been solved.

Early solutions for electrogalvanizing permitted the use of current densities of 5 to 20 amperes per square foot of surface being galvanized. The deposition of zinc was so slow that in order to produce wire at commercial speed, the galvanizing tanks were prohibitively long.

The galvanizing solution used by Republic Steel Corp. at its new wire mill in South Chicago, Ill., is the result of extensive research. With this solution, it is possible to deposit on round wire brilliant coatings of utmost uniformity, remarkably ductile and without pores or pits, at current densities up to 1500 amperes per square foot. The development of a galvanizing solution that would deposit satisfactory coatings at high-current densities made possible the installation of a

CURRENT passes from four 15,000 - ampere motor-generator sets through large bus bars to 27 sets of porcelain insulated fingers to form contact with 40 strands of wire which pass through electrolytic bath continuously. Speed of wire travel, voltage and amperes determine the thickness of the pure zinc coating applied to the wire



BY C. C. CRANE

Metallurgist, Wire Division, Republic Steel Corp., South Chicago, Ill.

galvanizing unit operating at commercial speed with a galvanizing tank 140 feet long.

The next problem was that of cleaning, for a satisfactory galvanizing solution would not produce perfectly adherent coatings on imperfectly cleaned wire. Round wire is required to withstand more drastic adhesion tests than steel strip which has been successfully electrogalvanized for years. With the methods of cleaning strip, electrogalvanized coatings on round wire would not approach the degree of adhesion of the coatings on strip.

The compounds used in drawing round wire are imbedded in the surface and pores of the steel by the extreme pressure resulting from the reduction in area of the wire as it is being drawn.

Cleaning Is Problem

Numerous cleaning processes have been developed but have been discarded for one reason or another. Wire running at speeds comparable to speed used in hot galvanizing, necessarily are immersed in the cleaning bath a short time. Some processes were not sufficiently rapid; others were unable to give perfect cleaning. Some methods worked satisfactorily at first, but deteriorated rapidly while others produced undesirable effects on the physical properties of the wire.

Little detailed information is available on the methods of cleaning used in electrogalvanizing units operating in Europe. Some methods of cleaning used in the United States employ highly corrosive chemicals. The method of cleaning used by the Republic Steel Corp. is the result of experimental work with many processes. Although not involving highly corrosive reagents or high temperatures, the process not only thoroughly cleans the wire, but also etches the surface to the exact degree most favorable for firm adhesion of the pure zinc coating.

Coils of steel used throughout the mill are received in the cleaning house direct from the rod storage yard on a 25-ton broadside transfer conveyor, under push button control. They move through acid, rinse, sull and lime tanks, where they are treated under controlled temperature, and then pass along to the bakers, via the same 5-ton roller bearing crane that received them and took them through the cleaning tanks.

A continuous 2-lane conveyor carries the coils through the rod bakers under automatic control and at exact temperatures previous to being transferred to the wire drawing department, where coils are welded end-to-end for continuous drawing through one or another of the high-speed wire drawing machines, all with self-contained motors and blocks. These units, some of which are 4, 5 and 6-draft continuous machines with drawing speeds up to 1400 feet per minute on 0.0625-inch wire drawn from a 0.2070-inch diameter rod likewise are served by tramrail hoists and a battery of electric lift trucks which shift the wire to the storage, nail or galvanizing departments.

Forty wires pass through a single electrogalvanizing unit in one continuous operation which carries them from payoff reels, through a lead annealing furnace, a series of electric cleaning and pickle tanks, to the 140-foot electrogalvanizing cell, after a number of intermediate rinses. The wires pass through the plating tank in contact with porcelain insulated fingers 1 inch or so above the zinc anodes, from which the deposit is carried to the moving strands at current densities up to 1500 amperes per square foot. The finished wire, which is plated with an even ductile coating built up of 27 layers of pure zinc, is coiled on three takeup frames which are controlled individually as to speed and have a total of 40 individual reels. The resulting finish is both smooth and pliable, ideally suited for fence because of its workability and high resistance to corrosion.

Control Is Central

Approximately 43,000 gallons of solution is required for each electrogalvanizing bath. It circulates through a filter, three 10,000-gallon settling tanks and a cooling tower, all on platforms above the plating line, to insure constant uniformity of finish. Four 15,000-ampere motor-generator sets alongside supply power for the electrogalvanizing. Voltage and amperes, as well as the speed of wire travel through the entire line, are controlled from one point, so that all the facts which determine thickness of the coating can be read with one quick glance at the various meters.

Experience gained by the company in the continuous electrogalvanizing of strip has been useful in the development of electrogalvanized round wire. Because of the close control and uniformity of coating thickness, electrogalvanizing is used extensively where high-quality zinc coatings are required on strip steel.

The solution plates smoothly and efficiently at high-current densities without high acidity. The coating produced from this solution has a bright matte finish and retains its color in storage. The coating is dense, uniform, ductile, pure and adherent to the wire.

Zinc used in electrogalvanizing is 99.9 per cent pure. As the current passes from the zinc anodes into the solution, it carries zinc with it. Any small amount of impurities that may be present, if insoluble in the solution, drop to the bottom of the tank and later are filtered out. Any soluble impurities pass into solution; but the zinc is deposited more readily than these impurities, and consequently the zinc coating on the wire is even more nearly pure than the zinc anodes themselves.

Pure zinc is ductile. As already explained, electrogalvanized coatings are pure zinc, free from contamination and consequently wire with this pure zinc coating can be bent, twisted and deformed without the slightest injury to the coating. Even with coatings as heavy as 3 ounces per square foot, no cracking, peeling, flaking, spalling or dusting is encountered. This means that there will be no exposed area due to punishment in fabrication.

Current Controls Weight

The weight of zinc deposited on the wire is controlled by the current flowing from the anodes to the wire and the speed with which the wire passes through the electrogalvanizing tank. The amount of current flowing and the speed of the wire remain the same when once set for a given weight of coating per square foot of surface. As a result, the thickness of zinc coating is uniform from end to end of each coil and from one coil to another.

Electrogalvanizing does not cause any trace of embrittlement or softening. Rope wire or spring wire may be galvanized without effect on the physical properties.

The coating deposited on the wire is smooth, uniform, brilliant, dense and nonporous. Heavy coatings applied by this process are just as smooth, tough, adherent and uniform as the light weight coatings.

Redesigns Mixers

Patterson Foundry & Machine Co., East Liverpool, O., announces that its entire line of Typhoon portable power mixers has been redesigned. Reduction of weight has been attained by use of aluminum in construction. Weight savings result in as much as 10 pounds in the ¼-horsepower size. Polished aluminum and chromium plate finish is employed throughout. All mixers are fitted with fan-cooled, downdraft, self-ventilating motors as standard equipment and with starting switches built inside of motor frames. The efficient propellers insure complete mixing in the vertical plane and the adjustable shaft is equipped with a heavy duty guide bearing to eliminate whip.

Foundrymen at Forty-first A.F.A. Meeting

Confer on Foundry Technology

ON THIS and succeeding pages are reports of various technical sessions conducted during the forty-first annual convention and exposition of the American Foundrymen's association in Milwaukee, May 3-7. Additional reports will appear in next week's issue of STEEL.

Steel Casting

PROBLEMS relating to design, specifications, production and inspection of steel castings completely occupied the time of three technical sessions and a roundtable luncheon conference. Greatest interest centered about the subjects of design and inspection for it is in these fields that a need for education and enlightenment exists.

The topic of designing for steel castings was introduced by R. A. Bull, steel castings consultant, Chicago, at the first session at which H. D. Phillips, Dodge Steel Co., Philadelphia, presided. Major Bull presented excerpts from a preliminary manuscript for a booklet which the American Foundrymen's association has under preparation to guide mechanical engineers on proper design. This program for aiding designing engineers is sponsored by the association's recently constituted committee on design of steel castings. Having been delegated with the task of preparing the manuscript, Major Bull outlined the contents of the work and sought constructive criticism.

Intended for Consumers

By its very nature, the information contained in the manuscript is intended for consumers of castings. The chief difficulties, the speaker pointed out, are encountered with large production castings; failures with jobbing castings do not become generally known for obvious reasons. Only two principles are recognized generally by designers, namely, need for uniformity of section, and need for avoiding sharp corners. Other factors must be recognized.

He mentioned that today's tendency for streamlining in design, that is, using curves for angles, has produced difficulties in the way of more intricate design. Contractional stresses, Major Bull stated, frequently are overlooked, thereby causing defects. Compromises in design must be made in the interest of production of sound castings. Symmetrical lines should be sought. He mentioned also that it is sometimes better to lighten some heavy sections than to make light sections heavier.

Discuss Casting Design

In discussion, one speaker inquired as to the effect of chemical composition on design and Major Bull replied that he considered the matter of composition best not be considered under design. Foundrymen should be permitted to use their best judgment in the composition so that the castings produced would meet specifications satisfactorily. C. W. Briggs, physical metallurgist, naval research laboratory, Anacostia, D. C., asserted that mechanical engineers must have specific rather than general information regarding proper design, otherwise, they will continue to produce designs along the same lines as those in the past.

Another speaker suggested that some castings difficult to produce might be made in two or three simple castings and then joined into one unit by welding. Major Bull stated that some work had been done along this line, but it has not advanced sufficiently that definite recommendations are advisable at this time.

F. A. Melmoth, vice president, Detroit Steel Casting Co., Detroit, declared the chances are that designers are simply producing shapes and they have little idea as to how these shapes will perform when translated into metal. He admitted this might be regarded as a rabid statement. In his opinion, every designer should have had some experience in foundry practice so that he has some understanding of casting difficulties.

One speaker had referred to castings showing cracks when the manganese content of the steel was too low. Mr. Melmoth referred to this comment and replied that in his opinion it probably was not a case alone of the manganese being too low but a case of some condition in the steel itself which made the manganese too low.

Presenting the report of the committee on methods for producing steel for castings, Mr. Melmoth, chairman, said 1936 produced no striking developments in steelmaking processes. He called attention, however, to revival of interest in the Perrin process used in France and other European countries.

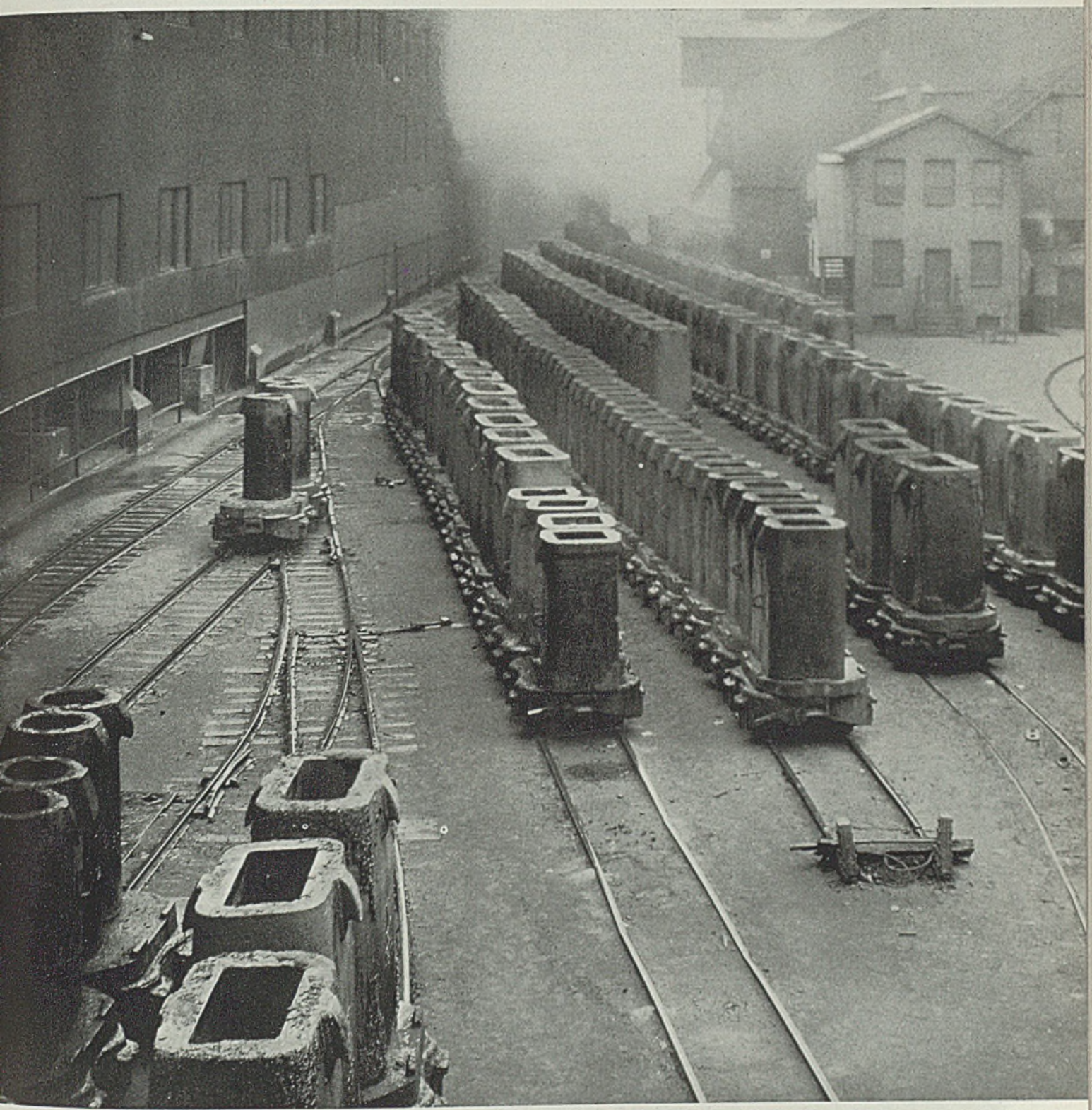
This process claims, by producing an intimate mixture of slag and metal, to so speed up the reactions occurring between the slag and metal that they occur in a very small proportion of the time normal in the orthodox steelmaking processes. The character of the slag can be varied to control the nature of the reaction desired, and when deoxidation is brought about by this means the claim is made that the oxygen content can be brought so low that the addition of silicon or aluminum produces no nonmetallic inclusions.

Describes Perrin Process

At the conclusion of this committee report, Jerome Strauss, vice president, Vanadium Corp. of America, Bridgeville, Pa., presented some interesting details of the Perrin process. He stated that it has been used in France for the past seven years in connection with the acid open-hearth process and now is being applied to bessemer practice. It is being studied in the United States in connection with both the open hearth and bessemer processes. One advantage of the process is its reproducibility. At present, its

For Half a Century

A LEADER IN INGOT MOULDS



VALLEY MOULD AND IRON CORPORATION

HUBBARD, OHIO

GENERAL OFFICES: HUBBARD, OHIO

suitability for steel for castings is not known.

J. M. Sampson, foundry engineer, General Electric Co., Schenectady, N. Y., presented the second report of the committee on test coupons, a committee of which he is chairman. Actual soundness of a casting is the most important requirement in securing a good result from any specimen, he emphasized. A speciment cut from certain sections so designed as to make it commercially unfeasible to prevent axial shrinkage should be appraised with the knowledge that the lower density occurs at a point that is for all practical purposes the neutral axis of the member and has little effect on the serviceability of the casting. However, for those castings subjected to pressure and corrosion the physics involved in solidification legislate against this center section being regarded merely as an area of low density. It is a microscopic void connected to the outside by one or more openings.

Specifications for steel castings usually cover allowable minimum values to be met for acceptance as to physical properties. In only a few specifications is the size of the test piece mentioned. It is believed, the report stated, that when specifications are drawn up, the required physical properties are based on actual results obtained over a period of time by a group of foundries and that these results are obtained from relatively small test coupons cast as an integral part of or gated to the casting. The physical properties thereby obtained are only a comparative measure of the analysis and its subsequent annealing, rather than an actual measure of the properties to be found in any of the various cross sections of the casting itself, or in test specimens taken from coupons of various cross section.

In making comparisons between different size coupons, the report concluded, location of coupons (cast integrally, gated to cast, or cast separately), or of tests cut from the casting section itself, they should be viewed with the following conditions in mind: (1) Density of the metal under a microscope, as an indication of the efficiency of the risers and the ability of the section to be fed from the risers; (2) effect of mass, particularly upon segregation of certain elements; (3) thermal effects, during heat treatment, particularly where heavy and light sections are involved.

Commenting upon this report, E. W. Campion, president, Bonney-Floyd Co., Columbus, O., stated that acceptance or rejection of coupon tests should not be taken as acceptance or rejection of a casting or lot of castings. Coupon tests, he said, are affected by many factors among which are design, foundry practice, rate of cooling, purity of metal, etc. Several speakers agreed that a grain of sand or small defect in a test bar can make the coupon test completely erratic.

Reporting as the A. F. A. representative on A.S.T.M. committee A-1 on specifications for steel, Mr. Campion commented upon the increasing number of specifications calling for nondestructive testing. This type of testing is in the formulative stage. To keep abreast of the situation, the A.F.A. is co-operating with the Steel Founders Society of America which has just appointed a new technical secretary to study this problem.

Cast Iron

CONSIDERABLE interest was displayed at the first session on gray cast iron. Hyman Bornstein, Deere & Co., Moline, Ill., officiated as chairman, and W. H. Spencer, Sealed Power Corp., Muskegon, Mich., as vice chairman. The first paper on the occurrence and control of ferrite, by R. H. Bancroft, Perfect Circle Co., Newcastle, Ind., and A. H. Dierker, Ohio State university, Columbus, O., showed that any given iron has a definite range of cooling rates within which a normal pearlitic structure will result, but higher or lower cooling

✦ ✦ ✦

Highlighting the

MILWAUKEE'S fine auditorium provided splendid facilities for the 1937 foundry show. Three exhibition halls in addition to the arena floor afforded ample space, yet the layout was sufficiently compact that little time was lost in getting from one section to another. The show was unquestionably the most attractive which the American Foundrymen's association has sponsored. Booths bore the modernistic,

rates will form different types of ferrite.

In discussion, Paul S. Lane, American Hammered Piston Ring division, Koppers Co., Baltimore, Md., stated that the phenomenon mentioned was known under a variety of names such as eutectic graphite, etc., and that Norbury and Morgan in England had been able to make it appear and disappear at will by gassing molten cast iron with carbon dioxide. M. F. Surls, Clark Tructractor Co., Buchannan, Mich., and Fred Sefing, International Nickel Co., Inc., New York, said that in their opinion, the furnace temperature during melting has an important effect on the final structure, and that iron with a total carbon of 3 per cent or under melted at 2900 degrees Fahr. would give primary ferrite.

Mr. Spencer mentioned that primary graphite formation was attributed to several causes, but that progress in its elimination was being made by control in slag and in melting conditions. Garnet Phillips, International Harvester Co., Chicago, stated that similar trouble in small gears was overcome by the addition of 0.35 per cent chromium.

A paper presented by J. A. Bowers and J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., dealt with the effect of coke size on cast iron melted in the cupola. The cupola employed was 21 inches in inside diameter, and the coke ranged in size from 1 to 4 inches. It was found that sulphur and carbon increase and silicon and manganese decrease with each decrease in coke size, and that after the first 8 to 10 ladles changes in the elements are practically unaffected by change in coke size.

In discussing the paper, R. F. Watson mentioned that in blast furnace practice an increase of 10 per cent in capacity and from 2700 to 2800 degrees in pouring temperature was noted by using sized coke. Mr. Bancroft asked if there was a possibility of setting up a schedule of coke sizes by mathematical analysis. Mr. MacKenzie replied that three variables involved made it a practical impossibility. Mr. Lyon, Wheeling Steel Corp., Wheeling, W. Va., said that his company found it necessary to supply sized coke to meet requirements of various sized cupolas, particularly those of small diameter. P. T. Bancroft, Moline, Ill., stressed the necessity of using uniform coke sizes in the cupola if the best results are desired.

A paper by H. H. Judson, Goulds Pumps Inc., Seneca Falls, N. Y., on founding of pressure castings, discussed the two-cupola process used in his plant to produce a high test cast iron. The iron freezes at 2400 degrees Fahr., and it must be poured hot. Also, large risers must be used for feeding. In discussion, John Grennan, University of Michigan, Ann Arbor, Mich., asked about arbitration test bars to which Mr. Judson replied that they were not used. Tests are performed on sections taken from castings broken under pressure testing to destruction.

Malleable Iron

PROPERTIES of fully annealed and heat treated malleable iron was the subject of a paper by R. Schneidewind and A. E. White, University of Michigan, Ann Arbor, Mich., at a meeting presided over by P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill., and E. A. Gullberg, Deere & Co., Moline, Ill.

The paper, profusely illustrated with tables and micrographs, contained the results of an unusually thorough investigation of the subject as conducted at the university.

A study was made of the properties of malleable iron in the fully annealed and in two heat treated (quench and draw) conditions. Purpose of the investigation was twofold, to determine whether quick anneal white irons for malleableizing could be purchased successfully on the basis of chemical specification, and second, to present rather complete physical property data for the designing engineer. It was found that three irons purchased on chem-

Show with STEEL

streamline touch which is doing much to make industrial exhibitions more appealing. Considerable use was made of color lighting effects, moving elements, and motion pictures.

* * *

Mathews Conveyer Co., Ellwood City, Pa., demonstrated the shock absorbing performance of its recently developed resiliently-mounted roller conveyor by lowering a 1900-pound steel billet roughly onto a short section of the conveyor. This demonstration attracted much attention when the billet was pushed back and forth on the conveyor, the spring-mounted rollers rose or fell to assume their proportionate share of the load.

* * *

A portable electric-driven central vacuum cleaning system recommended for foundry use was in operation in the booth of the Spencer Turbine Co., Hartford, Conn. Picking up a miscellaneous collection of bolts, nuts and washers, a machine gun effect was produced as these objects were deposited within the steel shell.

* * *

A chrome-plated working model of a car-type mold conveyor drew attention to the exhibit of the C. O. Bartlett & Snow Co., Cleveland, in much the same manner that miniature electric trains attract "boys" of from 5 to 75. Features of the equipment which the model emphasized were smoothness of operation and a table which prevents sand from falling through on the driving mechanism.

* * *

A large wall mural in the space occupied by the American Foundry Equipment Co., Mishawaka, Ind., depicted the evolution of metal cleaning from 1850 to 1937. Individual panels represented the various stages including wire brushing, tumbling, sand blasting, tumbling and sand blasting, typical pressure blast installation and finally the company's Wheelabrator tum blast.

* * *

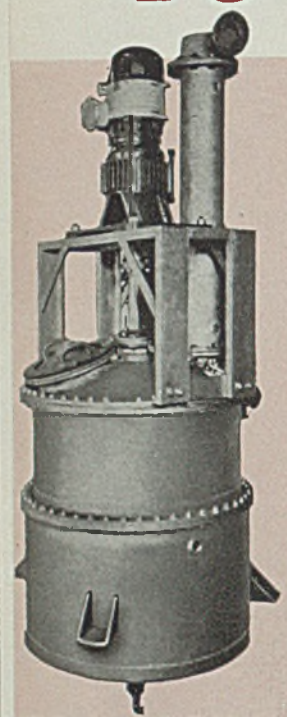
Most massive piece of equipment was a motive junior model of sandslinger operated by the Beardsley & Piper Co., Chicago. This equipment moved back and forth on a short track and deposited conditioned sand in piles where desired.

* * *

Christened the "S. S. Pangborn," the booth of the Pangborn Corp., Hagerstown, Md., bore a distinctive marine atmosphere. What with life preservers, boat rail, a cabin, and all attendants attired in blue serge coats, white flannels and officers' caps, the setting was thoroughly "see worthy." Inside the cabin were shown moving pictures of the blast cleaning and dust control equipment in operation in foundries. Smooth sailing weather prevailed throughout the show.

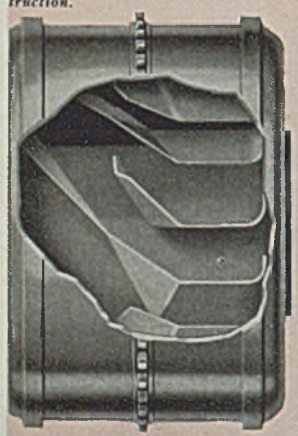
Another advantage of Rolled Steel Design..

YOU PICK YOUR STEEL



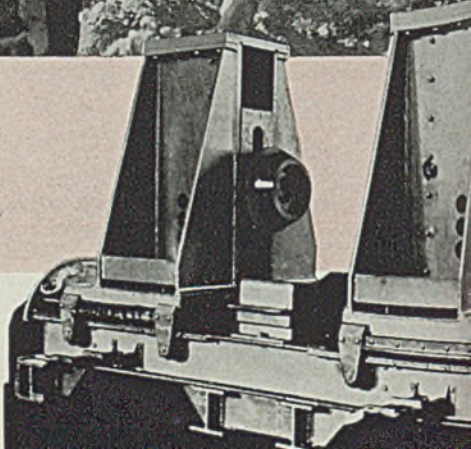
USS Stainless Steel (18-8 Stabilized) is often the best choice for welded chemical machinery like this power agitated autoclave, because it will last indefinitely and will not contaminate most corrosive products. This special modification of USS Stainless Steel can be cut, fabricated and welded with no loss in its corrosion-resistance.

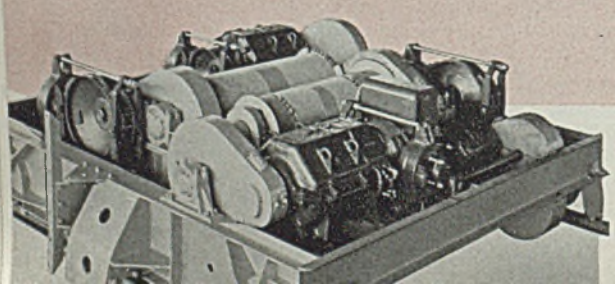
In construction like this concrete mixing drum USS Abrasion-Resisting Steel withstands the constant pound and grind, reduces breakage, ensures long life. A difficult unit to build unless you use rolled steel and welded construction.



30 CUBIC YARDS AT ONE GULP! *USS* MAN-TEN *all welded rolled steel construction gives this heavy duty dipper the strength and abrasion resistance to keep it on the job in this grueling service. The thousands of pounds of weight* MAN-TEN *construction saves can be converted into increased dipper capacity making it possible for the shovel to do more work with no increase in power.*

(Right) *Welded Rolled Steel and steel castings are combined in this cone-type uncoiler for tin plate mill to realize the most efficient and economical construction. Correct design and the proper selection of materials make this unit strong, rigid, free from vibration, eminently practical from every point of view.*





(Left) *USS* MAN-TEN *rolled steel construction gives this trolley the safety that crane equipment demands. With tensile strength of 85,000 lb. per. sq. in. min. and yield point of 55,000 lb. per. sq. in. min.* MAN-TEN *permits weight reduction far below conventional construction, without any sacrifice of strength or lasting qualities.*

TO FIT YOUR JOB

from an amazing variety of "staple" and "special" steels

ROLLED steel design—the technique of building up heavy machine beds, frames, supports, housings, wheels, drums, etc. by welding together component parts of rolled steel cut-to-shape—offers many important advantages:—

Rolled steel is highly uniform; it reduces the possibility of failure in service due to blow holes, segregation and non-uniform structure.

Rolled steel's physical properties are readily determined from the actual section being used and the properties are very uniform throughout the metal.

Rolled steel is free from brittleness, possesses excellent fatigue properties.

Rolled steel design eliminates the costly pattern problem, the shrinkage problem, and the necessity of adapting designs for pattern draw and metal flow.

Rolled steel design trims off all parasite poundage, all metal not actually needed to carry stresses or provide rigidity. It often reduces dead weight by half and more.

Rolled steel design looks modern and is modern, eliminates useless ornamentation, employs straight lines and plane surfaces. It increases eye appeal and saleability.

Rolled steel permits machine design to be mobile and liquid; makes possible the quick incorporation of style changes, model changes and new improvements without costly pattern write-offs.

In general, rolled steel design (economically combined with castings at strategic points) is the cheapest, strongest, safest, most attractive method of machine construction.

IN ADDITION—and this is perhaps its most important advantage—*rolled steel design enables you to make use of a great variety of special shapes and special steels.*

Various products such as billets, slabs, bars, pipe, tubing, forgings, rolled sections, etc. simplify the cost and difficulties of fabrication.

Special steels provide special properties where you need them to overcome various destructive forces. Higher hardening steels to carry heavier bearing pressures. Fatigue-resisting steels. Heat-resisting steels. Abrasion-resisting steels. High tensile steels for high unit stresses. Stainless steels for corrosion resistance. A special steel with special properties for virtually every special need.

To machine designers, fabricators, foundries, and welderies . . . we offer the widest range of special steels. Grade for grade, they are the finest steels it is now possible to make.

SPECIAL STEELS WITH SPECIAL PROPERTIES

to overcome destructive forces

Here is just a sample of the variety of special steels we offer—special steels to make your designs stronger or harder or abrasion-resistant or heat-resistant or fatigue-resistant or corrosion-resistant or whatever-you-need.

USS High Tensile Steels
- USS COR-TEN
- USS MAN-TEN
- USS SIL-TEN

USS Steel for Low Temperature Service

USS Abrasion-Resisting Steel

USS 11/14% Manganese Steel

USS Stainless Steels

USS Carilloy Alloy Steels

OPPORTUNITY

Perhaps the greatest opportunity to improve present heavy machinery lies in the skillful combination of rolled steel and castings . . . and the specification, for each rolled steel part, of the precise steel most suitable to overcome the destructive forces to which that part will be subject in service.

For example, it will often be advantageous to combine in one unit a section of USS A-R Steel to resist abrasion at a certain point, with USS High Tensile Steels to provide strength and save weight, and with a grade of USS Carilloy to carry heavy bearing stresses.

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

USS

UNITED STATES STEEL

ical specification varied somewhat with regard to the rate of breakdown of the cementite, but the tensile values and moduli of elasticity of the three irons showed fair agreement.

Properties in tension, compression, torsion, bending, fatigue, impact and hardness were determined at room temperatures. Results of the irons in the heat treated condition showed strengths which should prove attractive for many types of service. The torsion properties, due to the presence of temper carbon, are not so favorable. Tension and impact values were determined at temperatures of 400 and 800 degrees Fahr.

Microstructures of the quenched and drawn samples showed a spheroidized matrix which was compared with the pearlitic structure obtained by slowly cooling through the critical stage. Effects of a few alloys on the structure of slowly cooled irons also were shown.

Replying to remarks by J. W. Hamilton, Vanadium Corp. of America, New York, the speaker admitted that small surface defects on the test bars might be responsible for more or less variation in the results. Carl Joseph, Saginaw Malleable division, General Motors Co., stated that his company produces a quick anneal metal regularly with elongation up to 5 per cent and tensile strength over 85,000 pounds per square inch.

Study Shrinkage

Report of a committee appointed to conduct an investigation on the effect of the carbon content on shrinkage of malleable iron was presented by James Lansing Malleable Iron Society. Eight foundries cooperated in supplying the material for the tests. Pig iron in the charges varied from 10 to 40 per cent. Metal was poured at temperatures ranging from 2760 to 2775 degrees Fahr. Carbon content of the castings ranged from 2.00 to 2.75 per cent. In the preliminary castings all samples showed slight shrinkage at the gates and under the risers. However, the speaker pointed out that a change in the gating system eliminated this form of defect. Net result of the investigation showed that the carbon content does not affect the shrinkage factor. Many other variable factors are responsible, but all are amenable to good foundry practice.

Job Evaluation

STATING that the variety of problems arising from a mounting tax burden, increases in material costs, and the cost of labor have brought about the necessity of more scientific methods of rating and pricing jobs, H. S. Washburn, Plainville Casting Co., Plainville, Conn., presided at the first session on management and job evaluation.

Bertram Miller, supervisor, planning and wage department, General Electric Co., Erie, Pa., presented a talk on "Job Evaluation for Rate Setting," in which he defined job evaluation as a procedure designed to establish a wage rate for each job in the foundry. The job and not the individual on that job is being evaluated, he said. Two rates are commonly referred to in connection with job evaluation or wage payment plans, the anticipated day work rate, representative of the average efficiency of a worker, and the anticipated incentive rate, used to establish piece prices or standard cost as a result of detail time analysis.

Setting Up Job System

The speaker was concerned primarily with the establishment of anticipated day work rates, in his discussion. The system set up by the General Electric Co. involves the following steps: Determination of job characteristics affecting job values; development of a list of key jobs; establishment of a common denominator for each characteristic; relative value of the characteristics; and development of a value per point to compute rates consistent with company policy. These steps were presented in detail by Mr. Miller.

Skill, mental and physical application, responsibility and working conditions are the four characteristics of a job according to the speaker. He used the diemaker, craneman, sandblast operator and sweeper as representative, to illustrate the method used in preparing a key list for each of the previously mentioned characteristics. The point system of measurement was described, by which the various characteristics are measured and weighted, each point possessing the same value whether it be applied to a sweeper or highly skilled operator. According to Mr. Miller, points assigned represent the respective value of each characteristic over the base value which has been set at 400 points.

Employe's advantages derived from this system were given by the speaker as: Establishment of a fair anticipated earned rate; full recognition to skilled work; and an absolutely fair rate structure. Employer's advantages are: A requirement that payment be made for what the job is worth for the specific operation; elimination of labor trouble; and a direct means of comparing jobs of like requirements.

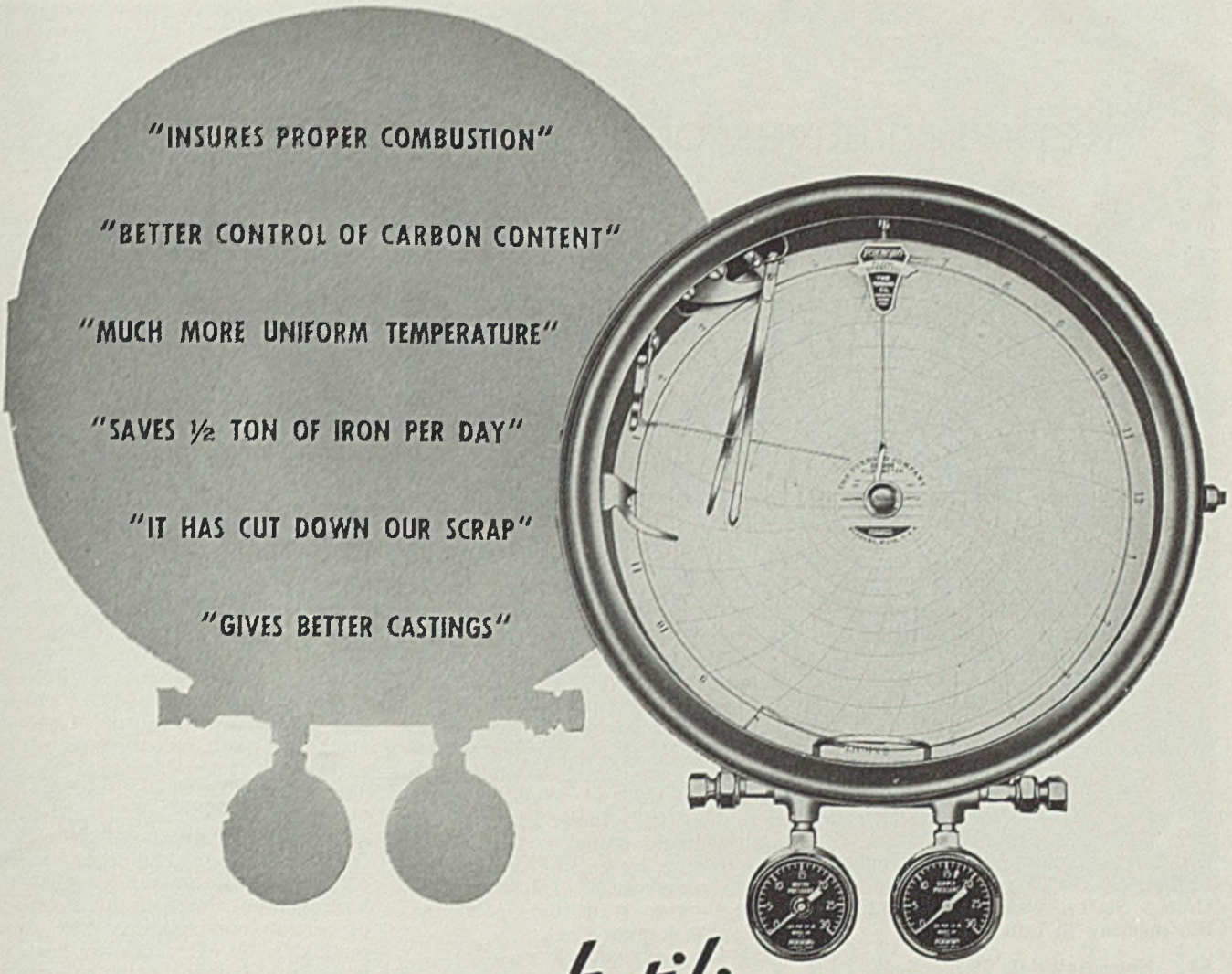
"Time-Motion Study and Job Standardization" was the subject dealt with by H. C. Robson, operating superintendent, Link-Belt Co., Chicago. The speaker outlined briefly the development of modern business and growth of industry through the years. The first requirement of production is a scientific investigation of needs and methods calculated to restore the centralization of knowledge, he said.

With that as a premise, the speaker went directly to a discussion of scientific management and job standardization. Time and motion study, in the opinion of Mr. Robson, is a study of habits and a determination by careful analysis of what the best habits would be for performing a given task. Results of standardization are increased production and better labor relations. The foreman's approximate estimate as against the accuracy of a system was pointed out emphatically during the speaker's talk. Mr. Robson devoted considerable time to the varied phases of job standardization, including wage payments, use of charts and graphs, analysis, co-operation between time study man and workmen, etc. Some applications of the system at the Link-Belt Co. were presented and analyzed, showing graphs used for time allowances and classifications as to types of work. Mr. Robson completed his talk by showing motion pictures of the company's equipment and operation, time taken for work, steps taken in various jobs, etc., before and after the application of an efficient, time saving and cost reducing job standardization, time-motion study.

Discussion Is Pertinent

Valuable points were brought out in the general discussion. Albert J. Messmer, Messmer Brass Co., St. Louis, asked Mr. Robson how many men could work on the Link-Belt Co. efficiency unit, the point being brought out that it could be set up for as many men as desired. William J. Grede, Liberty Foundry Inc., Milwaukee, prompted consideration of repeat molds and their connection with the job system. F. C. Nus, John Deere Tractor Co., Waterloo, Iowa, and John Thwaites, Beatty Bros. Iron Co., Ontario, Canada, discussed the use of committees for evaluating jobs, with the assistance of Mr. Miller.

Compensation for the length of time a job runs was discussed by A. E. Hageboeck, Frank Foundries Co., Moline, Ill., and Augustus Kelly, R. Hoe & Co., Dunellen, N. J., asked about the application of a standardization system with reference to a first class skilled molder as against a first-class patternmaker. T. S. Quinn, Lebanon Steel Foundry, Lebanon, Pa., William C. Atwater, Lennox Furnace Co., Marshalltown, Iowa, and Mr. Washburn also made suggestions and gave their reactions to the use of an evaluation and standardization system.



FOUNDRY after FOUNDRY *testifies*

...to better castings at less cost this modern way

Foundries everywhere who have adopted Foxboro Cupola Air Weight Controllers are enthusiastic over the results. The comments listed above are from typical letters, indicating the improved quality of castings, hotter iron and increased production which are obtained invariably.

Not only several large automobile foundries but smaller foundries in all parts of the country are profiting through the use of Foxboro Air Weight Controllers. Bear in mind they are not expensive and can be used with your present blower equipment. Moreover, they are simple . . . easy to install . . . and easy to operate.

Take advantage of the immediate savings and improvement in castings which you can obtain. Complete information is yours for the asking. The Foxboro Company, 118 Neponset Avenue, Foxboro, Mass., U. S. A. Branch offices in 25 Principal Cities.

FOXBORO

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CUPOLA AIR WEIGHT CONTROLLER

RESPONSE · ACCURACY

Representatives of 25 Countries Attend International Congress at London

MORE than 200 papers were submitted at the second congress, since the World war, of the International Association for Testing Materials held at London, April 19-24. In attendance at the congress were representatives of 25 countries. The next meeting is scheduled to be held at Berlin three to five years hence and Prof. Dr. Ing. Goerens of Germany, a vice president of the association was named president to serve until the next meeting. General secretary of the association is Prof. Dr. Ing. M. Ros, Materialprufungsanstalt, Zurich, Switzerland. W. H. Fulweiler, Philadelphia, vice president for the United States, was not present at the meeting in London.

New Materials Demanded

Sir William Bragg, outgoing president, declared that the world now demands materials which until recently were considered as impossible of production. Of great importance for the future, he declared, are present studies on creep of metals, surface hardening, corrosion and the possibilities of alloying. One of the great developments that has advanced such studies is the use of the X-ray method of examination.

An important paper, entitled "Laboratory Tests in Relation to the Serviceability of Steel and Steel Products," was submitted by Sir Robert A. Hadfield and S. A. Main, Hadfield's Ltd., Sheffield, England. The authors stressed the fact that actual experience in service of similar character is the only satisfactory basis for successful applications. They recommended those types of laboratory tests which determine the properties required under the service conditions encountered. Laboratory tests, they said, are of little use where steel is employed purely for its mechanical properties. They expressed a high regard for the use of the Fremont and Wheeler and Smith tests in the shop and they thought that the Haskell machine now successfully used in the United States had great possibilities for usefulness. Other papers dealing with relations between laboratory test and service results were contributed by research workers from Austria, Czecho-Slovakia, Rumania and Switzerland.

For the first time at one of these meetings electron interference and emissivity were discussed. Four papers on this subject were delivered. Dr. W. G. Burgers, of the N. V. Philips lamp works laboratory, Eindhoven, Holland, exhibited a remarkable film actually showing the occurrence of transitions of structure in iron by raising and lowering the temperature of an iron strip through the transition point at about 900 degrees Cent.

Dr. Ing. M. Niessner, Vienna, contributed a paper entitled "Microchemical Research of the Surface of Metallic Materials." Prof. A. R. Matthis, Charleroi, Belgium, read one entitled "The Determination of the Uniformity of a Zinc Layer." W. H. Dearden, University of Bristol, Bristol, England, contributed one entitled "The Preparation of Specimens for Macro and Micro Examination." A paper by Prof. Dr. Koster, Kaiser Wilhelm Institut for Metallforschung, Stuttgart, Germany, was entitled "Progress in Microscopic Research on Metals." Dr. F. F. Lucas, Bell Telephone Laboratories Inc., New York, submitted a paper entitled "Progress in Microscopy."

In discussion, Prof. C. Benedicks, Sweden, said he did not quite agree with a statement by Dr. Koster that the limit of magnification obtainable in microscopic examinations has been reached on the basis of what existing theory enables us to hope. Dr. C. H. Desch, National physical laboratory, Teddington, England, referring to the paper by Dr. Lucas, said the author had shown that small particles of carbide now are observable in a way that would not have been thought possible by the old theories.

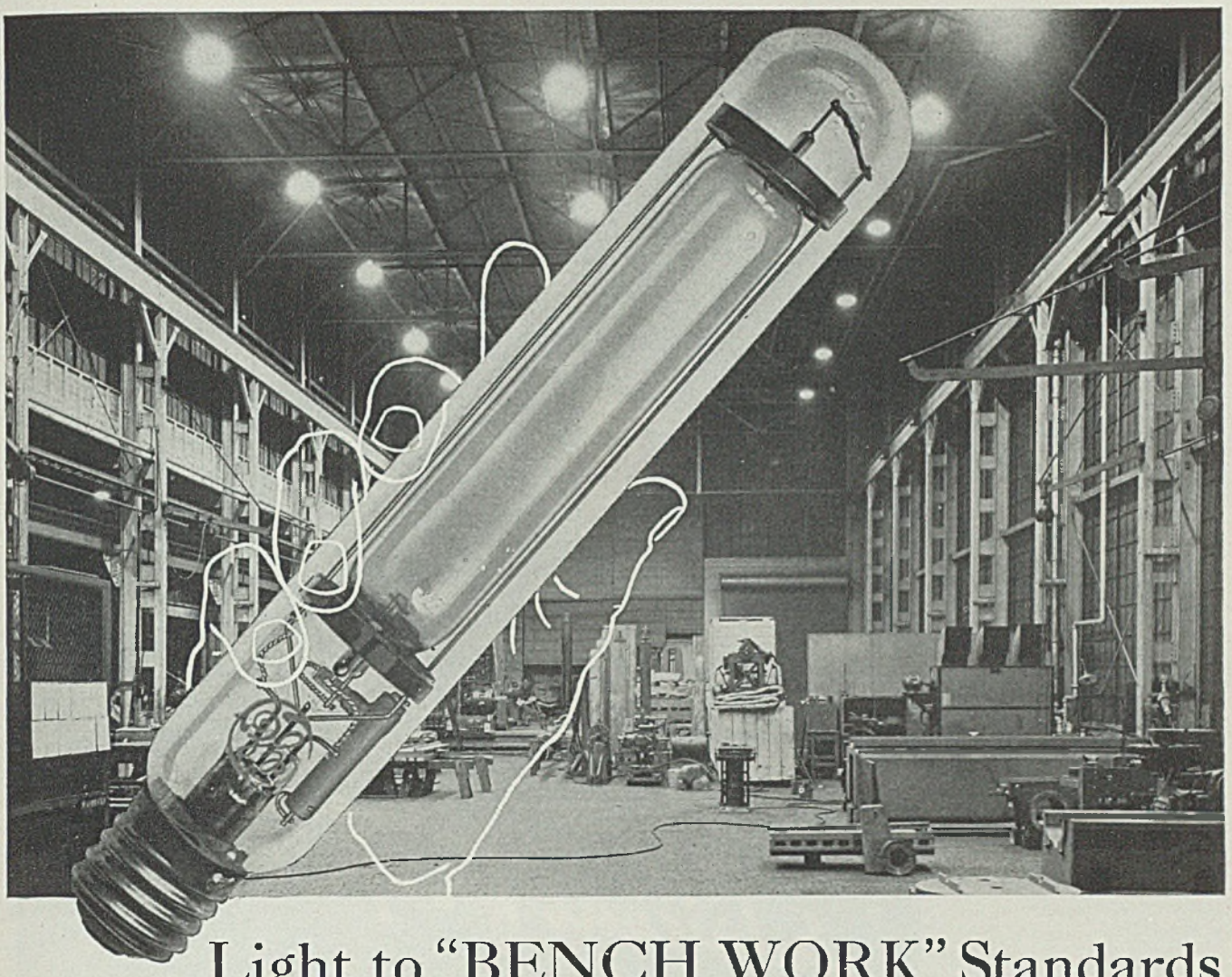
A contribution by R. Castro, Savoie, France, on "Methods of Measuring the Oxygen and Oxides in Iron and Steel," was summarized by Prof. Dr. A. M. Portevin, Paris. The paper was devoted to three methods. One is the "residual" method, requiring an iron solvent that does not attack the inclusions, which in many cases is difficult. Certain chlorine and iodine methods can be used with certain types of steel and more recently the use of iodine has been developed by the author and had given good results. It was pointed out that good results also had been obtained by the electrolytic method. The second method discussed is that of reduction by hydrogen but this is limited to steels of certain composition. The third method is by extraction by heat, in which the oxygen is totally extracted by reduction through carbon in vacuum and this method was considered as now well established.

Extraction of Inclusions

In a paper entitled "Electrolytic Extraction of the Non-Metallic Inclusions in Iron and Steel," Prof. A. Skapski, Mining academy, Cracow, Poland, expressed his belief that the electrolytic method and particularly the citrate method promise further development. Helge Lofquist, Stockholm, Sweden, submitted a paper on "Progress of Knowledge on Slag Inclusions."

In discussion, Dr. T. Swinden, United Steel Companies Ltd., Sheffield, England, said it is not yet possible by mechanical methods to study individually the mineral constituents of inclusions in steel. Sulphides and phosphides, he said, interfere with the results in using the iodine-alcohol method. The problem is twofold, he said, one of determining the inclusions and one of determining the oxygen in steel in such a way that the method can be used by the steelmaker.

In a paper entitled "The Solidification of Ingots," Dr. C. H. Desch said that the manner of solidification of an ingot may affect the prop-



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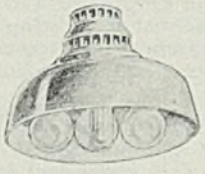

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1 GULF LUBCOTES are heavy bodied products especially manufactured to have the requisite property of high adhesiveness for metal surfaces necessary in lubricants for open gears.

2 Due to selected crudes used and to the process of refinement employed, GULF LUBCOTES possess unusual lubricating qualities together with the essential property of flowing with the movement of the gear and pinion teeth.

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erties of forged or rolled material in two ways, through the shape and arrangement of the crystals and through uneven distribution of chemical constituents. These two factors are not independent but are determined by the process of solidification. He regarded the solidification of ingots as still a controversial subject.

In a paper entitled "The Phenomenon of Creep Recovery," H. J. Tapsell, national physical laboratory, Teddington, England, said that when a load is removed from a metal under stress part of the creep is recovered. If the load is only partially removed creep sets in again after a partial recovery. The recovery of creep may go on for thousands of hours. Dr. C. L. Clark and Dr. A. E. White, University of Michigan, Ann Arbor, Mich., submitted a paper entitled "The Mechanism of the Creep of Metals." A. Nadal, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., described a machine used in the Westinghouse laboratories for conducting rapid, constant strain rate tests on steel.

Study Creep Recovery

In discussion, Dr. R. W. Bailey, Metropolitan-Vickers Electrical Co. Ltd., Manchester, England, said it is doubtful if the study of creep recovery will greatly help to unravel the problem of the actual process of creep. He described a simple experiment by which the facts brought out in Mr. Tapsell's paper could be found. He did not agree with Drs. Clark and White that carbides have the amount of influence on the stiffening of steel indicated in their paper. Professor C. Benedicks, Sweden, considered that the discovery of creep recovery was a very important point, and he suggested the possibility that surface tension might be a cause of the contraction of steel after the stress has been removed. Dr. Jenkins and Dr. Hatfield both expressed the opinion that the phenomenon of creep is mainly due to recrystallization.

Four papers were devoted to the discussion of creep testing methods. L. Gottignies, University of Brussels, contributed a paper on "The Resistance of Plastic Deformations of Steels Under Stress at High Temperatures."

Dr. R. W. Bailey, in a paper entitled "Creep and Engineering Design," said the addition of certain alloys to steel was beneficial up to certain temperatures, but that when the steel was under service at high temperatures for long periods the addition of certain alloys, such as chromium, tended to increase softness. He thought short-time creep tests are not good enough for the purpose of finding the engineering value of a steel which is to be under service at high temperatures during long periods. It was pointed out in discussion that if low carbon steels are used the softening effect of chromium above certain temperatures is not so noticeable. Prof. P. Chevenard, stated that properties of metals at high temperatures are complicated, especially for industrial alloy steels that have been heat treated. He pointed out that the effects of heat treatment differ according as to whether the metal is under stress or not; therefore, experiments must be made over long periods. Laboratory tests give only approximate results; practice alone under service conditions can give true results.

Creep Test Results

A group of five papers dealt with testing results. The first, by Dr. Ing. V. Jares and Dr. Ing. L. Jenicek, Prague, was followed by a paper entitled "Creep As Occurring in Different Steels Under Service Conditions," by Dr. W. H. Hatfield, in which the author scheduled the steels used in service at the Brown-Firth works at Sheffield. He stated that, up to a point, his results confirmed Dr. Bailey's remarks on the softening effect of chromium above 550 degrees. He expressed the opinion that some new alloy steels must be found for use under service at high temperatures in order that the engineer may have a range of steels which can be used for a long period at such temperatures.

A paper entitled "Interpretation and Use of Creep Results," was contributed by J. J. Kanter, Crane Co., Chicago. A paper entitled "Effect of Temperature on the Properties of Steels," was submitted by C. E. MacQuigg, Union Carbide & Carbon Research Laboratories, New York.

In discussion, Dr. Rohn, correspondent for Germany of the Institute of Metals, stated that the behavior of metals changes at the point of recrystallization, and he pointed out that most of the research work has been done at temperatures below that point. Professor Portevin emphasized this point, particularly as regards the distinction between the recovery of the lattice and recrystallization. He cited the case of iron which, having absorbed some hydrogen, becomes hard after cold-working; this is due to lattice deformation, as shown by the fact that the hardness is maintained even when the hydrogen has been taken out. If the sample is reheated, one obtains, at the same time, lattice recovery and recrystallization, with diminution of the hardness. It is, therefore, possible to harden a metal by introducing certain atoms and taking them out again.

Two papers dealt with bending or impact properties. One, by Prof. Dr. Ing. G. Welter, Technische Hochschule, Warsaw, Poland, described a special bending and impact test machine for observation under varying temperatures. This was followed by a contribution by Prof. Dr. Ing. Vicente I. Garcia, University of Montevideo, Uruguay, on "The Tensile Test By Shock of Metals," in which a specially stepped test-piece having two diameters was described. Professor Duvez, Belgium, described a less complicated test-piece.

Five papers dealt with chemical properties of metals. Following a paper by Prof. Dr. Ing. E. Houdremont and Dr. G. Bandel, of Fried. Krupp, Essen, Germany, Dr. U. R. Evans, of the metallurgical laboratories of Cambridge University, Cambridge, England, gave a paper entitled "Corrosion As Influenced By Increased Temperature." The author emphasized the essential difference between the rules and formulae given in the laboratory and in engineering practice. He pointed out that while corrodibility usually increases with temperature, the reverse does sometimes happen as, for instance, in boiler tube economizers. When there is condensation, there may be a very high degree of corrosion, which depends mainly on the nature of the materials and the atmosphere with which they are in contact.

High Temperature Papers

Dr. C. H. M. Jenkins, national physical laboratory, Teddington, England, introduced a paper entitled "Chemical Properties and Stability of Metals at High Temperatures" and this was followed by a contribution by Prof. Dr. A. Krupkowski, of the Mines Academy, Cracow, Poland, on "The Rate of Oxidation of Liquid Metals." Professor Portevin drew attention to the practical interest of Prof. Krupkowski's paper, especially as regards the foundry and autogenous welding. He explained that when oxides are insoluble in metal they cause difficulties in casting, and he cited the case of aluminum, where the difficulty is still greater in regard to welding. A skin of alumina forms and this has an influence on the surface tension of the molten metal. Such oxide skins can be done away with by the use of fluxes, but if they penetrate inside the metal they will cause cracks. On the other hand, such oxide skins are sometimes used deliberately to protect the liquid metal against further oxidation, and for that purpose aluminum is used in small quantities in the melting of copper and silver. A paper entitled "Regarding the Factors Influencing Corrosion at Increased Temperature" was presented by Prof. Carl Benedicks.

Papers on testing methods and results included a contribution from

Prof. A. Portevin, E. Pretet and H. Jolivet on "Recent Progress and Applications of the Study of Gaseous Corrosion." In summarizing the paper, Professor Portevin said that next to the quantitative study of oxidation it is necessary to know the chemical and physical characteristics of the oxide. In this connection, some oxide skins are so fine that it is impossible to detach them without destroying them, but it is possible to analyze them by means of the electron refraction method.

High Temperature Behavior

Another paper on the corrosion and oxidation at high temperatures of nonferrous metals was given by Dr. W. Rohn. Dr. Sven Brennert, of A. Bol. Separator, Stockholm, Sweden, contributed a paper on "Influence of Temperature on the Formation of Pitting in Stainless Steel." F. E. Bash, Driver-Harris Co., Harrison, N. J., gave a paper entitled "Testing High-Endurance Oxidation-Resistant Alloys," in which were described this company's methods for controlling production quality and for the development of new and improved materials for high temperature applications. A paper by Prof. S. L. Hoyt and M. A. Scheil, A. O. Smith Corp., Milwaukee, described equipment used for the life testing of Smith alloy No. 10.

A number of papers on light metals and their alloys covered age hardening and other general phenomena in connection with aluminum, aluminum alloys and magnesium alloys.

A paper on "Plastic Deformation," was given by Dr. E. Siebel, the Technical high school, Stuttgart, Germany. A paper by E. K. Henriksen, Royal Technical university, Denmark, was entitled "Internal Stresses in Machined Surfaces." Prof. Benedicks raised the point that when a sheet of metal is placed on a planer the pressure of the tool and the heat generated cause stresses that result in slightly bending the sheet. Referring to a paper by Dr. Ragnar Woxen, Stockholm, "Some New Results Regarding the Cutting of Metals," Prof. Benedicks said that this paper gave a simplified equation permitting calculation of tool life. In a paper, "Cutting Properties of Metals," Prof. O. W. Boston, University of Michigan, Ann Arbor, Mich., described the factors governing metal cut, the factors on which tool quality depends and five reasons for tool failure. He discussed cutting fluids, surface finish and machinability.

In discussion it was pointed out that the abrasion of a tool used in a lathe on a cylindrical piece of a certain length may cause the final profile to be slightly conical instead of cylindrical. It was stated that with certain steels abrasion decreases when speed increases, and other conditions being equal, carbon steels have the greatest tendency to abrasion. In a reference to Dr. Boston's paper, it was pointed out that the analysis of a steel has a great influence on its machinability. An equation was suggested for determining, within experimental errors and by using five factors, whether a steel is machinable.

F. Le Chatelier, Paris, referred a statement by Sir Robert Hadfield that wear tests in the laboratory do not give a measure of the actual wear resisting qualities of a steel in service. The author pointed out that in laboratory work there are contradictions of the results of tests, because so many factors intervene in the process of wearing. Even in the relatively simple case of reciprocal friction between two surfaces there are eight factors that intervene. It is necessary, however, that scientific testing investigations be made in the laboratory, and in the light of results obtained practical tests can be devised that give some idea of the behavior of the metal in service.

Dr. F. P. Bowden, and T. P. Hughes, Laboratory of Physical Chemistry, Cambridge, England, presented a paper entitled "Surface Temperature of Sliding Metals and Its Influence On Flow and Wear." The authors measured these temperatures by determining the friction between two metals of different composition forming an electrothermic couple. The frictional temperature can reach 1000 degrees Cent. and even with a lubricant can rise to 600 degrees, so that certain metals can actually melt and flow during friction. There is also formation of oxide.

Effect of Oxygen on Wear

The importance of oxidation in the wear of steel was also brought out in a paper by H. E. Smith of the National Physical Laboratory. The author attempted to carry out abrasive tests in an oxygen free atmosphere. While these tests were not completely conclusive, he was of the opinion that they confirmed previous tests which showed that wear does not occur so quickly when no oxygen is present. It was also found that humidity definitely increases wear. In discussion, Prof. Skapski, referring to the formation of oxide, said that Dovinski, another Polish research worker, had shown that when copper had been polished, electrodefraction patterns corresponding to the existence of an oxide were obtained, but that when the polishing was effected in an atmosphere free of oxygen, the pattern disappeared.

A group of papers dealing with wear in special cases included one by A. Pohl, of Austria, on "The Study of Wear on Railroad Tyres." This was followed by a paper by Dr. Seizo Saito, Sumitomo Metal Industries Ltd., Osaka, Japan, on "The Reduction of Vibration By Compound Contact Pieces or Powder." Dr. Masuhiro Suzuki, research office, Japanese Government Railways, contributed a paper, "An Investigation of Abrasion in Cast Iron." A paper by Samuel J. Rosenberg, National bureau of standards, Washington, was entitled "Oxide Films As a Protection Against Wear."

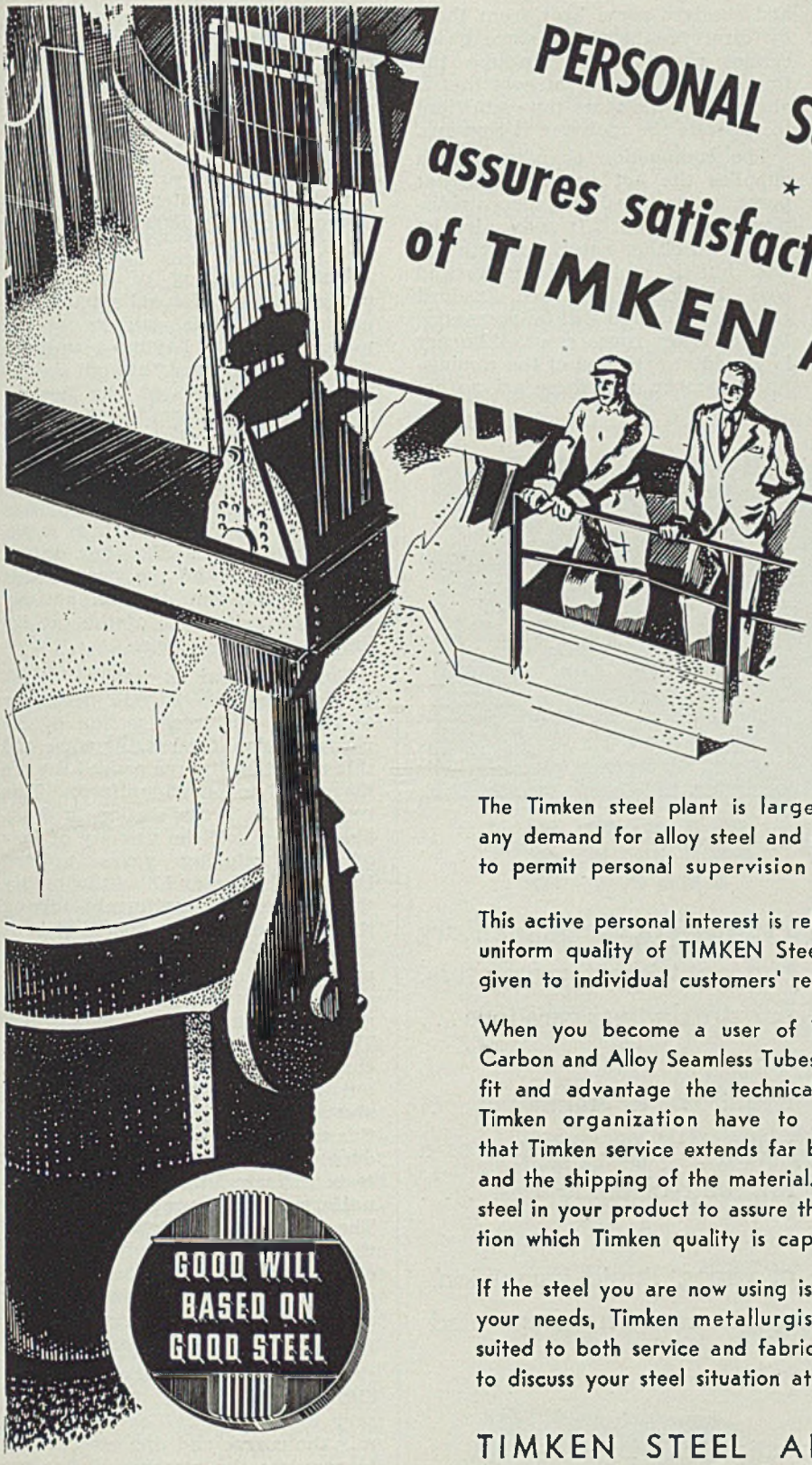
F. Guyot, Societe O. R. E. X., Brussels, Belgium, submitted a paper on industrial radiography by gamma rays. A number of papers were devoted to equilibrium diagrams. Three papers were devoted to nonmetallic inclusions.

Produces Fire Brick of Improved Quality

M. D. Valentine & Bro. Co., Woodbridge, N. J., refractories manufacturer, has installed a de-airing unit. This has resulted in improving the quality of the company's firebrick, giving it uniform density and homogeneity and eliminating the possibility of softness. Well known characteristics, such as minimum spalling, ability to withstand quick changes in firing temperatures, and ability to stand up under heavy loads at high temperatures are retained in the de-aired product. The company has installed a complete line of new conveyors and high speed rolls for breaking down the clay. The installation insures thorough disintegration and mixing of the clay before they are discharged in a constant flow to the pug mills. The company has installed new storage buildings which permit carrying a full line of refractories. It now is installing a complete laboratory for maintenance of full control over all the factors.

Materials Handling in Steel Covered by New Booklet

New booklet entitled "Equipping the Steel Industry for Continuous Production" has been issued by Mathews Conveyer Co., Ellwood City, Pa., and is the only available reference of its kind offered the steel industry by the conveyor industry. It is a 103-page, profusely illustrated volume, describing in detail the complete line of Mathews conveyers and discussing their application throughout the steel and metalworking industries. The booklet has been prepared primarily for distribution to operating and production executives and copies may be obtained from the company.



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The Timken steel plant is large enough to take care of almost any demand for alloy steel and seamless tubing—but small enough to permit personal supervision by the management at all times.

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When you become a user of TIMKEN Alloy Steels or TIMKEN Carbon and Alloy Seamless Tubes you will be assured of every benefit and advantage the technical and productive facilities of the Timken organization have to offer. Furthermore, you will find that Timken service extends far beyond the entering of your orders and the shipping of the material. It follows the performance of the steel in your product to assure that you receive the utmost satisfaction which Timken quality is capable of giving.

If the steel you are now using is not the most suitable analysis for your needs, Timken metallurgists will suggest an analysis better suited to both service and fabrication requirements. We are ready to discuss your steel situation at any time.

TIMKEN STEEL AND TUBE DIVISION

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN
ALLOY STEELS

Beneficiating Low Grade Iron Ores

(*Continued from Page* 50)

and other conditions, the exhaust ports are placed 18 inches above the hot ports in the Cooley furnace to maintain a minimum temperature of the exhaust gases of about 200 degrees Fahr. At this temperature, the carrying power of the gas for water vapor is so large that even abnormal quantities of moisture are handled without difficulty. The fine ore that by-passes the heating zone passes over and around the hot ports and receives some heat from them by direct contact, but since gases cannot pass upward through the fine ore, the amount of heat that it absorbs is little more than sufficient to vaporize the moisture it contains.

The combustion chamber, which supplies the hot gases to the hot ports, is designed for the combustion of fuel oil. It may also be used with either natural or artificial gas, but if stokers or pulverized coal burners are used, radical changes in design will be necessary. In the Cooley furnace, an oil burner is placed at each end of the combustion chamber, and these are so operated that no flame enters the hot port castings. This is an important consideration, since flame in these castings may cause overheating and rapid deterioration of the alloy steel. Thermocouples are placed in the entrance to the hot ports, and the oil burners are so operated that these couples register a temperature of approximately 1800 degrees Fahr. at all times.

Uniform heating of the coarse ore is essential for satisfactory operation, and this can be accomplished only by having a uniform flow of gas upward through the entire cross section of the heating zone and a uniform movement of the ore downward through the hot gases. No difficulty was encountered in securing a uniform gas flow, but considerable study was necessary to secure uniform movement of the ore. Whether or not the movement of the ore at this point is uniform depends entirely upon the movement of the ore below the heating zone.

For structural as well as metallurgical reasons, it was necessary to reduce the cross section of the furnace below the heating zone, and this reduction in area caused the ore movement to be nonuniform. This reduction in cross section is desirable to increase the velocity of flow of the reducing gases upward through the ore and also to simplify the problem of uniformly mixing the fine ore with the coarse ore. A uniform mixture of the ore at this point is desirable to produce an ore column through which the reducing gases may pass without channeling. The method of baffling used to secure uniform motion of the coarse ore through the heating zone is shown in the drawing, and while this method of baffling does not produce absolutely uniform motion, tests indicate that it is sufficiently uniform for all practical purposes. The drawing shows these baffles in their present form, but several changes in the shapes and locations of these baffles were made before satisfactory operation was secured.

The mixing of the fine ore with the coarse ore was found to be a difficult undertaking. It was necessary to arrange baffles not only to mix the coarse and fine ore but also to regulate the amount of fine ore that flows into the reduction chamber from the fine-ore bin. The small, round baffle in the middle of the fine ore compartment just below the hot port castings is used to control the rate of flow of the fine ore, and by raising or lowering this baffle a few inches the amount of fine ore passing into the reducing chamber can be controlled within reasonable limits. The various baffles in the reducing chamber are

designed to mix the coarse and fine ore and, at the same time, give the reducing gases access to all of the ore particles. The open spaces below these baffles equalize the gas pressure and produce the desired directions of flow, since the gases tended to flow from one open space to the next above.

Near the bottom of the reducing chamber, the cross section of the furnace is again reduced to discharge the ore through a small central opening. From full-size model tests, the arrangement of baffles in the lower part of the reduction chamber was determined and proved to be entirely satisfactory in the operation of the furnace.

The importance of having the proper arrangement of baffles in the furnace to secure uniform ore movement is shown by the figures in Table II. During the 1934 season, before the baffles were changed, the roasting efficiency of the coarse ore was low and of the fine ore, which is a comparatively small percentage of the product, was high. After the baffles were changed at the beginning of the 1935 season and a more uniform movement of the ore was secured, the results show that the roasting efficiencies of all sizes of the ore were approximately equal.

Table II

Effect of Changing Baffles

Size of Ore	Per Cent Efficiency of Roast 1934	1935
+0.525-inch	56.3	90.3
+ 4 Mesh	82.0	89.4
+ 8 Mesh	91.8	91.8
+65 Mesh	93.2	90.8
—65 Mesh	94.9	90.8
Total	87.5	90.0

+Over.
—Less than.

The gas used for reducing the ore enters the furnace near the bottom of the reducing chamber at the point shown in the drawing. The reducing gas now in use is formed by vaporizing fuel oil in a vaporizer heated by steam from the steam chamber. The vaporizer is similar to a fire tube boiler, the high-temperature steam passing downward through 2-inch pipes which are surrounded by the oil to be vaporized. The temperature of the steam is about 1000 degrees Fahr., and the boiling point of the oil used is about 600 degrees Fahr. In the vaporizer, the oil is not only vaporized but the vapor is also superheated to a temperature of about 900 degrees Fahr. The oil, pumped into the vaporizer at a rate that produces the required flow of reducing gas, assumes a level in the vaporizer depending upon the amount and temperature of the steam produced in the steam chamber. This method for the production of a reducing agent is entirely satisfactory, although the reducing agent itself can be materially improved by converting the hydrocarbons into hydrogen and carbon monoxide.

No attempt is made to crack the oil in the vaporizer, but in the reducing chamber in contact with the iron oxide, reactions occurred that produce principally methane, carbon, carbon monoxide and hydrogen, the two latter being the active reducing agents. The carbon is discharged from the furnace with the ore and is lost, and part of the methane passes upward through the reducing chamber and burns in and around the hot ports. This causes considerable trouble at times, because this combustible gas occasionally channels up through the ore and burns at some particular point. This tends to cause local overheating of the ports, which, if permitted to continue, will produce warping and rapid deterioration of the alloy steel. To eliminate this difficulty, it is necessary at times to withdraw part of the unconsumed gases from the furnace at the top of the reduction chamber and burn them in the combustion chamber.

(To be concluded)

NEW EQUIPMENT

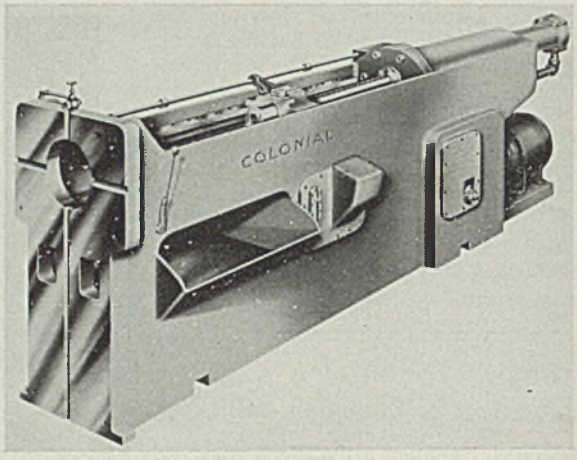
Milling Machines—

Brown & Sharpe Mfg. Co., Providence, R. I., has recently announced eight newly designed plain and universal machines in the No. 2 and No. 3 sizes. Machines are available in two styles, the standard type for the more straightforward run of manufacturing or toolroom work, and the dual control type where the work is such that wide feed range and complete control from both front and rear operating positions are important. Both styles are equipped with 16-spindle speeds ranging from 30 to 1200 revolutions per minute. All machines are available for either overhead or motor drive. Standard type machines have 16 feed rates while dual control machines are equipped with 32 feed rates.

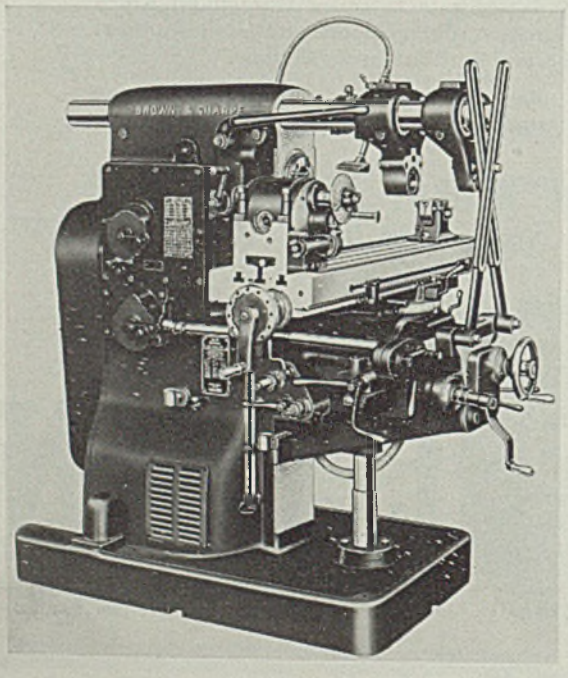
♦ ♦ ♦

Broaching Machine—

Colonial Broach Co., Detroit, has recently announced an all-purpose broaching machine designed for pull-type broaching and hydraulically operated. The machine is readily adapted to surface broaching of round or splined holes, keyways and similar operations. Available in two basic stroke designations, 48 and 60 inches, the machine comes in four tonnage capacities of 6, 10, 15 and 20 tons. Stop collars are provided on the machine so that any requirement as to stroke length can be met. Standard cutting speed is 30 feet per minute, but lower speeds are available if desired. The new machine has a base of fabricated steel designed to absorb all broaching stresses without distortion, with easy replacement of hard bronze shoes. The hydraulic power mechanism consists of an enclosed, externally located electric motor direct-coupled to a 1000-pound hydraulic pump.



Colonial Universal broaching machine designed for all broaching operations



Brown & Sharpe universal milling machine, available for either overhead or motor drive

♦ ♦ ♦

Precision Weighing Machine—

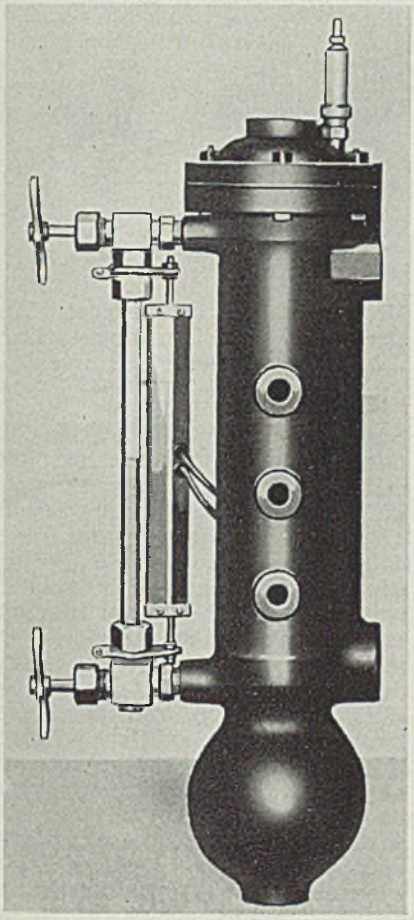
Jeffrey Mfg. Co., Columbus, Ohio, has announced a new precision machine applicable to the processes of continuous weigh-feeding, proportioning and batching. It is called the Waytrol and combines the following three features: 1. All-electric vibrating feeding; 2. A synchronous weigh-belt on a scale beam so pivoted as to receive material at the most sensitive end; and 3. Automatic all-electric control sensitized device called the "electric brain." Feeding and weighing on the unit are physically separated processes. The electric brain registers any unbalance of the belt and makes correction by speeding up or slowing down the vibrating feeder. For dustless operation and

to avoid the possibility of error caused by wind pressure, the entire unit is enclosed in steel and glass. The device is available in sizes handling from a few pounds up to many tons per hour and will operate from any standard 60-cycle.

♦ ♦ ♦

Water Gage Illuminator—

Wright-Austin Co., Detroit, has recently developed a simple device for illuminating water gages. The device consists of a neon light tube



Neon light tube and magnifying lens make up this device for illuminating water gages

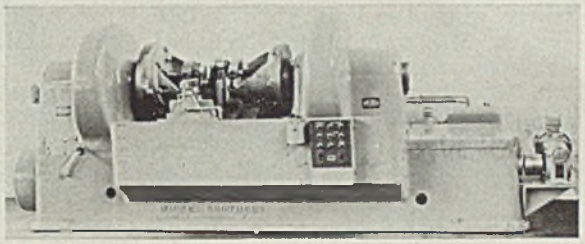
and a magnifying lens placed behind the water gage, attached by two screw clamps which grip around the top and bottom water gage fittings. The water or liquid filled part of the gage glass stands out as a broad red band, the empty space above appearing as a hairline stripe. Water level can be read distinctly day or night.

♦ ♦ ♦

Crankshaft Lathe—

Wickes Brothers, Saginaw, Mich., have developed a new lathe designed for machining large diesel and tractor type crankshafts. This machine

Wickes lathe designed for machining large diesel and tractor type crankshafts



is to be known as the model UH-8 and is provided with an automatic work cycle which provides power rapid traverse, coarse feed, fine feed, diameter stop, dwell, rapid retreat of tools and automatic stop of the lathe in the unloading position. Hydraulic speed is provided with a forced feed lubrication system, and the lathe is mounted on antifriction bearings. A tailstock movable on the bed for accommodating crankshafts of different lengths is provided. The lathe has a swing over the cross slide of 30 inches, a net weight with electrical equipment of 28,000 pounds and is driven by a 15-horsepower motor through multiple V-belts.

♦ ♦ ♦

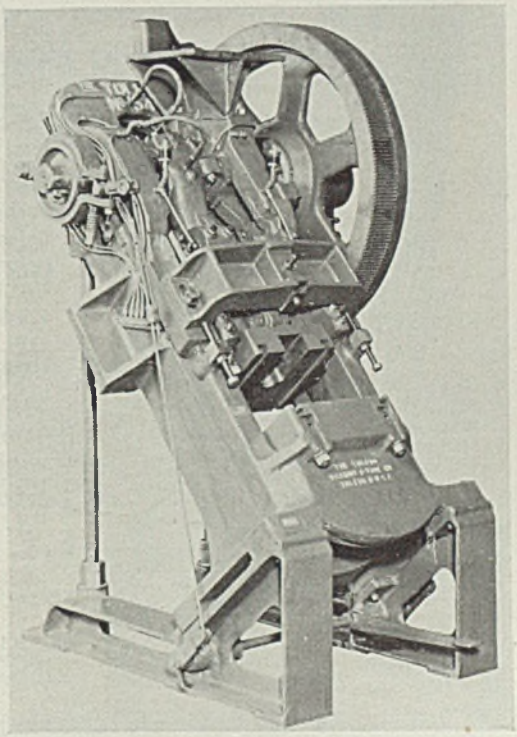
Repunching Press—

Toledo Press & Tool Division, A. W. Bliss Co., 1420 Hastings street, Toledo, Ohio, has recently placed on the market a new design of their No. 54 straight sided, single crank press. This press is of the flywheel type, with a direct connected motor drive to the flywheel by means of a silent pinion meshing with teeth on the flywheel. A 3 horsepower, 820 revolutions-per-minute motor is required to drive the press. The press has been designed for quantity production in field and rotor laminations. Where the blanks are cut from full size sheets in a large automatic press. These blanks are then completed in suitable compound dies operated in repunching presses similar to this one. Frame is of compact one-piece construction case in chrome-nickel pearlitic semi-steel for maximum rigidity. The press has 2½-inch stroke, distance bed to slide 13 inches, full eccentric shaft and a bolster with T-slots and poppets for inclined die setting. Lubrication requirements are taken care of by one-shot manual operated grease device along with sight feed oil cups.

♦ ♦ ♦

Power Shovel—

Northwest Engineering Co., Chicago, announces that the new line of smaller shovels will be equipped with a device called the cushion clutch. This is the main clutch in the hoist drum and by means of the cushion effect, maximum stresses are reduced on all parts under



Newly designed Toledo No. 54 straight sided single crank press of the flywheel type with direct connected motor drive

power when the hoist rope is tensioned. When the dipper teeth hit an immovable rock, the operator has from three to five times as long to throw out the clutch to prevent engine stalling. Life of the hoist rope as well as other moving parts, are greatly increased, according to company claims.

♦ ♦ ♦

Printer—

Charles Bruning Co. Inc., 102 Reade street, New York, has recently placed on the market a continuous printer designed for exposing BW black-line paper or blue-print paper. The machine is built for 100 alternating current and 110 direct current and exposes paper of any width up to and including 42 inches. According to the company, the machine has a capacity of between 100 to 150 yards of black-line paper per day using cloth tracings.

♦ ♦ ♦

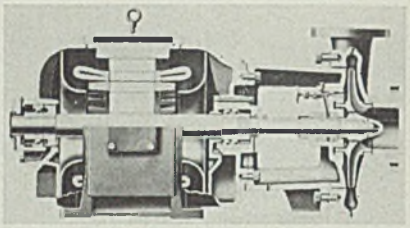
Flow Meter—

Askania Regulator Co., Chicago, has recently developed a meter for oil flow measurement usable for control purposes. According to the manufacturer, the device, to be known as the Askania Oil Transometer, minimizes errors in oil flow measurement due to changes in viscosity, temperature and specific gravity. The unit operates on the principal of a governor which rises as the flow increases and increases air pressure on a diaphragm.

♦ ♦ ♦

Motor Mounted Pumps—

DeLaval Steam Turbine Co., Trenton, N. J., announced a new line of motor driven centrifugal pumps for capacities from 5 to 1200 gallons per minute and heads of 10 to 230 feet. The pump is mounted upon the end bell of an electric motor, the two forming a compact and self-contained unit, with only one shaft and two bearings. A motor mounted pump is shipped ready for immediate connection to piping and power supply line and can be installed with the shaft horizontal, vertical, or inclined, or the unit can be mounted upon a hand truck or suspended from a sling. Pump casing is of cast iron, while the impeller, wearing ring, shaft sleeve, stuffing box gland and lantern ring are of bronze. Special materials can be supplied where required. All parts subject to wear are made to limit gages so that they are interchangeable, and replacements ordered from the factory can be inserted without having to be fitted.



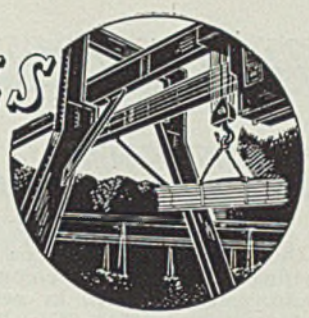
De Laval motor driven centrifugal pump, one of a line ranging from 5 to 1200 gallons per minute

Practice Recommendations On Forged Tools Ready

Committees in charge of simplified practice recommendations of the national bureau of standards announce that recommendations R158, forged axes; R159, forged hammers; and R160, forged hatchets are now before the industry for acceptance.

Revision of the standards set forth in the original recommendations of July,1935,has effected a net reduction of 123 sizes in the list of axes as it now stands, a reduction of 13 sizes in the hammers and a reduction of 11 sizes in the hatchets. Copies are available from the division of simplified practice, national bureau of standards, Washington.

MATERIALS HANDLING



Raise Conveyor Rate

(*Concluded from Page* 58)

50 stops per hour but radios were coming off faster than the conveyor. Inquiry showed that early in the morning, due to a short absence of an operator, the girls had been behind the conveyor so held units back when the conveyor moved up and then pushed them on when completed. They had gradually speeded up and not stopped speeding after they caught up with the conveyor but continued to push the work on. The pace was too fast and, of course, the girls blamed the management for increasing the conveyor speed.

The superintendent stopped the conveyor, had the girls adjust the work in position by pushing back the extra units and again started the conveyor. The girls saw how they had speeded themselves up, laughed, and thus passed off what might have been considerable dissatisfaction toward the management.

Auxiliary Hoists Valuable

INSTALLATION of auxiliary hoists of smaller capacities on overhead electric traveling cranes of the heavy-duty type has been considered good materials handling practice in plants where a considerable proportion of the lifting operations involves lighter loads than those for which the cranes are designed primarily. In many plants today, however, this economy of crane operation has been overlooked.

An inspection trip through a plant in the Chicago area recently disclosed that one of one two manufacturing departments was equipped with a 15-ton overhead crane with an auxiliary 5-ton motor-operated hoist, while the other, the assembly department, was provided with a 15-ton crane without auxiliary equipment. This 15-ton crane served as the main hoisting and transporting unit. While a distinct need for this capacity crane existed, it was noticeable that a large percentage of its loads was not over 2 or 3 tons, yet these operations required the use of the 15-ton equipment.

Questioned an executive of the company as to the reason for using auxiliary equipment in one department and not in the other, an executive of the company elicited the information that it was merely one of those neglected items of installation. Use of auxiliary equipment in the one department has been a source of real satisfaction; failure to equip the other unit in similar fashion a cause of regret.

Runways on Concrete Posts

NO PROVISION was made for erecting a crane runway in the new reinforced concrete addition to the main Chicago plant of the Liquid-Carbonic Corp. since clamp brackets were used on previous installations. However, cranes were necessary for handling heavy parts in assembly, completed bottle fillers and other equipment manufactured for bottling plants.

The runway was installed by clamping brackets to the round columns with four 1-inch bolts and bearing plates at four points to prevent the bolts cutting into the concrete and loosening. The runways consist of 10-inch I-beams welded together at the ends with mine track rails tack welded on the top flange for the flanged track wheels on the 16-foot span Richards-Wilcox hand traveling cranes.

Two runways are installed. Both carry single-beam bridges, one with a 2-ton Wright army type chain hoist, the other a similar hoist of 1-ton capacity.

Prevent Wire Rope Kinks

UNLESS a wire rope is first looped, it is rarely kinked. This hint on an important phase of materials handling is passed along to users in a recent issue of *The Yellow Strand,* house organ of Broderick & Bascom Rope Co., St., Louis. Furthermore, kinks in wire rope are said to be more easily prevented than cured.

One of the best preventive measures is given as follows: When a reel of rope is purchased, do not unwind the rope with the reel lying on its flange. Jack up the reel and keep the line taut between reel and drum. Unwind either from bottom of reel to bottom of drum, or from top of reel to top of drum. Never throw the rope off in loops. Instead uncoil it by rolling the coil along the floor.

When studying handling methods do not overlook work which necessarily must be handled by hand. Proper positioning of work in processing and for assembly sometimes results in extremely high cost reductions and may be made at practically no expense.

RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Electric Hoist — Northern Engineering Works, 210 Chene street, Detroit. Bulletin EA-101, illustrating its new type "A" electric hoist.

Pebble and Ball Mills—Patterson Foundry & Machine Co., East Liverpool, O. Catalog No. 372, illustrating and describing its pebble and ball mills, with detailed specifications.

Thermostats — Struthers Dunn Inc., 139 North Juniper street, Philadelphia. Folder illustrates relays, timing devices, thermostats, electric counters, melting pots and ladles.

Wire Ropes—American Cable division American Chain & Cable Co. Inc., 230 Park avenue, New York. Bulletin giving constructnve information on rope strengths and working loads.

Road Machinery — Caterpillar Tractor Co., Peoria, Ill. Booklet No. 4046, describing various phases of road building from removing trees and stumps from the right of way to finishing the dirt road with a diesel tractor and blade grader.

Industrial Transportation — Colson Corp., Elyria, O. Catalog showing the Colson system of materials handling, including description of semi-live platforms and special lift jack for use with same; describes and illustrates special skids and rack trucks.

Steel Shop Boxes — Lyon Metal Products Inc., Aurora, Ill. Catalog describes and illustrates a wide range of steel boxes for every manufacturing and storage use, including brief descriptive matter on steel shelving, lockers, shop and tool storage equipment.

Ball Bearings—New Departure division General Motors Corp., Bristol, Conn. Booklet "S", listing prices, sizes and types of their ball bearings, with sections on bearing selection, mounting directions, fits and tolerances, equivalent bearing tables and telegraphic code.

Roofing Products — United States Steel Corp. subsidiaries, 434 Fifth avenue, Pittsburgh. Catalog presenting sales material and information on various types of roofing products, including pictorial presentation of many types of sheet metal roofing and siding, with accessories.

Industrial Lighting Equipment — Westinghouse Electric & Mfg. Co., lighting division, Cleveland. Catalog section 61-180, describing many types of lighting equipment for use with 200 and 400-watt high intensity mercury vapor lamps. Combination mercury-incandescent units are also described.

Simplified Arch Construction — Geo. F. Reintjes Co., 2517 Jefferson street, Kansas City, Mo. Bulletin No. 201, announces development of a simplified arch construction, which requires fewer shapes of tile and castings, is flexible in application and universally applicable to any existing arch steel work.

Standards Bureau Prepares High Purity Iron Oxide

As a preliminary step in preparing metallic iron of extremely high purity, the national bureau of standards, Washington, has announced successful preparation of iron oxide which is free from even spectroscopic traces of 46 elements and in which silicon is the only impurity present in amount exceeding 0.001 per cent. Other elements present are aluminum, calcium, magnesium and copper, but the sum of these four impurities is less than 0.001 per cent.

This work was accomplished by H. E. Cleaves and J. G. Thompson, metallurgy division, and forms part of one of the current research projects at the bureau in which an attempt is being made to prepare metallic iron of high purity and of definitely known composition, so that the properties of this material may be determined. Attempts will be made to convert this oxide to metallic iron without introducing further contamination, it is stated.

Iron is the most important metal in our modern civilization but it never has been prepared in an absolutely pure state, that is, completely free from all impurities, or even in as high a state of purity as has been attained for some other metals, such as gold, platinum, zinc and aluminum.

Consequently, the fundamental properties of iron, on which the properties of commercial irons and steels are based, never have been determined directly. Best available information about many of the properties of pure iron has been obtained by indirect methods from samples of unknown purity and the accuracy of such data is unknown, according to the bureau.

New England Directory Is Guide to Business

Directory of New England Manufacturers, published by George D. Hall Inc., 665 Boylston street, Boston, Mass., with the editorial cooperation of the New England council; 724 pages, cloth; supplied by STEEL, Cleveland, for $15, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Compiled as a complete reference book to New England industry, this revised edition, issued Jan. 2, 1937, is backed by a biennial program of revision. The next edition is scheduled for Jan. 2, 1939.

It contains an alphabetical list of 17,000 New England manufacturers, with names of the principal officers, a description of the product made, the number of factory employes, capital, and location of plants or branch offices.

For convenience in mapping out sales campaigns in a particular line of business, a second section classifies these concerns by state, city and town. A third section lists alphabetically, for the convenience of purchasing agents, all products made by New England manufacturers, with the names and addresses of the makers. There is also a brand-name section, in which are listed brand or trade names of New England products with names of the manufacturers.

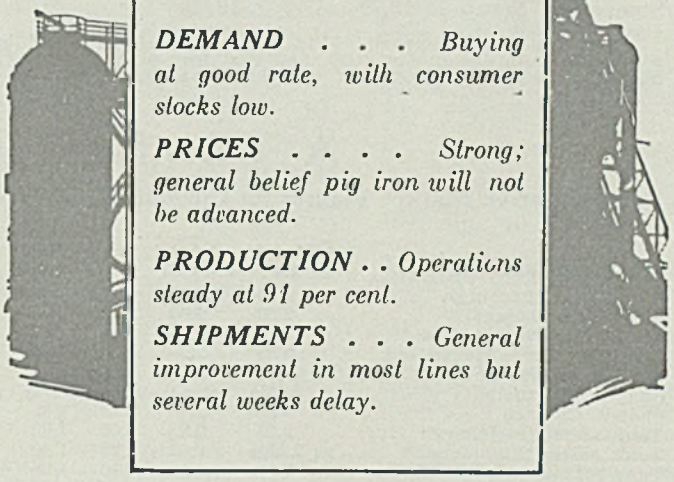
Offers New Refrigerator

Designed to employ either freon or methyl chloride as a refrigerant, a new line of self-contained low pressure refrigerating units has been announced by Carbondale division, Worthington Pump & Machinery Corp., Harrison, N. J. The units are recommended by the company for use either in air conditioning purposes or in general refrigerating service.

Compressor unit is small, mounted on a welded base, and is of V-type, from 4 to 8 cylinders depending on the use. Electric motor drives the compressor through multiple V-belts, and a self-adjusting bed plate maintains proper tension at all times.

Mills Hold High Rate To Hasten Delivery

Autos Make New Mark; Buying Holds Up Well; Iron Ore in Record



MARKET IN TABLOID

DEMAND *. . . Buying at good rate, with consumer stocks low.*

PRICES *. . . . Strong; general belief pig iron will not be advanced.*

PRODUCTION *. . Operations steady at 91 per cent.*

SHIPMENTS *. . . General improvement in most lines but several weeks delay.*

WITH large specification backlogs in practically every line of steel production the present lull in buying, contrasting sharply with feverish activity a few weeks ago, is welcome to mills and conditions grow easier each week.

With statistics showing records or near records in almost every department no apprehension is felt over the quieter situation. Tonnage on books is sufficient for several weeks, in some cases well into the fall, and with consumption at a high rate further buying will sustain operations at a high level. In fact, current buying is of good proportions and suffers only by comparison with the unnatural rate of March. Producers, for the most part, have too much domestic business to accept much of the attractive export inquiry, even at the tempting premiums offered. A Valley interest has booked 25,000 tons of pig iron for Japan at $2 over the domestic market.

With steel mills exerting every effort to hold production high in the effort to meet demands the national operating rate is steady at 91 per cent of capacity, in spite of necessary repairs that tend to reduce output from time to time. Pittsburgh has gained three points to 93 per cent, Eastern Pennsylvania three points to 73½, Wheeling six points to 94 and Cincinnati four points to 94 per cent. Chicago lost 2½ points to 83 per cent, Youngstown four points to 83, Buffalo one point to 92 and New England three points to 90 per cent. Cleveland at 79½ per cent, Birmingham at 83, Detroit at 100 and St. Louis at 94 made no change.

Production of steel ingots in April totaled 5,017,875 gross tons, at 90.27 per cent of capacity. The shorter month gave a total slightly under March but the percentage of capacity then was only 89.91. However, the April total has been exceeded only in March and in May, 1929. April produced nearly 30 per cent more ingots than the same month of 1936. Production for four months of 1937 is almost 50 per cent larger than for all 1932.

All records for Lake Superior iron ore shipments for April were broken when 3,770,555 tons were shipped by vessel. This compares with 2,516,241 tons in April, 1929, the previous record. In the entire ore season of 1932 only 3,567,985 tons were moved. In April, 1936, 19,446 tons were shipped.

March exports of steel scrap set an alltime record with 362,249 tons. For first quarter scrap exports were 586,369 tons. Steel exports, without scrap, in March totaled 208,327 tons, the highest month since July, 1929, a gain of 59 per cent over those of February and 118 per cent over March, 1936. For first quarter exports, exclusive of scrap, were 476,886 tons, 91.5 per cent over first quarter of last year.

By putting out 2050 more cars last week than the week before the automotive industry established an alltime record for a single week with a total of 141,525 cars. This compares with the previous high of 140,800 cars during one week of April, 1929. General Motors produced 56,550 cars, Ford 35,875 and Chrysler 32,000.

Placing of 9772 freight cars in April brought the total for four months to 40,705, the highest for that period since 1929. Continued purchase of cars in May gives promise of sustaining high rate.

British steelmakers have advanced prices about £1 per ton, in view of the strong market and inability to produce sufficient to meet demands. Somewhat better supplies of semifinished steel are being obtained from the Continent but not sufficient to ease the market definitely.

Continued decline in scrap prices has carried the composite of steelmaking grades 81 cents lower, to $18.79, equaling the level of the first week of February. The same influence caused a decline of 11 cents in the iron and steel composite, to $40.14. The finished steel composite remains unchanged at $61.70.

COMPOSITE MARKET AVERAGES

	May 8	May 1	Apr. 24	One Month Ago Apr., 1937	Three Months Ago Feb., 1937	One Year Ago May, 1936	Five Years Ago May, 1932
Iron and Steel	$40.14	$40.25	$40.36	$40.39	$36.74	$32.92	$29.34
Finished Steel	61.70	61.70	61.70	61.45	55.92	52.20	47.62
Steelworks Scrap..	18.79	19.60	20.42	21.27	19.19	13.40	7.03

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 8, 1937	April 1937	Feb. 1937	May 1936
Steel bars, Pittsburgh	2.45c	2.45c	2.20c	1.85c
Steel bars, Chicago	2.50	2.50	2.25	1.90
Steel bars, Philadelphia	2.74	2.74	2.49	2.16
Iron bars, Terre Haute, Ind.	2.35	2.35	2.10	1.75
Shapes, Pittsburgh	2.25	2.25	2.05	1.80
Shapes, Philadelphia	2.45½	2.45½	2.25½	2.01½
Shapes, Chicago	2.30	2.30	2.10	1.85
Tank plates, Pittsburgh	2.25	2.25	2.05	1.80
Tank plates, Philadelphia	2.43½	2.43½	2.23½	1.99
Tank plates, Chicago	2.30	2.30	2.10	1.85
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.15	1.85
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	2.80	2.40
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.40	3.10
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.25	1.95
Sheets, No. 24, hot anneal., Gary	3.25	3.25	2.90	2.50
Sheets, No. 24, galvan., Gary	3.90	3.90	3.50	3.20
Plain wire, Pittsburgh	2.90	2.90	2.60	2.40
Tin plate, per base box, Pitts.	$5.35	5.25	4.85	5.25
Wire nails, Pittsburgh	2.75	2.75	2.25	2.10

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$34.00	$28.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	34.00	28.00
Billets, open-hearth, Pittsburgh	37.00	37.00	34.00	28.00
Wire rods, No. 5 to ⅜-inch, Pitts.	47.00	47.00	43.00	40.00

Pig Iron

	May 8, 1937	April 1937	Feb. 1937	May 1936
Bessemer, del. Pittsburgh	$25.26	$25.26	$22.30	$20.81
Basic, Valley	23.50	23.50	20.50	19.00
Basic, eastern del. East Pa.	25.26	25.26	22.51	20.81
No. 2 fdy., del. Pittsburgh	25.21	25.21	22.21	20.31
No. 2 fdy., Chicago	24.00	24.00	21.00	19.50
Southern No. 2, Birmingham	20.38	20.38	17.63	15.50
Southern No. 2, del. Cincinnati	23.69	23.69	20.94	20.20
No. 2X eastern, del. Phila.	26.135	26.135	23.385	21.68
Malleable, Valley	24.00	24.00	21.00	19.50
Malleable, Chicago	24.00	24.00	21.00	19.50
Lake Sup., charcoal, del. Chicago	30.04	30.04	26.54	25.25
Gray forge, del. Pittsburgh	24.17	24.17	21.17	19.67
Ferromanganese, del. Pittsburgh	107.29	99.79	84.79	80.13

Scrap

Heavy melting steel, Pittsburgh	$19.75	$22.75	$19.65	$14.75
Heavy melt. steel, No. 2, East Pa.	17.25	19.06	17.75	10.81
Heavy melting steel, Chicago	17.75	20.75	19.50	13.05
Rail for rolling, Chicago	22.00	23.35	20.75	14.65
Railroad steel specialties, Chicago	22.25	23.75	21.00	14.65

Coke

Connellsville, furnace, ovens	$4.85	$4.50	$4.00	$3.50
Connellsville, foundry, ovens	5.30	5.05	4.25	4.25
Chicago, by-product foundry, del.	11.00	11.00	10.25	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

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

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.95c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, del.	3.48c
Philadelphia, del.	3.44c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.80c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.09c
New York, delivered	4.13c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.39c
New York, del.	3.43c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.70c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.75c
Philadelphia, del.	3.84c
New York, del.	3.88c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke, (base box), Pittsburgh	$5.35
Waste-waste, 2.75c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

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

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.53c
Philadelphia, del.	2.43¾c
Boston, delivered	2.65c
Buffalo, delivered	2.50c
Chicago or Gary	2.30c
Cleveland, del.	2.44¾c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, delivered	2.53c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.45¼c
New York, del.	2.50¼c
Boston, delivered	2.63¼c
Bethlehem	2.35c
Chicago Chicago	2.30c
Cleveland, del.	2.45c
Buffalo	2.35c
Gulf Ports	2.65c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, del.	2.52c

Bars

Soft Steel
(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.00c
Philadelphia, del.	2.74c
Boston, delivered	2.85c
New York, del.	2.78c
Pitts., forg. qual.	2.80c

Rail Steel
To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Moline, Ill.	2.35c
Cleveland	2.35c
Buffalo	2.40c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.55c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.60c
Gulf ports	2.65c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.84c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.40c
Chicago, Buffalo, Cleveland, Birm., Young.	2.45c
Gulf ports	2.80c

Wire Products

Prices apply to straight or mixed carloads; less carloads $5 higher; less carloads fencing $5 over base column.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.20c
Galv. fence wire	3.60c
Woven wire fencing (base column, c. l.)	$74.00
Single loop bale ties, (base column, c. l.)	63.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

Alloy S.A.E.	Alloy Diff.	Alloy S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. N., Van	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot rolled, 25-1ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.69c
New York, del.	2.73c
Cooperage hoop.	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.40c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	3.40c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh, 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	3.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base 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	65-5 off
Do. larger	60-10 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 72½-5 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	60 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-20 off
Do., ½ to 1-inch	60-15 off
Do., over 1-inch	60-12½ off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
⅞-inch and smaller, Pitts., Chi., Cleve.	70 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$5.75 off

Cut Nails

Cut nails, C. L., Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1½	23½	17
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

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

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	.....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.96
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.00-58.00
6 to 24-in., Chicago	54.00-55.00
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

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 and Young.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 *to* 9 x 9-*in., base*

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young., Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to ⅝-inch incl.	47.00
Do., over ⅝ to 11/32-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 4.90
Connellsville, fdry.	5.25- 5.50
Connell. prem. fdry.	6.00- 6.50
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.85-11.30
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.25
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.00
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.60

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	14.75c
do. (450 lbs.)	14.00c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	7.25c

Per 100 lbs. Atlantic Seaboard

Sulphate of ammonia	$1.35

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.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	24.50
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	.....
Jackson, O.	24.00	24.00	.....	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	25.26	25.26	24.76	25.76
Baltimore from Birmingham	25.58	.....	24.46	.....
Boston from Birmingham	26.87	.....	25.87	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.77	.....	.....
Brooklyn, N. Y., from Bmghm.	27.05	.....	.....	.....
Canton, O., from Cleveland	25.26	25.26	25.76	25.76
Chicago from Birmingham	24.22	.....	24.10	.....
Cincinnati from Hamilton, O.	24.07	25.01	24.51	.....
Cincinnati from Birmingham	23.69	.....	22.69	.....
Cleveland from Birmingham	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.26
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago, Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	.....	.....	.....
Newark, N. J., from Bethlehem	26.39	26.89	.....	.....
Philadelphia from Birmingham	25.38	.....	25.26	.....
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	.....
Pittsburgh district from Neville Island	⎧ Neville, base plus 63c, 76c, ⎩ and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	25.94	25.94	.....	26.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.04
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

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)	43.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	25.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$19.00
Do., for barge	$20.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.29
Spiegeleisen, 19-21% dom. Palmerston, Pa., spot.	33.00
Do., New Orleans	33.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.80-1.85
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	142.50
Spot, carlots	145.00
Spot, ton lots	150.00
Ferrophosphorous, 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: New York N. Y.	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
May 1	14.00	14.12½	13.75	55.25	54.75	6.00	5.85	6.75	20.00	17.00	35.00
May 3	14.00	14.12½	13.75	57.00	56.50	6.00	5.85	6.75	20.00	17.00	35.00
May 4	14.00	14.12½	13.75	55.87½	55.37½	6.00	5.85	6.75	20.00	17.00	35.00
May 5	14.00	14.12½	13.75	55.62½	55.12½	6.00	5.85	6.75	20.00	17.00	35.00
May 6	14.00	14.12½	13.75	54.75	54.25	6.00	5.85	6.75	20.00	17.00	35.00
May 7	14.00	14.12½	13.75	55.25	54.75	6.00	5.85	6.75	20.00	17.00	35.00

*Carlot prices.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 14.00c Conn. copper

Sheets

Yellow brass (high)	19.50
Copper, hot rolled	21.62½
Lead, cut to jobbers	9.50
Zinc, 100-lb. base	12.50-13.00

Tubes

High yellow brass	22.25
Seamless copper	22.37½

Rods

High yellow brass	16.00
Copper, hot rolled	18.37½

Anodes

Copper, untrimmed	18.87½

Wire

Yellow brass (high)	19.75

OLD METALS

Nom. Deal. buying prices

No. 1 Composition Red Brass

New York	9.25
*Cleveland	9.00
Chicago	8.50-8.75
St. Louis	8.50-8.75

Heavy Copper and Wire

*New York, No. 1	11.50
*Cleveland, No. 1	11.00-11.25
Chicago, No. 1	10.75-11.00
St. Louis, No. 1	10.00-10.50

Composition Brass Borings

*New York	8.75

Light Copper

*New York	9.50
*Cleveland	9.00-9.25
Chicago	8.50-8.75
St. Louis	8.50-8.75

Light Brass

Chicago	5.50-5.75
*Cleveland	5.50
St. Louis	5.75-6.00

Lead

New York	4.25- 4.50
Cleveland	4.50- 4.75
Chicago	4.75- 5.00
St. Louis	4.75- 5.00

Zinc

New York	3.25- 3.50
*Cleveland	3.00- 3.25
St. Louis	3.75- 4.00

Aluminum

*Borings, Cleveland	10.00
*Mixed, cast, Cleve.	13.75-14.00
*Clips, soft, Cleve.	15.50
*Mixed, cast, St. L.	13.00-13.50

SECONDARY METALS

Brass, ingot 85-5-5-5, lcl.	14.75
Stand. No. 12 alum.	19.00-19.50

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	4.00c
Boston††	4.05c
Buffalo	3.10c
Chattanooga	3.96c
Chicago (j)	3.85c
Cincinnati	4.05c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.45c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.96c
Baltimore*	3.25c
Cincinnati	4.05c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.96c
Cleveland (c)	2.55c
Cincinnati	3.75c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	3.14c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle, under 1 ton	4.22½c
St. Louis	3.99c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES

Baltimore	3.90c
Boston††	3.92c
Buffalo	3.35c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.45c
San Francisco	4.05c
Seattle (i)	4.45c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.90c
Boston††	3.93c
Buffalo	3.47c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland, ¼-in. and over	3.86c
Detroit	3.95c
Detroit, 3/16-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	4.95c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.95c
Boston (g)	4.00c
Buffalo	3.72c
Chattanooga	3.91c
Chicago	3.85c
Cincinnati,	4.00c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.35c
New York‡ (d)	4.07c
Portland	4.50c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.75c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.35c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Buffalo	4.10c
Boston (g)	5.30c
Chattanooga*	4.76c
Chicago (h)	5.10c-5.75c
Cincinnati	5.40c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.55c
Milwaukee	5.21c-5.86c
New Orleans*	4.49c
New York‡ (d)	5.47c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	4.20c
Boston††	4.25c
Buffalo	3.52c
Chattanooga	4.16c
Cincinnati	4.25c
Cleveland	4.16c
Chicago	4.10c
Detroit, 1/16-in. and lighter	4.185c
Houston	3.35c
Los Angeles	4.50c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	4.95c
San Francisco	4.50c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c
Tulsa	3.55c

HOOPS

Baltimore	4.45c
Boston††	5.25c
Buffalo	3.52c
Chicago	4.10c
Cincinnati	4.25c
Detroit, No. 14 and lighter	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.30c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Boston*	4.65c
Buffalo (h)	3.70c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.50c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	5.85c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	5.85c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.39c
Chicago	3.87c
Cincinnati	3.82c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	69c
High carbon, Cr	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c

Water hardening 12½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	60 to 65
New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs., 50 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, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras; **One to 9 bundles; *† 50 or more bundles; †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 6

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	$24.75	5 0 0	$31.14	3 17 6
Basic bessemer	19.43	3 18 6*	14.06	1 15 0
Hematite, Phos. .03-.05	21.66	4 7 6	.....	.....
SEMIFINISHED STEEL				
Billets	$38.90	7 17 6	$35.16	4 7 6
Wire rods, No. 5 gage	47.64	9 12 6	56.25	7 0 0
FINISHED STEEL				
Standard rails	$44.55	9 0 0	$48.21	6 0 0
Merchant bars	2.43c	11 0 0	1.82c	5 0 0
Structural shapes	2.35c	10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.55c	11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.09c	14 0 0	2.82c	7 15 0††
Sheets, gal., 24 gage, corr.	4.14c	18 15 0	4.46c	12 0 0
Bands and strips	2.21c	10 0 0	2.36c	6 10 0
Plain wire, base	2.43c	11 0 0	2.72c	7 10 0
Galvanized wire, base	3.20c	14 10 0	2.90c	8 0 0
Wire nails, base	2.65c	12 0 0	3.09c	8 10 0
Tin plate, box 108 lbs.	$ 6.06	1 4 6	.....	.....

British ferromanganese $95 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$20.54	4 3 0(a)	$19.04	425	$27.89	825	$25.34	63
Basic bessemer pig iron	20.42	4 2 6(a)	12.32	275	14.70	435	27.96 (b)	69.50
Furnace coke	7.78	1 11 6	6.14	137	5.75	170	7.64	19
Billets	30.94	6 5 0	29.34	655	28.22	835	38.82	96.50
Standard rails	1.88c	8 10 0	1.95c	975	1.80c	1,200	2.38c	132
Merchant bars	2.10c	9 10 0	1.77c	885	1.46c	975	1.98c	110
Structural shapes	2.02c	9 3 0	1.72c	860	1.46c	975	1.94c	107
Plates, †¼-in. or 5 mm.	2.17c	9 16 9	2.21c	1,105	1.87c	1,245	2.29c	127
Sheets, black	3.09c	14 0 0§	2.70c	1,350‡	2.19c	1,460‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.75c	17 0 0	4.20c	2,100	2.85c	1,900	6.66c	370
Plain wire	2.60c	11 15 0	2.72c	1,360	2.48c	1,650	3.11c	173
Bands and strips	2.27c	10 5 0	2.00c	1,000	2.02c	1,350	1.94c	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 65 per cent over paper sterling.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	14.00-14.50
Bos. dock, No. 1, exp.	17.00
N. Eng. del. No. 1	16.00
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	17.50-18.00
Chicago, No. 1	17.50-18.00
Cleveland, No. 1	18.00-18.50
Cleveland, No. 2	16.50-17.00
Detroit, No. 1	16.00-16.50
Eastern Pa., No. 1	19.00
Eastern Pa., No. 2	17.00-17.50
Federal, Ill.	14.00-14.50
Granite City, R. R.	16.75-17.25
Granite City, No. 2	14.00-14.50
New York, No. 1	16.00-16.50
N. Y. dock, No. 1 exp.	16.00
Pitts., No. 1 (R. R.)	20.50-21.00
Pitts., No. 1 (dlr.)	19.50-20.00
Pittsburgh, No. 2	17.50-18.00
St. Louis, R. R.	16.00-16.50
St. Louis, No. 2	14.00-14.50
Toronto, dlrs. No. 1	11.00-12.00
Toronto, No. 2	10.00-11.00
Valleys, No. 1	20.00-20.50

COMPRESSED SHEETS

Buffalo, dealers	17.50-18.00
Chicago, factory	16.50-17.00
Chicago, dealer	16.00-16.50
Cleveland	17.50-18.00
Detroit	17.25-17.75
E. Pa., new mat.	19.50-20.00
E. Pa., old mat.	15.50-16.00
Pittsburgh	19.50-20.00
St. Louis	14.00-14.50
Valleys	19.50-20.00

BUNDLED SHEETS

Buffalo	14.00-14.50
Cincinnati, del	13.50-14.00
Cleveland	14.50-15.00
Pittsburgh	18.50-19.00
St. Louis	12.00-12.50
Toronto, dealers	8.00

SHEET CLIPPINGS, LOOSE

Chicago	12.00-12.50
Cincinnati	12.50-13.00
Detroit	12.00-12.50
St. Louis	10.00-10.50

STEEL RAILS, SHORT

Birmingham	16.00-18.00
Buffalo	23.50-24.50
Chicago (3 ft.)	22.00-22.50
Chicago (2 ft.)	23.50-24.00
Cincinnati, del	21.50-22.00
Detroit	23.00-23.50
Pitts., 3 ft. and less	25.00-25.50
St. Louis, 2 ft. & less	19.00-19.50

STEEL RAILS, SCRAP

Boston, district	†16.50
Buffalo	20.00-20.50
Chicago	18.50-19.00
Cleveland	23.00-23.50
Pittsburgh	22.50-23.00
St. Louis	18.00-18.50

STOVE PLATE

Birmingham	10.00-10.50
Boston district	†11.50-11.75
Buffalo	14.75-15.25
Chicago	12.00-12.50
Cincinnati, dealers	10.50-11.00
Detroit, net	12.00-12.25
Eastern Pa.	15.50-16.00
New York, fdry.	†11.00
St. Louis	11.50-12.00
Toronto, deal'rs, net	9.50-10.00

SPRINGS

Buffalo	22.00-23.00
Chicago, leaf	22.50-23.00
Chicago, coil	23.50-24.00
Eastern Pa.	25.50-26.00
Pittsburgh	25.00-25.50
St. Louis	20.75-21.25

ANGLE BARS—STEEL

Chicago	20.50-21.00
St. Louis	18.00-18.50

RAILROAD SPECIALTIES

Chicago	22.00-22.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	22.50-23.50
Cleveland, billet, bloom crops	24.00-24.50
Eastern Pa. crops	25.50-26.00
Pittsburgh, billet, bloom crops	25.00-25.50
Pittsburgh, sheet bar crops	26.50-27.00

FROGS, SWITCHES

Chicago	18.50-19.00
St. Louis, cut	18.00-18.50

SHOVELING STEEL

Chicago	17.50-18.00
Federal, Ill.	14.00-14.50
Granite City, Ill.	14.00-14.50
Toronto, dealers	9.00- 9.50

RAILROAD WROUGHT

Birmingham	12.00-12.50
Boston district	†10.00-10.25
Buffalo, No. 1	17.50-18.00
Buffalo, No. 2	19.50-20.00
Chicago, No. 1, net	16.50-17.00
Chicago, No. 2	17.50-18.00
Cincinnati, No. 2	16.50-17.00
Eastern Pa.	20.00
St. Louis, No. 1	14.50-15.00
St. Louis, No. 2	16.75-17.25
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	17.00-17.50
New York	13.00-13.50

BUSHELING

Buffalo, No. 1	17.50-18.00
Chicago, No. 1	17.00-17.50
Cincin., No. 1, deal.	14.50-15.00
Cincinnati, No. 2	9.00- 9.50
Cleveland, No. 2	12.50-13.00
Detroit, No. 1 new	15.50-16.00
Valleys, new, No. 1	18.00-18.50
Toronto, dealers	9.00

MACHINE TURNINGS

Birmingham	7.00- 8.00
Buffalo	11.50-12.00
Chicago	10.50-11.00
Cincinnati, dealers	10.50-11.00
Cleveland	12.50-13.00
Detroit	11.00-11.50
Eastern Pa.	13.00-13.50
New York	†10.00-10.25
Pittsburgh	15.00-15.50
St. Louis	9.00- 9.50
Toronto, dealers	8.00- 8.50
Valleys	13.50-14.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.75- 9.00
Buffalo	13.00-13.50
Cincinnati, dealers	9.75-10.25
Cleveland	12.50-13.00
Detroit	11.50-12.00
Eastern Pa.	12.00-12.50
New York	†8.00- 8.50
Pittsburgh	14.00-14.50
Toronto, dealers	8.00- 8.50

CAST IRON BORINGS

Birmingham	7.00- 8.00
Boston dist. chem.	†10.00-10.25
Boston dist. for mills	†9.25
Buffalo	13.00-13.50
Chicago	11.50-12.00
Cincinnati, dealers	9.75-10.25
Cleveland	12.50-13.00
Detroit	11.50-12.00
E. Pa., chemical	15.50
New York	†8.00- 8.50
St. Louis	9.50-10.00
Toronto, dealers	9.00

PIPE AND FLUES

Cincinnati, dealers	11.50-12.00
Chicago, net	13.00-13.50

RAILROAD GRATE BARS

Buffalo	15.50-16.00
Chicago, net	12.50-13.00
Cincinnati	10.50-11.00
Eastern Pa.	15.50-16.00
New York	†11.00-11.50
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†12.00-12.25
Buffalo	18.00-18.50
Cleveland	17.50-18.00
Detroit	14.50-15.00
Pittsburgh	18.00-18.50

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	23.00-23.50
Eastern Pa.	16.00

ARCH BARS, TRANSOMS

St. Louis	18.50-19.00

AXLE TURNINGS

Boston district	†11.00-11.50
Buffalo	16.00-17.00
Chicago, elec. fur.	19.50-20.00
Eastern Pa.	17.00-17.50
St. Louis	12.50-13.00
Toronto	9.50

STEEL CAR AXLES

Birmingham	20.00-21.00
Buffalo	22.00-23.00
Boston district	†20.00-21.00
Chicago, net	23.50-24.00
Eastern Pa.	27.00-27.50
St. Louis	24.00-24.50

SHAFTING

Boston district	†19.50-19.75
New York	†20.00-20.50
Eastern Pa.	25.00
St. Louis	14.00-14.50

CAR WHEELS

Birmingham	16.50-17.50
Boston dist., iron	†15.00-15.25
Buffalo, iron	18.50-19.50
Buffalo, steel	22.50-23.50
Chicago, iron	20.50-21.00
Chicago, rolled steel	22.00-22.50
Cincinnati, iron	18.50-19.00
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	20.00-20.50
Pittsburgh, steel	25.00-25.50
St. Louis, iron	19.00-19.50
St. Louis, steel	20.75-21.25

NO. 1 CAST SCRAP

Birmingham	11.50-12.50
Boston, No. 1 mach.	†15.50
N. Eng. del. No. 2	17.50
N. Eng. del. textile	18.50
Buffalo, cupola	18.50-19.00
Buffalo, mach.	19.25-19.75
Chicago, agri. net	13.00-13.50
Chicago, auto	14.50-15.00
Chicago, mach. net	15.50-16.00
Chicago, railr'd net	14.50-15.00
Cinci., mach. cup	16.00-16.50
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	20.00-20.50
E. Pa., mixed yard	17.50-18.00
Pittsburgh, cupola	18.75-19.25
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.25-14.75
St. L., No. 1, mach.	15.00-15.50
Toronto, No. 1, mach., net	16.00-17.00

HEAVY CAST

Boston dist. break.	†13.00-13.25
New England, del.	17.00-17.25
Buffalo, break.	16.00-16.50
Cleveland, break.	15.50-16.00
Detroit, break.	14.50-15.00
Detroit, auto net	15.00-15.50
Eastern Pa.	18.00-18.50
New York, break.	†14.00-14.50
Pittsburgh	16.50-17.00

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	20.00
Buffalo	22.00-22.50
Chicago, R. R.	21.00-21.50
Cinci., agri. del.	15.50-16.00
Cleveland, rail	22.00-22.50
Detroit, auto, net	17.50-18.00
Eastern Pa., R. R.	21.00-21.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	19.25-19.75

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-18.00
Boston	†18.00-18.50
Buffalo	21.50-22.00
Chicago	21.75-22.25
Eastern Pa., R. R.	21.00-21.50
New York	†18.00-18.50
St. Louis	19.25-19.75

LOCOMOTIVE TIRES

Chicago (cut)	22.00-22.50
St. Louis, No. 1	19.25-19.75

LOW PHOS. PUNCHINGS

Buffalo	22.00-22.50
Chicago	23.00-23.50
Eastern Pa.	26.00-27.00
Pittsburgh (heavy)	24.00-24.50
Pittsburgh (light)	23.00-23.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic ports

Foreign manganiferous ore, 45.55% iron, 6-10% man.	*17.00
No. Afr. low phos.	17.00
Swedish low phos.	nominal
Spanish No. Africa basic, 50 to 60%	*15.50
Tungsten, spot sh. ton, unit, duty pd.	$22.00-22.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.00

*Nominal asking price for spot.

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	44.00
So. African, 50-52%	Nominal
Indian, 50-52%	Nominal

Bars

Bar Prices, Page 98

Pittsburgh—Bar mills soon will be in a position to make better progress in cutting down their large backlogs, the result of the slackening in new business following reaffirmation of current prices for third quarter. Operations have held up well. With a few consumers less insistent, producers are better able to shift schedules and accommodate the many who are after speedier shipments. Hot-rolled carbon bars are quoted 2.45c, Pittsburgh.

Cleveland—Bar mills continue active with shipments close to capacity. Although pressure for deliveries has eased considerably since third quarter prices were announced operations remain at a high rate, due to extended backlogs. Some improvement has been noted in deliveries for specifications have dropped behind shipments.

Chicago—Bar specifications have declined less than sales and shipments are steady at a high rate. Farm equipment manufacturers, operating near an all-time peak, continue heavy bar users and anticipate a maintenance of full schedules through June. Indications point to implement and tractor sales this year of 25 per cent over 1936. Bar deliveries show little improvement, mills being booked through July in most instances.

Boston—Carbon steel bar buying is less active, although demand for alloy and forging bars holds well without much improvement in deliveries. Soft steel bars are firm at 2.85c, Boston.

New York—Commercial bar sellers report decline in buying, though the volume is still good. Deliveries are improving as producers are able to make some small prompt shipments. This reflects less pressure from buyers now that prices have been extended for third quarter, and that production is surpassing specifications.

Philadelphia — Commercial bar specifications are tapering, with deliveries easier. Four weeks appears the usual minimum, against five to six weeks recently.

Youngstown, O.—Steel bar consumers must be content to accept continued allotments of bars for third quarter. Partsmakers for auto companies are among those thus seeking assured position on third quarter mill rolling schedules.

Ferro Enamel Corp., Cleveland, has completed a large continuous type porcelain enameling furnace for the Norge Corp., Muskegon, Mich. Furnace is of U-type design, employing Norton Alundum refractories and 11 cross-fired Surface Combustion gas burners.

Plates

Plate Prices, Page 98

Pittsburgh—After the heavy buying in April, which was comparable to March, plate deliveries under ten weeks are hard to obtain. Three barges, involving 600 tons of plates, have been awarded to Marietta Mfg. Co., Point Pleasant, W. Va., by Standard Oil Co. of New Jersey.

Cleveland—Most producers are pressed for deliveries. Operations are well sustained, with shipments exceeding specifications. Backlogs remain twelve to fourteen weeks. Most recent tonnage is for small structural jobs and miscellaneous consumers requiring under 100 tons each. Freight car builders are active and expect additional buying

by the roads soon, to further swell backlogs.

Chicago—Plate mills still operating full and backlogs will support near capacity schedules into next quarter. While railroad and freight car builders continue the leading outlet for plates here, there is an active demand from miscellaneous users. Prospects for tank builders are favorable. Structural fabricators have shown less improvement in plate needs than other users, particularly for nearby projects.

New York—Plate deliveries are improving although some sellers have little or nothing available before July delivery. Demand has shown a reasonable decline, especially since April 30, when protection expired.

Philadelphia—Bids go in this week on two tankers for the Sinclair Navigation Co., New York, requiring approximately 5000 tons of hull steel each. The Reading will also buy two 110-foot steel lighters. Such projects are tending to bolster tonnage which, generally speaking, is off somewhat from a week ago. Plates are firm at 2.35c, Coatesville, Pa., or 2.435c, Philadelphia.

San Francisco—Projects involving plates appear to be confined to work requiring less than 100 tons. Awards aggregated 2280 tons and brought the total for the year to 24,234 tons, compared with 54,771 tons for the corresponding period in 1936.

Seattle—While no large projects are up for figures, fabricating shops report a normal volume of spring business in tank and boiler jobs. Service station projects are numerous and ship repair work is active.

Plate Contracts Placed

700 tons, 30-inch welded steel pipe, Spokane, Wash., to Steel Tank & Pipe Co. of Oregon, Portland, Oreg.

600 tons, three barges, for Standard Oil Co. of New Jersey, to Marietta Mfg. Co., Point Pleasant, W. Va.

235 tons, 750,000-gallon, Bedford, Ind., to Chicago Bridge & Iron Works, Chicago.

160 tons, to mattress barges, Omaha, Neb., to the Darby Corp., Kansas City, Kans.

160 tons, 300,000-gallon elevated tank, Westerly, R. I., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Plate Contracts Pending

325 tons, 1,000,000-gallon tank and tower, Freeport, N. Y.; bids May 12.

Sheets

Sheet Prices, Page 98

Pittsburgh—Unlike most other products, hot-rolled sheet specifications have shown little recession since the announcement reaffirming third quarter prices, and producers have been unable to reduce their heavy backlogs. Most consumers are still clamoring for deliveries and many are still anxious to obtain positions well in the future on mill schedules. On the national scale, operations are holding at their high rate, galvanized at around 76 per cent; common black and full finished at better than 85 and hot strip at around 75. Prices are steady.

Cleveland—Mills report little decline in pressure for deliveries, although in some cases the announcement of third quarter price policy has permitted rescheduling of shipments. However, the encouraging feature is that most consumers are at peak operations and are in actual need of a constant influx of material.

Chicago—New sheet business is lighter and specifications show some decreases but mills are able to continue capacity schedules by virtue

of heavy backlogs. Consumption remains fairly steady but extension of present prices has eased pressure for delivery. Backlogs extend into third quarter in most instances but some tonnages can be worked into rolling schedules at an earlier date.

Boston — Sheet buying has declined, but on the whole holds fairly active. Consumers are still pressing for deliveries in some instances, but others have accepted a rescheduling of shipments on some finishes. Reaffirming of prices has eased the situation considerably and a further improvement is expected shortly.

New York—In spite of active buying of sheets the delivery situation is easier. Gaps in rolling schedules appear more frequently and while they are promptly filled by new orders the net effect is that the average sheet consumer can do much better on shipments than recently.

Buffalo — Producers are under heavy pressure to ship sheets as rapidly as possible. Bethlehem's old hand mill here as well as its new strip mill are working practically at capacity.

Philadelphia—Sheet buying has tapered slightly, although there is not the pressure for deliveries of a few weeks ago. Meanwhile, delivery schedules show spotty improvement, as certain rescheduling is taking place, particularly where the tonnage is for consumers who bought for current quarter delivery primarily as a protection against possible higher prices in third quarter.

Youngstown, O. — Sheetmakers continue unable to make a dent into backlogs. Demand seems equally divided between black and galvanized sheets.

Cincinnati — Contracting with sheet mills continues at a high rate with the only recession in demand noticed in cold-rolled. Needs of other consumers are unaffected and tonnage on books extends well into third quarter. Several users have engaged deliveries for fourth quarter. Shortened time for deliveries on cold-rolled, compared to other grades, is partly due to expansion of facilities.

St. Louis—Buying of sheets has dwindled noticeably, but backlogs are still formidable and deliveries deferred. Demand for galvanized from the general manufacturing trade is reported in substantial volume.

Ramey Mfg. Co., Columbus, O., has purchased building at 243 North Fifth street, that city, in which it has conducted manufacturing operations for past nine years.

Pipe

Pipe Prices, Page 99

Pittsburgh — Standard pipe, oil country goods, mechanical and seamless tubing are active. Numerous three and four-inch gathering lines are being built, and several large pipe line projects are planned. Although activity is less than in March, sellers are confident of continued good business. Prices are steady.

Cleveland — Requirements for standard steel pipe for industrial expansion and repairs continue to dominate the market. Domestic demand while active does not aggregate much tonnage. Outlook for the next few weeks indicates little change. Cast pipe requirements are still comparatively dull, as most municipalities are unable to carry out their plans without federal aid.

Chicago—Cast pipe demand, while somewhat more active than during earlier months of the year, continues to lag behind the 1936 rate. A few

cities have increased their purchases compared with the volume of the previous several years but activity still is retarded by the reduction in federal appropriations for municipal improvements.

Boston—Cast pipe buying and inquiry is slightly heavier, but still under last month. Boston has closed on 455 tons. With a substantial backlog, the district pipe foundry continues operating near capacity. Merchant steel pipe demand through jobbers is active.

New York—With 4078 tons of cement-lined to be closed May 10 for New York, delivery at five boroughs, cast pipe inquiry is heavier with several sizable tonnages expected out shortly in southern New England. Buying of late has been mostly in small lots. In the South, Miami Beach, Fla., placed 7500 tons with three foundries and Tampa closes this week on 2025 tons.

Youngstown, O. — Demand for wrought pipe from oil fields continues to supplement building pipe requirements with the result that mills are busily employed. Line pipe and electric-welded tube demand is more sporadic, with no large new projects in sight at the moment.

Birmingham, Ala. — Weather changes have brought about a few cast iron pipe awards, but market generally is not active. The far West is taking a little tonnage.

Tulsa, Okla.—Oklahoma Natural Gas Co. has awarded 20 miles of 10-inch and 18 miles of eight-inch gas line to White Deer Pipe Line Construction Co. Line runs from Crescent to Enid, Okla., and will be acetylene welded by the Lindeweld method.

San Francisco—The usual seasonal lull is noted in the cast iron pipe market and little of importance has transpired of late. Awards and inquiries are confined to unimportant lots. To date this year 14,742 tons have been placed, compared with 11,746 tons for the same period a year ago. The Mountain Fuel & Supply Co., Salt Lake City, Utah, will construct a 21-mile 10-inch gas pipe line between Clay Basin Field in Utah to a point close to Rock Springs, Wyo.

Seattle—The market is bare of important inquiries but small lots are being moved out of stock. New projects are being planned but will not be out for figures immediately. Shoshone, Idaho, plans improvements to include additional wells and tanks. B. G. Smith, city engineer, Camas, Wash., has prepared plans for increased pumping facilities and a 6-inch main extension.

Steel Pipe Placed

350 tons, 2 to 8-inch for Alderwood Manor, Seattle, system, to Pacific Water Works Supply Co., Seattle.

Cast Pipe Placed

7500 tons, Miami Beach, Fla., to United States Pipe & Foundry Co., Burlington, N. J., American Cast Iron Pipe Co., Birmingham, Ala., and Florence Pipe Foundry & Machine Co., Florence, N. J.

300 tons, 12-inch, Meriden, Conn., to Donaldson Iron Works, Emaus, Pa.

101 tons, specification 3708, Los Angeles, to unnamed interest.

Cast Pipe Pending

4078 tons, 8, 12 and 20-inch, mostly 12-inch, New York, delivery to all five boroughs; bids May 10, department of purchase.

2125 tons, mostly 6 and 12-inch, Tampa, Fla.; bids May 12.

500 tons, Metropolitan district commission, Boston.

455 tons, 8 and 12-inch, Boston, Mass.; bids in.

350 tons, 6 and 12-inch, Westerly, R. I.; bids in.

100 tons, 8-inch, Fort Meade, Md.

Cold-Finished

Cold Finished Prices, Page 99

Pittsburgh — Specifications from the automotive industry helped

strengthen activity of cold-finished bar producers last week. Pressure for material already on mill books continues from many consumers. Backlogs are still sizable, and although consumers apparently are in less hurry to re-order than a month ago, sellers do not anticipate any sharp letdown. Prices are steady.

Transportation

Track Material Prices, Page 99

Steel requirements for the 700 cars to be constructed by the Reading Co. will shortly provide platemakers with an unexpected tonnage of fair size. It is estimated that approximately 3000 to 3500 tons of rolled steel will be required, including principally ⅛-inch sheets and ⅜-inch plates. It is understood that used trucks will be installed.

Tennessee Central has ordered 2250 tons of rails from the Tennessee Coal, Iron & Railroad Co. Monongahela railroad has ordered 1000 tons from Carnegie-Illinois Steel Corp.

Locomotive builders are unusually busy. The Great Western has ordered one type 2-8-0 locomotive from American Locomotive Co. Wheeling & Lake Erie is building 10 six-wheel switching locomotives in its own shops. The Seaboard Air Line has ordered 10 locomotive tenders from Baldwin Locomotive Works.

Union Pacific is understood to be inquiring for underframes for 2000 box cars and 700 automobile cars. Delaware & Hudson is building 100 box cars in its own shops, and Cincinnati, New Orleans & Texas Pacific has added 59 cars to its recent order of 2000 from Pullman-Standard Car Mfg. Co.

Awards of freight cars in April totaled 9772, compared with 8155 in March and with 4427 in April, 1936. Four months total is 40,705 which is the largest for that period in any year since 1929. Cars placed in May aid those pending, promise continuance of a high rate. Comparisons follow:

Jan.	17,806	2,050	24	152
Feb.	4,972	6,900	806	19,725
March	8,155	632	0	30
April	9,772	4,427	350	800
4 mos.	40,705	14,009	1,180	20,707
May	.....	8,900	2	717
June	.....	5,200	5,151	1,835
July	.....	7,229	500	19
Aug.	.....	225	200	105
Sept.	.....	1,750	875	7
Oct.	.....	2,210	1,250	75
Nov.	.....	1,550	100	254
Dec.	.....	23,450	10,050	110
Total	.....	64,643	19,308	23,829

Rail Orders Placed

Monongahela railroad, 1000 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

Tennessee Central, 2250 tons of rails, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Car Orders Placed

Cincinnati, New Orleans & Texas Pacific, 59 box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Delaware & Hudson, 100 forty-ton box cars to own shops.

Lehigh & New England, 150 mine cars, to American Car & Foundry Co., New York.

Car Orders Pending

Godfrey L. Cabot, Boston, 20 thirty-five-ton steel covered hopper cars; bids asked.

Union Pacific, 2000 box car underframes and 700 automobile car underframes; bids asked.

United States Sugar Corp., 60 cane cars.

Locomotives Placed

Great Western, one type 2-8-0 locomotive, to American Locomotive Co., New York.

Seaboard Air Line, five locomotive tenders, Baldwin Locomotive Works, Eddystone, Pa.; these are in addition to five locomotives and five tenders reported as placed recently.

Wheeling & Lake Erie, 10 six-wheel switching locomotives, to own shops.

Wire

Wire Prices, Page 99

Cleveland—Consumption of wire products in farming districts and manufacturing plants such as bolt and nut and wire specialty interests is well maintained. Shipments and operations in the finishing departments continue at peak.

Pittsburgh — Third-quarter price announcements have taken some pressure off inquiry, but practically none off delivery. Demand for merchant and manufacturers' wire products, say some producers, is slightly above normal considering that many people bought heavily in March and April. Manufacturers' products stocks are low. Prices are steady.

Chicago—New business in manufacturer's wire and merchant wire products is relatively quiet. Specifications also are somewhat lighter. Shipments are holding well and consumption of plain wire remains at a high rate among leading users. Backlogs will help to support active schedules during the balance of quarter, but consumers are in no hurry to order ahead, in view of price reaffirmation.

Boston—Wire mill operations continue near capacity with shipments heavy. New buying is less active, but appears to be leveling off to steady volume. Manufacturers' wire and specialties still move actively.

New York—While spring wire is relatively less active than most products, decline is partly seasonal and total volume of new wire buying is better than expected following heavy specifications in recent months. Demand continues well spread and not far under current consumer consumption, despite substantial stocks. Deliveries show further improvement.

Behind the Scenes with STEEL

Blanketed

THROUGHOUT this past week we have sat strapped to our typewriter, dodging telegrams, night letters, special deliveries and airmails flying at us from Milwaukee, where STEEL has been on, not behind, the scene at the Foundry convention. Reports of the first sessions are to be found on pages 74, 76, 77 and 80 of this issue, together with highlights which blinded our roving reporter. When last seen he was attempting to kayo the Asbestos Kid in the puppet show featured in the Protective Equipment Inc. booth, but the balance of the staff is carrying on nobly and in the next issue, on your desk May 17, will appear blow-by-blow summaries of the remaining sessions.

* * *

Red Faces Dept.

RED indeed was the face of Edward Stanley, riveter. Cause was a small splash in San Francisco harbor, made by $400 worth of gold rivet. Dignitaries stood around, speeches already made; in fact, this was the climax of the great Golden Gate bridge. The last rivet, a golden one, was placed in position and Riveter Stanley started to work. The rivet snapped, dropped with a splash. According to reports, however, the bridge will not fall down, for a steel substitute which makes up in unbreakableness what it lacks in goldenness has been used in the fatal spot.

* * *

Denouement

FOR many eons one of our favorite characters has been the hingehead—he who sits beside the almighty and nods his approval virtuously and vigorously to his superior's every action—a yes-man. Comes now one of our constituents at General Fireproofing Co., Youngstown, O., and presents us with a genuine hingehead, which is a little metal gadget fitting on top of a hinge. At any moment we expect the horrible thing to come to life and start haunting us for taking its name in vain.

* * *

Wide-Eyed

ONE of our former associates, now gone from under the protective wing to face the cold cruel world, admits that most industrial executives he meets are constant readers of STEEL. Astounded, amazed and abashed is the poor fellow because in his days on the inside he expressed disbelief in claims of his fellow-workers of the circulation department that upwards of 60,000 executives in the industry read the mag. Now he is wont, or some other equally good term, to believe the claims are too, too diminutive. Personally, we wont to be alone.

* * *

Changed

CAREFUL scrutiny of STEEL'S masthead will disclose several changes. New name added is that of Gordon D. Skinner, ex-Detroiter, now a space chaser out of the Cleveland office. Clyde H. Bailey has moved from his usual spot under the Cleveland headline to that of Service Manager. Newly opened is the Detroit office, now under the guiding hand of A. H. Allen, and congratulations have flooded in from all over the country to E. L. Shaner, STEEL'S editor, on his recent election to the presidency of the Penton Publishing Co.

* * *

Speed

ZIP! That blur which just whipped past might have been one of STEEL'S circulation men after his umpty-umpth subscription in the current campaign, or it might have been one of the editors rushing to beat the deadline with a newsflash, but reliable sources tell us it was none of these. It was one of those new streamlined concrete mixers, latest victims of the whoosh-conscious industrial designers, roaring past on all two wheels with its tongue hanging out and spouting concrete in the most approved streamline fashion.

* * *

Timing

TODAY, Friday, this nation is appalled at the terrible disaster at Lakehurst last night. On Thursday giant presses were grinding out the early pages of this issue of Steel, including the advertisement of Tide Water Associated Oil Co. on pages 12 and 13. Little did those connected with publication of this ad realize what special significance it would carry to those who read it on Monday. Time, according to Einstein, is quite an important dimension in this world.

—SHRDLU

Strip

Strip Prices, Page 99

Pittsburgh—New business in hot and cold-rolled strip has slackened slightly, but current buying approximates 75 per cent of shipments and mills have enough bookings to keep them busy well through this quarter. Hot strip deliveries have improved slightly.

Cleveland—Producers report continued heavy shipments to the farm implement, auto partsmakers, household appliance and hardware manufacturers, although specifications have shown a gradual decline since third quarter prices have been announced unchanged. Few orders have been cancelled or deferred to third quarter, as most consumers are in urgent need of material.

Chicago—Slackening pressure for delivery of strip is enabling producers to improve delivery in instances where tonnages can be worked into current rolling schedules. Backlogs continue heavy, however, and an extension of present active schedules into next quarter is in prospect.

Boston — Cold strip mills, operating at a high rate with new buying less active, are making reductions in backlogs and gradually improving deliveries. Shipments are heavy, and, despite rather heavy stocks held by consumers or on order, a well diversified demand keeps incoming volume higher than expected.

New York—Cold strip demand continues widely diversified, with a gradual decline of new orders. Deliveries continue to improve as mills, still operating at a high rate, are able to work in new specifications on rolling schedules. Hot strip buying has receded about in line with cold demand, most rerollers in the East

being well stocked on narrow widths. Prices are firm and unchanged and under no pressure from consumers.

Philadelphia—Narrow strip deliveries, which have lagged behind most other flat rolled products, are showing a decidedly easier trend, with hot strip now being offered in some cases around two weeks and cold strip around four weeks. Such deliveries are still the exception, but can be obtained.

Youngstown, O.—Makers of narrow width strip are falling farther behind on deliveries, especially for hot-rolled. Pressure on cold strip mills continues heavy, especially from auto partsmakers. Allotments also are the rule in the shipments of strip as in bars.

Shapes

Structural Shape Prices, Page 98

New York—An increased number of large projects, including 3700 tons, subway section, New York; 3000 tons, New York city schools, and heavier bridge requirements in eastern states, closing May 11 and 18, lifts pending tonnage to approximately 25,000 tons. New work is again coming out in greater volume than awards.

Boston—Except for a few small projects, fabricating shops have added little to backlogs. Bids have closed on Massachusetts bridges taking 2100 tons. Private projects in Connecticut increasing. Plain material continues firm at 2.635c, Boston.

Philadelphia—Featuring new inquiry are approximately 4000 tons for the Market street courthouse here, bids June 8. Moreover, there is an increasing amount of new work. Shapes deliveries continue three to four weeks, with prices unchanged at 2.35c, Bethlehem, Pa., or 2.455c, Philadelphia.

Pittsburgh—Awards included 2200 tons for railway facilities for the San Francisco-Oakland Bay bridge. Pending business includes 1100 tons for buildings, Cincinnati Chemical Co., Norwood, O., and numerous smaller projects. Backlogs of fabricators are large and activity will be well maintained apparently for weeks.

Cleveland—Fabricators report an active demand from private sources. Some claim definite delivery promises from the mills are becoming more difficult as backlogs continue to expand. State projects have not come up to expectations but demand from private sources has improved measurably over last year. Prices are firm.

Chicago—Fabricated structural market is dragging most inquiries coming from distant areas. Bridge work predominates. Orders include 1725 tons at Topeka, Kans., and 2000 tons here. Only small lots are pending for Illinois bridges.

San Francisco—Awards were the third largest for any week so far this year and aggregated 12,163 tons, bringing the total to 86,806 tons as compared with 60,995 tons for the

Shape Awards Compared

	Tons
Week ended May 8.....	25,213
Week ended May 1.....	19,003
Week ended April 24.....	17,178
This week, 1936.....	13,290
Weekly average, 1936.....	16,332
Weekly average, 1937.....	27,360
Weekly average, April	28,197
Total to date, 1936.....	368,235
Total to date, 1937	519,832

Includes awards of 100 tons or more.

corresponding period in 1936. Bids were rejected on 850 tons for the Central Tower, San Francisco Exposition. New bids will be opened on May 14.

Seattle—Business is developing in greater volume, both awards and tonnage pending increasing this week. A. S. Schulman Electric Co., Chicago, has the general contract for fabricating and erecting 560 steel towers, over a 116-mile route for Seattle's light department. American Bridge Co., Pittsburgh, will furnish the steel, involving 5500 tons.

Shape Contracts Placed

5500 tons, 516 galvanized steel towers, Skagit transmission line, 116 miles, for Seattle light department, to American Bridge Co., Pittsburgh; through A. S. Schulman Electric Co., Chicago, general contractor.

3500 tons, plant additions, Puget Sound Pulp & Timber Co., Belingham, Wash., to Isaacson Iron Works, Seattle; H. S. Wright & Co., Seattle, general contractor.

2200 tons, railway facilities, San Francisco-Oakland Bay bridge, California; 1100 tons to Judson Pacific Co., San Francisco, and 1100 tons to American Bridge Co., Pittsburgh.

2000 tons, 103rd street viaduct, Chicago, to American Bridge Co., Pittsburgh.

1725 tons, bridge, Topeka, Kans., to Kansas City Structural Steel Co., Kansas City, Mo.

945 tons, bonded warehouses, Louisville, Ky. to Joseph T. Ryerson & Son Co., Inc., Chicago.

600 tons, paper mill building, Lock Haven, Pa. to Ingalls Iron Works, Birmingham.

550 tons, repairs, Manhattan bridge, New York, to Taylor-Fichter Steel Construction Co., Inc., New York.

500 tons, building, West Thirty-fourth street, New York, Spear & Co., New York, to Harris Structural Steel Co., New York.

460 tons, power house addition, North American Rayon Co., Elizabethtown, Tenn. to Virginia Bridge Co., Roanoke, Va.

425 tons, conveyors and miscellaneous construction, consolidated Edison plant, Fourteenth street, New York to Jones & Laughlin Steel Corp., Pittsburgh.

420 tons, bridge WPGH-9, Brown county, So. Dakota, to Des Moines Steel Co., Des Moines, Iowa.

400 tons, building, Moraine Products division of General Motors, Dayton, O., to R. C. Mahon Co., Detroit.

400 tons, telephone building, Stockton, Calif., to Herrick Iron Works, Oakland, Calif.

395 tons, store and studio building, Philadelphia, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

350 tons, Matansuka river bridge, Alaska, to unnamed interest.

330 tons, boiler house, Duquesne Light Co., Neville Island, Pa. to American Bridge Co., Pittsburgh.

300 tons, grade crossing elimination bridge, Verona, N. Y., for New York Central railroad, to American Bridge Co., Pittsburgh.

270 tons, building, Boyertown Burial Casket Co., Menands, N. Y., to James McKinney & Sons, Albany, N. Y.

265 tons, bridges, Thirteenth avenue, Brooklyn, N. Y., to American Bridge Co., Pittsburgh, through Wilson & English Construction Co., New York.

250 tons, hangar building, Albuquerque, N. M., to American Bridge Co., Pittsburgh.

225 tons, state bridge and approaches, Boscawen-Canterbury, N. H., to American Bridge Co., Pittsburgh; M. DeGroot, Jericho, Vt., general contractor; reinforcing to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, plant, California Packing Co., Honolulu, T. H., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

215 tons, boiler house, New Haven Pulp & Board Co., New Haven, Conn., to Berlin Construction Co., Berlin, Conn.; Frederick L. Smith, New York, architect.

210 tons, hangar, Harrisburg, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

200 tons, addition to post office, Sacramento, Calif., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

180 tons, shafts, Delaware river aqueduct, New York, Board of Water Supply, contract No. 333, to Jones & Laughlin Steel Co., Pittsburgh; through Frazier-Davis Construction Co., St. Louis.

180 tons, factory addition, Beech, W. Va., to Riverside Steel Co., Wheeling, W. Va.

165 tons, turbine supports, Williamsburg Power Plant Corp., Brooklyn. N. Y., to Bethlehem Fabricators Inc., New York.

150 tons, truck transfer building, West Twenty-third street, New York, to Alpha Iron Works, New York; through Charles R. Krieg Co., New York.

150 tons, machine shop for Brown Bros., Spokane, Wash., to Isaacson Iron Works, Seattle.

150 tons, addition to hotel, Geary & Mason streets, San Francisco, to Judson-Pacific Co., San Francisco.

150 tons, pure foods building, state fair grounds, Syracuse, N. Y., to Syracuse Engineering Co., Syracuse.

150 tons, vocational school, Chicago to Wendnagel & Co., Chicago.

140 tons, traveling forms, Bids 81,738. Metropolitan water district, Los Angeles, to Pacific Iron & Steel Co., Los Angeles.

135 tons, bridge 1043-R-296-B, Holmes county, Mississipi, to Pidgeon-Thomas Iron Co., Inc., Memphis, Tenn.

135 tons, building addition, Jersey City. N. J. to Selbach-Meyer Co., Union City, N. J.

133 tons, crane runways, Metropolitan water district, Los Angeles, to Western Pipe & Steel Co., Los Angeles.

110 tons, miscellaneous construction, North American Rayon Co., Elizabethtown, Tenn., to Johnson City Foundry & Machine Co., Johnson City, Tenn.

110 tons, coal tipple, Jacksonville, Ill., to St. Louis Structural Steel Co., St. Louis.

110 tons, Betsy Ross school, Chicago, to Eggers Iron Co., Chicago.

110 tons, addition, Farren school, Chicago, to Duffin Iron Co., Chicago.

100 tons, plant addition, Scovill Mfg. Co., Waterbury, Conn., to Berlin Construction Co., Berlin, Conn.

Shape Contracts Pending

5000 tons, viaduct, Dyckman street, New York.

4000 tons, estimated, courthouse, Market and Ninth street, Philadelphia, bids opened June 8. Ballinger Co., Philadelphia, architect.

1100 tons, buildings, for Cincinnati Chemical Co., Norwood, O.

1000 tons, bridge, Westchester Avenue, Bronx river, New York; Fred T. Ley & Co., Inc., New York low.

1000 tons, courthouse, Brooklyn, N. Y.; Psaty & Fuhrman Inc., New York, low

1000 tons, federal office building, Houston, Tex.; bids June 9.

850 tons, central tower, San Francisco exposition; new bids May 14.

850 tons, bridge, Moorehead, Minn.

750 tons, foundry building, for Key Co., East St. Louis, Ill.

600 tons, addition to machine shop, Chrysler Corp., Detroit.

550 tons, bridges, Central railroad of New Jersey, Elizabeth, N. J.; Elldorer Contracting Co., Irvington, N. J. low.

500 tons, warehouse building, Concrete Engineering Co., Chicago.

500 tons, gas plant, Tampa, Tex.

450 tons, crane runway, United Engineering & Foundry Co., Vandergrift, Pa

400 tons, store and broadcasting building for Westinghouse Electric & Mfg. Co., Philadelphia.

400 tons, building No. 10, for Calco Chemical Co., Bound Brook, N. J.

400 tons, addition, Adam Scheidt Brewing Co., Norristown, Pa., bids May 11.

400 tons, four state bridges, Illinois; bids May 14.

300 tons, building, Bedford, Ind.

290 tons, Del Rey-Pacific Electric bridge, United States Engineer office, Los Angeles; Wisconsin Bridge & Iron Co., Milwaukee, low.

250 tons, protection screen material, Harrisburg, Pa., electrification, for Pennsylvania railroad.

250 tons, state bridge Satsop river, Wash.; bids at Olympia May 18.

230 tons, rectifying building, for Maryland Distillery, Relay, Md.

200 tons, hospital addition, White Plains, N. Y.

176 tons, crossing at Wilson Way, Stockton, Calif.; bids May 19.

150 tons, addition, Write Aeronautical Corp., Paterson, N. J.

125 tons, theater, Framingham, Mass.

Two units, 250 ton capacity, traveling electric gantry cranes and transfer car for loading both cranes; delivery naval proving ground, Dahlgren, Va.; bids close June 2.

Unstated, forest service steel span over Kootenai river, Mont., near Warland; bids soon.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 99

Bolt, nut and rivet specifications show little change but consumption among leading consumers remains heavy. Farm implement and tractor manufacturers account for substantial lots and expect to maintain near-capacity schedules through this quarter. Requirements of railroads and freight car builders also are heavy. Miscellaneous demand, as reflected by jobbers' sales and small lot purchases, is well sustained. Prices are fairly steady.

Reinforcing

Reinforcing Bar Prices, Page 99

Pittsburgh—A good volume of small projects and a few large jobs are in prospect. Awards last week included 425 tons for a warehouse for the J. W. Knapp Co., Detroit.

Cleveland — Outstanding award went to Truscon Steel Co., Youngstown, O., involving 480 tons, for grade crossing elimination at Akron, O. Pending tonnage includes 300 tons for the Geo. Worthington Hardware Co. building, Cleveland. Fabricators continue active as business shows no signs of receding. Deliveries can be made within three to four weeks. Prices are firm.

Chicago—Inquiries are in fair volume and pending work is increasing. Awards are headed by 850 tons for Acme Steel Co. buildings here. Illinois is lagging behind neighboring states in inaugurating highway and bridge building.

Boston—Reinforcing steel buying and inquiry is slightly heavier, mostly for public work, bridges and sewer projects. The bulk of the latter being for the Hartford, Conn. district. Small-lot purchasing has increased and awards also include 200 tons for a filtration plant, Lawrence, Mass. Prices show increasing firmness.

New York—Heavy bridge, highway, sewer and miscellaneous demand for reinforcing steel is expected to be enhanced soon by a substantial increase in tonnage for World's Fair construction. Contracts closed lag behind new inquiry, indicating more active buying during the weeks ahead. Prices on most contracts are firmer.

Philadelphia—While current buying remains slack, tonnage is being figured. The largest single project

Concrete Awards Compared

	Tons
Week ended May 8	5,751
Week ended May 1	4,672
Week ended April 24	4,430
This week, 1936	2,391
Weekly average, 1936	6,005
Weekly average, 1937	4,292
Weekly average, April	5,131
Total to date, 1936	129,196
Total to date, 1937	81,565

is the Howard street bridge in Baltimore, bids May 11 There is more institutional work for the state closing in June. Prices are fairly steady.

San Francisco—Demand for reinforcing steel continues strong with mills booked weeks in advance. Awards totaled 3010 tons and brought the aggregate for the year to 30,665 tons, compared with 85,518 tons last year.

Seattle—Small construction jobs are creating a fair volume. Local mills are still running to capacity although first quarter backlog is about out of the way. The largest award consists of 1572 tons for bureau of reclamation at Pomona, Wash.

Reinforcing Steel Awards

1572 tons, bureau of reclamation, invitation B-33,500-A, Pomona, Wash., to Carnegie-Illinois Steel Corp., Chicago.

850 tons, buildings, Acme Steel Co., Riverdale, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

480 tons, grade crossing eliminatioins, Akron, O., to Truscon Steel Co., Youngstown, O.

425 tons, warehouse, J. W. Knapp Co., Detroit, to Truscon Steel Co., Youngstown, O.

391 tons, treasury department, schedule 24,833 for delivery at Compton, Calif., to unnamed interest.

355 tons, pulp plant addition, Bellingham, Wash., and postoffice substation, Seattle, to Bethlehem Steel Co., Seattle.

253 tons, shop building, government air depot, Sacramento, Calif., to Truscon Steel Co., San Francisco.

225 tons, state paving jobs, King and Snohomish counties, Washington, to Northwest Steel Rolling Mills, Seattle.

220 tons, Wilson avenue bridge, Newark, N. J., to Joseph T. Ryerson & Son Co., Chicago; through Standard Bitulithic Co., New York.

206 tons, building for Bigelow-Sanford Carpet Co., Emeryville, Calif., to W. S. Wetenhall Co., San Francisco.

130 tons, bridge, St. Anne's avenue, New York, to Carroll & McCreary Co. Inc., Brooklyn; C. Turiano Contracting Co., Bronx, N. Y., general contractor.

115 tons, state highway project, Northern state parkway, Nassau county, New York, to Concrete Steel Co., New York; through Andrew Western Co. Inc., New York.

115 tons, state highway project, Long Island, N. Y., to Concrete Steel Co., New York; through Good Roads Engineering & Contracting Co., New York.

110 tons, bridge, Willis avenue, New York, to Truscon Steel Co., Youngstown, O.; Rusciano & Son, Bronx, N. Y., general contractor.

104 tons, armory, St. Louis, to Laclede Steel Co., St. Louis.

100 tons, sewage disposal plant, Somerville, N. J., to Taylor-Davis Co., Philadelphia.

100 tons, high school and state bridge project, Washington, to Seattle Steel Co.

Reinforcing Steel Pending

650 tons, courthouse, Ninth and Market streets, Philadelphia, bids June 8; the Ballinger Co., that city, architect.

475 tons, Panama; bids May 20.

440 tons, mostly mesh, highway project, Greenwich, Conn.

425 tons, postoffice, Waterloo, Iowa.

375 tons, footings for Seattle light department transmission towers; A. S. Schulman Electric Co., Chicago, general contractor.

325 tons, senior high school, Wellesley, Mass.; M. Spinelli & Sons, Boston, general contractors.

325 tons, bridges, Nassau county, New York.

300 tons, building, Geo. Worthington Hardware Co., Cleveland; bids in.

215 tons, packing plant, Esterville, Iowa.

195 tons, Sacramento river bridge at Red Bluff, Calif.; bid opened.

175 tons, state bridge, route No. 20, over Boston & Albany railroad and Westfield river, Huntington, Mass.; bids May 10.

165 tons. mostly mesh, highway project, Enfield, Conn.

158 tons, crossing at Wilson Way, Stockton, Calif.; bids May 19.

156 tons, Satsop river state bridge, Washington state; bids at Olympia, May 18.

129 tons, four PWA projects, Oakland, Calif.; Truscon Steel Co., San Francisco, low.

125 tons, state bridge, Merrimack river, Lowell, Mass.; bids May 10.

124 tons, highway, Natchez Trace parkway, Madison county, Mississipi; bids May 27.

110 tons, state highway project No. 937, Cortland, N. Y.

Unstated, intake Gorge power plant, Seattle light department; bids at Seattle, May 13.

Pig Iron

Pig Iron Prices, Page 100

Pittsburgh—Pig iron market has slightly easier tone, although shipments continue heavy and stocks low. Spot business is light. Speculation over third-quarter business has declined and many persons who previously believed an increase might be made have now revised opinion. Export inquiries are lighter.

Cleveland—New business has declined materially over the last 30 days, while shipments have held firm at approximately the March level. An active market is predicted soon after June 1, when prices for third quarter are expected to be announced.

Chicago—Pig iron shipments are steady, reflecting continued good schedules among most foundries. New business has dwindled, usually consisting of only occasional carloads. Producers have taken no stand on third quarter prices but consumers generally anticipate no increase over the $24 market now prevailing on No. 2 foundry and malleable.

Boston—The Mystic Iron Works furnace is now in blast at Everett, Mass. Considerable iron is on books for shipment during remainder of this quarter and a sustained run is indicated. Part of early output will apply against foreign orders, although domestic consumers will be

covered as needed. Buying is light with shipments against orders steady. Little southern iron is available.

New York—Pig iron melters await with interest opening of books for third quarter in view of a possible advance. This has not stimulated speculative buying. Most melters are well covered for second quarter and producers have little available. It is believed if consumers were apprehensive as to an increase in price they would be seeking further tonnage, which probably could be placed with some furnaces. Cables from Tokyo state Japan has contracted for 350,000 tons of pig iron from the United States but local buyers for Japan state they have no knowledge of such business being placed.

Buffalo—Consumers are taking deep interest in the future price trend of iron. Opening of third quarter books is being awaited with unusual interest on account of rumors of further advances. There will be considerable second quarter buying later judging from the large percentage of delivery on contracts now held. Water movement of iron continues very heavy. The Rogers Brown furnace now down for relining will go back into operation before Memorial day, it is expected.

Philadelphia—Pig iron melt continues heavy, with sellers seeing no let-up in shipments. New buying, however, continues spotty, notwithstanding a belief in some trade quarters that higher prices will be announced for third quarter. Trade opinion appears divided on future course of prices, with some believing that prices merely will be extended, rather than advanced.

Youngstown, O.—Struthers Iron & Steel Co. has booked a second order for 25,000 tons of pig iron from eastern brokers for export to Japan within the next two months. It is understood a premium of $2 per ton over current domestic prices was paid.

Cincinnati — Inquiries for small lots of third quarter pig iron are more numerous. Buying continues to lag far behind the melt as foundries reduce stocks and supply needs from shipments against first quarter contracts. Scattered purchases show new prices firm. Foundry operations remain near capacity.

Birmingham, Ala.—Fourteen furnaces are in blast, meeting all demands. Spot buying continues. Surplus stock is ample.

St. Louis—April shipments of pig iron fell slightly below March, but were larger than the April total last year by about 30 per cent and incidentally the heaviest for the month since 1929. New buying is confined chiefly to small scattered lots, the only sale of any size being 2000 tons of No. 2 foundry to an east side mill for delivery over the next 30 days.

Toronto, Ont.—Demand for merchant pig iron is holding steady with sales confined to spot delivery. No forward delivery contracts were reported last week, but some melters are covered for second quarter needs. Sales for the week were around 1700 tons, of which approximately 1000 tons was foundry iron and some 500 tons malleable.

Scrap

Scrap Prices, Page 102

Philadelphia—Further reductions in scrap have been made here, affecting such principal items as No. 1 and No. 2 steels and heavy breakable and cupola cast. Most revisions are based largely on dealer offering prices rather than new consuming orders, as consumers are still disposed to await developments. Nevertheless, a stronger undertone prevails and reductions are not as sharp or as widespread. Moreover, there is a slight increase in consuming interest.

A total of 32,920 tons of steel scrap exported from here in April establishes a new record for this port, according to the board of commissioners and navigation. Shipments in the corresponding month last year, it was stated, totaled 6610 tons. Bids are being submitted to the maritime commission, Washington, on the scrapping of 28 freighters which have been laid up since the World war.

Pittsburgh—A sale of No. 1 heavy melting steel into mill consumption late last week brought the market down to $19.50 to $20, following closing of railroad lists at prices considerably under a month ago. Most dealers have a bearish attitude and mills show little inclination to buy further.

Cleveland—Heavier grades of scrap are softer as larger volumes are attracted by recent peak prices. Heavy melting steel is down 50 cents. Railroad lists now closing have tended to sustain the market.

Chicago—While scrap prices give some indications of leveling off, the consumer buying which is necessary to prevent a continuation of the recent downward trend has not developed. In the absence of mill purchases, prices still are largely nominal. Heavy melting steel has brought around $19 on railroad lists, but dealers are picking up some small lots at less than $18.50. Old material still is coming out in fairly heavy volume, though offerings of

quality grades are relatively light.

Boston — No. 1 heavy melting steel scrap for export is down $1 a ton and No. 2 is 50 cents lower. Most buying for dock delivery and boat loadings are heavy. Domestic demand is dull with prices off about 50 cents a ton on several grades. It is proposed by New England railroads to introduce a separate rate on scrap for export, on a mileage basis, higher than those applying to domestic shipments.

New York—Heavy melting steel grades are $1 lower and brokers now are paying $16 as the top price for No. 1. Stove plate and No. 2 steel are also $1 lower. For domestic shipment borings and turnings, heavy breakable cast and stove plate are 50 cents lower. Prices for domestic buyers are largely nominal, due to lack of buying. Most activity continues for dock delivery for export.

Buffalo—Dealers look for early buying to establish actual rather than the present nominal quotations on scrap. No. 1 heavy melting steel is worth about $19 in the opinion of leading buyers with dealers asking 50 cents to $1 more and little new business being done. Low phosphorus grades and steel rails are steady in a declining market. Borings and turnings have maintained a good share of their former strength in spite of a rapid drop in machine shop turnings. The list is lower this week but dealers think it has considerable underlying strength and will shortly move toward steadiness or possible advance.

Detroit — Continued absence of buyers from the market has caused prices to decline further, most grades being 50 to 75 cents lower, bringing the market to about the level of Jan. 1. Many dealers are of the opinion prices are declining below a reasonable level. Necessity for moving automotive scrap is forcing acceptance of unusually low bids on this class of material.

Cincinnati — Mills continue their apparent apathy toward iron and steel scrap, creating a softer market and bringing declines of 50 cents. Weakness was seen in recent bidding on railroad lists.

St. Louis—Practically all grades of scrap have been cut 25 cents to $1.50 per ton. There has been a fair volume of buying on the decline, mainly of specialties for reasonably prompt delivery. Offerings are freer than heretofore, especially of No. 2 heavy melting, the grade most used in this district.

Birmingham, Ala.—Prices of steel and iron scrap have been lowered considerably in keeping with quotations in other centers. No additional buying has resulted. The general situation is weak.

Seattle—Scarcity of steamer space is restricting export shipments and has had a bearish effect. Some full cargoes have been booked for Japan but this has not relieved the situation appreciably. Prices of $12 to $14 are being variously quoted. It is reported that 20,000 tons are at Portland, Oreg., terminals awaiting shipment, with the same situation at Vancouver, B. C. Japanese buyers are active and eager for prompt delivery which cannot be guaranteed.

Toronto, Ont.—General conditions in the iron and steel scrap markets show no change. Melters show keen interest and there is a good demand for most materials. Dealers, however, state that while there has been some improvement offerings are well under demand and dealers are depleting yard holdings. Mills are taking delivery of all steel scrap available and foundries are pressing for iron grades. Machinery cast is scarce and consumers are forced to use larger tonnages of pig iron.

Warehouse

Warehouse Prices, Page 101

Pittsburgh—Although warehouse orders volume is not quite as brisk as a month ago, most operators term it very satisfactory. Recent rainy weather in many sections has hampered tinners and roofers. Sheet deliveries from mills are still poor. Warehouse interests do not expect any period of extremely slow business this quarter.

Cleveland—Improvement in deliveries on most steel products from mills has been felt in the decline of stock turnover of warehouse distributors. As a rule shipments have fallen a little behind the comparable period in April. Stocks of most distributors have improved over the last 30 days. Prices remain firm on all products.

Chicago—Sales are holding well in a period which normally results in a downward trend. Warehouses anticipated relatively even demand during balance of quarter, with less dip than is customary during summer.

Boston — The number of orders for steel from warehouses continues high, but average somewhat smaller in tonnage. Demand is widely spread with jobbers still benefiting from extended mill deliveries on some products. Prices are firm and unchanged.

Philadelphia — Warehouse business remains good, with orders still reflecting sold-up condition of mills, as well as good miscellaneous demand from consumers who normally are warehouse customers.

Detroit—Sales of warehouse steel products are steady, total business for April being about on a par with March. Prospects are clouded by lack of activity in tool and die shops and by possibility of few changes in automobile models. A fair volume of warehouse business is emanating from industries outside the automotive industry, and helps to

balance the slackness in the latter.

Cincinnati—Ordering from warehouse has carried over into this month at the high level established during the latter part of April when increased sales of sheets and plates offset a dip. Building materials remain below seasonal expectation.

St. Louis—The movement of iron and steel out of store continues satisfactory with items in the building material category making an especially favorable showing. Wire and wire products, notably chicken wire and screening, are in brisk demand, particularly in the South.

Seattle—April volume was fair but fell behind the imposing totals of March. The trade is adjusting itself to the higher price schedules. Present business is confined to small tonnages. The recently raised price structure is being generally maintained in Oregon and Washington.

Iron Ore

Iron Ore Prices, Page 102

Cleveland—All records for April shipments of Lake Superior iron ore were exceeded last month, when 3,770,555 tons were shipped by vessel. The former April record was 2,516,241 tons in 1929. Only 19,446 tons was shipped in April 1936.

The April tonnage exceeded by 202,570 tons the total of 3,567,985 tons for the entire year 1932.

This record was achieved despite the fact ice conditions were unfavorable until the latter part of the month. The rush was due mainly to the low stocks at furnaces and lower lake ports, and the need for consumers to round out their supplies properly in accordance with analyses requirements. As previously indicated the movement is believed to foreshadow a total this season close to the 65,204,600 tons in 1929. The Lake Superior Iron Ore association reports the April movement from ports as follows.

Port	April 1936	April 1937
Escanaba	19,446	449,821
Marquette		308,400
Ashland		153,773
Superior		1,204,169
Duluth		933,378
Two Harbors		721,014
Total	19,446	3,770,555

Ore Imports In Lead

Philadelphia—Ore arrivals continue to lead iron and steel importations here, with 7780 tons of chrome ore arriving during the week ended May 1. Other arrivals last week included 1198 tons of pig iron from British India and 623 tons from the Netherlands.

Four hundred and two tons of structural shapes and eight tons of steel bands came in from Belgium; 115 tons of steel bars and 29 tons of structural shapes from France; and 24 tons of wire rods from Sweden.

Semifinished

Semifinished Prices, Page 99

The falling off in domestic and foreign bookings for finished products has been reflected only slightly in semifinished so far. Nonintegrated mills are still specifying at a good rate and from all indications semifinished may continue fairly close to its present high rate of activity for some time. Export inquiry has been lighter, but this is not entirely indicative of a fulfillment of requirements. Demand for sheet bars is heavy, and wire rods have lost little ground.

Important Valley steelmakers find themselves booked farther ahead with exact specifications for wire rods than any other commodity. Nut, bolt and rivet makers, wire

drawers and a miscellaneous line of consumers are presenting specifications for third quarter and are taking their tonnage allotments as a matter of course as they have been doing since February.

Tin Plate

Tin Plate Prices, Page 98

Pittsburgh—Tin plate producers continue under great pressure for shipments. Specifications are being filed freely and consumers who not long ago were accustomed to obtaining material in four to five weeks now find it hard to get used to delivery in eight or ten weeks. Operations are close to 100 per cent. Considerable now depends on the weather, and if crops are not affected by drouth, specifications from this class of business should greatly exceed last year. Beer can manufacturers are enjoying an exceptionally active season.

New York—Specifications for tin plate are heavy, with most producers booked solidly until Oct. 1. In view of higher prices indicated for that time contract customers are ordering to the limit of their contracts and are willing to take more in available. However, heavy pressure for immediate delivery indicates large consumption. Little tonnage is available for export but premiums from abroad appear to be no higher.

Steel In Europe

Foreign Steel Prices, Page 101

London—(*By Radio*)—A general price increase of £1 or more per ton has been made on all British iron and steel products, effective May 1. The pig iron shortage is taking on serious proportions and while premiums are being offered supplies continue inadequate. All steel production departments are operating to full capacity. Continental semi-finished steel deliveries are expanding, which is bringing some relief to British rerollers.

The Continent reports export demand continues active, especially from India, the Far East and Brazil.

Metallurgical Coke

Coke Prices, Page 99

This month's output of beehive coke and coal is expected to show a decline. With spot business easier, beehive ovens in the Connellsville, Pa., district have been slowed up. One independent steel company which reconditioned 400 ovens not long ago ordered a complete shutdown last Saturday. Contract buyers generally are in less hurry for shipments. Considerable attention has been directed to negotiations over the signing of captive mine contracts with the United Mine Workers.

Nonferrous Metals

Nonferrous Metal Prices, Page 100

New York — Nonferrous metals tended toward steadiness last week in generally quiet markets. Sales of copper, however, increased to an average of over 2000 tons per market today.

Copper—Sentiment improved on increased consumer interest and maintenance of export copper at a level well above the domestic quotation, or around 14.32½c, c.i.f. Electrolytic copper held firm here at 14.00c, Connecticut. In view of the approaching coronation and Whitsun holidays little change is expected to develop in the foreign market during the next week or ten days.

Lead — The market continued stable with consumers displaying confidence in the present 6-cent New York level and buying in a steady manner. No change is expected over the immediate future unless the London market moves sharply.

Zinc — Prime western zinc held firm at 6.75c, East St. Louis. The market is supported in the absence of active demand by its strong statistical position. Stocks of slab zinc at the end of April were reported at only 13,911 tons, equivalent to only one week's needs at the recent avreage rate of shipments.

Tin — The domestic tin market eased from the highs registered early in the week on lack of consumer demand and lower prices in London. Fluctuations were within narrower limits, however, than has been the case for several weeks. Straits spot closed around 55.37½c.

Antimony — American spot rose ⅛-cent on Friday to 15.37½c, New York, while Chinese metal held nominally unchanged at 17.00c, duty paid New York. Consumers showed little interest in the market.

American Steel Foundries Resumes at Verona Works

American Steel Foundries is resuming operations at its Verona, Pa., works, providing employment for more than 400 men, according to W. F. Wilson, plant manager.

More than $1,500,000 has been spent in renovating the plant in the past year, Mr. Wilson said. Idle for eight years, it is expected soon to exceed pre-depression castings production of 2000 tons a month. Railroads use most of its output.

Plant has a 25-ton open-hearth furnace, a three-ton electric furnace, numerous molding machines, and a modern sand-handling machine.

Minnesota To Lay Section Of Cast Iron Pavement

United States bureau of public roads has approved construction of an experimental section of iron pavement on a grade crossing elimination project near Eveleth in St.

Louis county, Minnesota, N. W. Elsberg, Minnesota state highway commissioner, has announced. St. Louis county has approved an appropriation of $15,000 toward the additional cost of the paving. The project specifies about 5000 square yards. The experiment was authorized by the state legislature.

Another test of iron paving has been proposed at Hibbing, Minn., where the city council recently adopted resolutions recommending that funds be appropriated.

Advisory Board Opposes Seventy-Car Train Limit

Protest is being voiced against a bill in the United States senate placing a limit of 70 cars on freight trains. Great Lakes regional advisory board, Cleveland, is seeking to organize opposition to the proposed measure, senate bill No. 69.

The purpose of this legislation is to require the employment of additional train crews and the board estimates increased cost to railroads would be $200,000,000 per year in operating expense in normal years. This would figure out about $4 per car in cost of traffic now moving.

May-June Sheet Wage Based on $2.95 Card Rate

Wages to be paid sheet mill workmen in the May-June period will be based upon a $2.95 card rate, 25 per cent above the $2.15 base rate, plus 10 cents an hour advance according to a conference agreement of March 23. In the January-February period sheet mill wages were on a $2.65 card rate. This was announced last week after the bi-monthly settlement between representatives of Western Sheet and Tin Plate Manufacturers association and the Amalgamated Association of Iron, Steel and Tin Workers.

Canada Gains in Steel, Pig Iron, Auto Output

Steel ingot and casting production in Canada totaled 125,104 tons in March, compared with 11,823 tons in February and 101,092 tons in March, 1936. First quarter output was 352,164 tons, against 294,682 tons for first period last year.

Pig iron output advanced to 70,986 tons in March, compared with 61,995 tons in February, and 55,009 tons in March, 1936. For first three months, production totaled 199,381 tons, 27,285 more than output for corresponding period in 1936.

Ferroalloy output declined from 5668 tons in February to 3868 tons in March. Automobile production gained from 19,707 units in February to 24,901 in March. Automobile imports advanced to 2105 units in March over 1387 in February.

Canada's March Steel Imports Rise Sharply

Canada's steel imports for March totaled $18,686,000, against $11,695,000 in March last year. Imports from the United States increased from $10,234,000 to $16,500,000. Automobile parts led the list with total value of $3,657,000, compared with $2,407,000 for March, 1936. Machinery imports increased from $2,225,000 to $3,569,000. Other imports from the United States included farm implements, $1,626,000; automobiles, $1,611,000; plates and sheets, $1,441,000; rolling mill products (miscellaneous), $907,000; engines and boilers, $883,000; castings and forgings, $211,000; tools, $193,000; tubes and pipes, $162,000; hardware and cutlery, $161,000; stamped and coated products, $145,000.

March exports increased from $5,966,000 to $6,282,000, exports to the United States having a total value of $632,000, as compared with $471,000 for March, 1936.

Great Lakes Red Book Lists Many Changes

With Great Lakes shipping beginning one of its most active seasons, many important changes in vessel data are noted in the 1937 edition of the *Great Lakes Red Book* just issued by the Penton Publishing Co., Cleveland. This vest pocket directory is in its thirty-fourth annual edition.

In addition to the names of more than 1500 vessels registered on the Great Lakes, both American and Canadian, with the names of owners, operators, captains and engineers, the *Red Book* contains a complete directory of shipbuilding yards in the Great Lakes area, with executive personnel and other pertinent information. An alphabetical list of all ships, an index of the capacity of ore carriers and a complete port directory are included.

Bound in paper, 4¾ x 3 inches, 179 pages, the price per copy in the United States and Canada is $1.

Additional Warehouse Chapters Elect Officers

Additional chapters of the American Steel Warehouse association have elected officers as follows, W. S. Doxsey, executive secretary, Cleveland, announces:

Baltimore: President, Henry A. Lowry, Seaboard Steel & Iron Corp.; vice president, A. M. Pfeiffer, Dietrich Bros. Inc.; secretary, Eugene Mowlds, Scully Steel Products Co., all of Baltimore.

Central states: President, Roy H. Atwood, Jones & Laughlin Steel Corp.; vice presidents, A. C. Cox, A. M. Castle & Co., and Walter D. Monroe, Chicago Steel Service Co.; secretary, M. R. Lowenstine, Jr., Central Steel & Wire Co.; treasurer, Edwin G. Fisher, National Steel Co., all of Chicago.

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

St. Louis: President, L. H. Jostes, Beck & Corbitt Co.; vice president, E. W. Fleer, Schurk Iron Works; secretary, Milner Donovan, Donovan Iron & Supply Co., all of St. Louis.

Missouri valley: President, Herman H. Kuehlke, Richards & Conover Hardware Co., Kansas City, Mo.; secretary, J. L. Snowden, Drake-Williams-Mount Co., Omaha, Nebr.

Cincinnati: President, Charles S. Dickerson, Miami-Dickerson Steel Co., Dayton, O.; secretary, F. E. Morris, E. K. Morris & Co., Cincinnati.

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

Philadelphia: President, A. C. Allshul, Joseph T. Ryerson & Son Inc.; vice presidents, L. Norris Hall, L. Norris Hall Inc.; George P. Kraemer, Edgar T. Ward's Sons Co.; secretary-treasurer, J. J. Collins, L. Norris Hall Inc.

Pittsburgh: President, J. M. Hilbish, Jones & Laughlin Steel Corp.; secretary, T. A. Harper, Edgar T. Ward's Sons Co.; treasurer, William L. Abbott, McKee-Oliver Inc.

Wisconsin: President, George Gibbs, Gibbs Steel Co., Milwaukee; vice presidents, L. R. Moise, Moise Steel Co., Milwaukee; R. E. St. John, Morley-Murphy Co., Green Bay; secretary-treasurer, George Smith, Joseph T. Ryerson & Son Inc., Milwaukee.

For recently elected officers of eight other chapters, see STEEL, April 26, p. 33.

Brake Shoe & Foundry Organizing Divisions

American Brake Shoe & Foundry Co. has consolidated the American Forge Co. and the Southern Wheel Co., with the parent company. These are now known as the American Forge and Southern Wheel divisions, respectively.

Consolidation of certain other subsidiaries and their organization as divisions will take place as soon as practicable.

In line with this program, the Brake Shoe division has recently been created. This division produces, in addition to brake shoes, miscellaneous iron castings.

Maurice N. Trainer, vice president, has been placed in charge of the Brake Shoe division.

Permissible Variations In Plates Standardized

The technical committee of the Association of American Steel Manufacturers, Pittsburgh, has issued a standard practice booklet covering standard permissible variations in the thickness, weight, width, length, flatness and camber for sheared and universal mill plates and floor plates.

The data are in tabular form and represent revisions of the previous standard practice established in 1935.

70 Link-Belt Managers Worked Up from Ranks

In his annual report to stockholders, Alfred Kaufmann, president, Link-Belt Co., Chicago, said that 70 men in managerial positions in the company's eight plants had worked up from the ranks. Of these, 21 started in the drafting room, 21 in the shop and 28 as office boys and clerks. Their average length of service is 27 years.

"To me, this is an answer to the question so often asked by the younger men as to whether opportunities ahead are as big today as they were 20 or 25 years ago," Mr. Kaufmann stated.

Packaging Institute To Broaden Its Activities

Use of stainless steel in packaging machinery construction; metallizing—spraying of molten metal by acetylene spray gun; and standard commercial practice for cold finished carbon steel bars, were among

subjects discussed at the recent semiannual meeting of the Packaging Machinery Manufacturers institute in New York. Members of the organization reported an increasing and unprecedented demand for automatic machinery.

A production and engineering clinic, to meet at frequent intervals, was established at the meeting, and attracted a representative group of production and engineering men. Purpose of the clinic is to consider problems of standardization and common interest and to exchange technical knowledge. To provide means for this exchange of information, the institute was asked to issue a monthly bulletin.

H. L. Stratton, 342 Madison avenue, New York, is secretary of the institute.

Blast Furnaces Are Losing Feminine Names

Blast furnaces, many of which were formerly named after wives, children, and sisters of ironmakers, have been steadily losing their feminine designations, according to the American Iron and Steel institute.

Rugged furnaces, producers of iron, at one time were called by such names as Sarah Ann, Fannie, Betty, Little Belle and Matilda. This custom has been said to have arisen from the unpredictable behavior and occasional balkiness of early furnaces.

With development of technical improvements in ironmaking, ending former uncertainties and delays, the towering blast furnaces have lost the seemingly temperamental and feminine traits. Today, iron workers talk of the No. 1 furnace rather than of the Mary Ann, Eva Lily or Tassie Belle.

Eight blast furnace plants with feminine names are still in existence, however. Several are being operated. At one time more than 100 stacks were called by feminine names. Several others were known as Little Pet, Little Giant and Last Chance.

Germany Increases Sales Of Machinery to Cuba

While Cuba continues to import most of her industrial and agricultural machinery from the United States, the American percentage of participation in this trade has been declining during the past three years, while that of German manufacturers has been trending strongly upward, according to Assistant American Commercial Attache Charles E. Ducote, Havana, in a report to the department of commerce.

In 1933 the United States supplied 77.3 per cent of this machinery imported into Cuba and, in the first six months of 1936, 82.0 per cent. However, in 1934 the percentage was 90, and in 1935, 86.9, showing a declining trend. In 1933 the percentage of German importations was 8.7, and in 1936, 9.9. The United Kingdom, according to the figures, has a steady share of from 2 to 3 per cent.

Vacations for Salaried Workers Prevalent Policy

Vacations with pay are granted clerical workers of 98 per cent of 450 companies surveyed recently by the National Industrial Conference board. Most prevalent policy in force is to allow two weeks vacations to salaried employes with one year's service. More than 43 per cent of industrial companies and 19.2 per cent banks and insurance companies covered by survey follow this practice.

Next in order of frequency are companies that provide one week's vacation after six months' service and two weeks for one year's service.

Aside from these two groups vacations policies were found to vary widely although usually at least one year's service is a prerequisite for full participation.

Equipment

Chicago — Equipment markets continue active, though buyers are less anxious to close on machine tools since higher prices became effective. Price increases served to stimulate demand before they became effective. Inquiries, however, indicate a maintenance of good sales. Railroads and farm equipment builders are considered as prospects for additional machine tool purchases.

Pittsburgh — Machinery dealers and builders report demand holding up well here, with deliveries unimproved. Automotive requirements are increasingly active and export inquiries are steady. Electrical equipment manufacturers in particular have been busy.

Cleveland — Machine tool and equipment inquiries and sales held steady last week. Most sales are small but cover a wide range. Dealers report April business was about equal to that of March. Manufacturers' business is more active than that of distributors, much of their output going to other districts. Deliveries continue to be their principal problem.

Seattle—Dealers report active demand for roadbuilding machinery. Logging is brisk and lumber plants are making replacements, adding to the volume of trade. Mining equipment is moving freely as operations increase. Water system accessories, particularly pumps and motors, have been selling in a considerably increased volume.

Construction and Enterprise

Ohio

BRADNER, O.—Village has plans prepared and will issue $15,500 bonds toward construction of $49,000 water plant improvements, including reservoir, softening plant, pipe lines, valves, hydrants, etc. Champe, Finkbeiner & Associates, Nicholas building, Toledo, are engineers. A. A. Stump is mayor.

CLEVELAND — City is considering construction of generating plant in southeasterly portion of the city. Frank O. Wallene is director, department of public utilities; Robert Hoffman room 518 City hall, is city engineer.

CLEVELAND — Ohio Crankshaft Co., 6600 Clement avenue, recently acquired 18 acres at Harvard avenue and East Forty-second street, for plant expansion. Construction will start soon on first unit of project, a one-story brick and steel building, 150 x 500 feet, estimated to cost $225,000. William C. Dunn is president of the company.

DAYTON, O.—Inland Mfg. Co., division of General Motors Corp., will install conveyors, electric hoists and controls in new addition to automotive parts plant. Cost is estimated at $800,000.

DELPHOS, O.—City will hold special election, June 22, to determine whether construction shall continue on $300,000 municipal electric light plant. Carl Simon, Van Wert, O., is consulting engineer. (Noted April 12, March 29).

GREENVILLE, O. — Darke county rural electric co-operative, care of Ohio Farm Bureau Rural Electrification Inc., Pure Oil building, Columbus, O., is taking bids, due May 19, for construction of 200 miles rural lines at an estimated cost of $225,000. Carl Frye, above address, is engineer.

TOLEDO, O. Davis Machinery Co., 1 South St. Clair street, is considering construction of three-story addition, 60 x 75 feet, estimated to cost $75,000, including equipment.

Michigan

BRECKENRIDGE, MICH.—Village is taking bids, due May 12, for construction of waterworks pumping station, including installation of deep well turbine pump and auxiliary equipment. R. T. Paulus is village clerk receiving figures.

DETROIT—Automotive Stamping & Mfg. Co., 6000 Beniteau avenue, has been incorporated by Gustav Von Reis, 5901 Harrel avenue, to engage in general manufacturing.

DETROIT — Metalmen Mfg. Co. has been incorporated by Calvin McRae, 5430 Lawton avenue to manufacture tools.

DETROIT — Sterling Burner Corp. has been organized by Archie Featherstone, 15330 Idaho avenue, to manufacture fuel burners.

FLINT, MICH. — Super-Glo Oriental Wax Co. Inc. is considering construction of two-story factory building, 150 x 160 feet, on South Dixie highway, at Flint.

GRAND RAPIDS, MICH.—Phoenix Refineries Inc., P. O. Box 104, has been organized by Stephen F. Dunn, 300 Michigan Trust building, to refine and sell crude oil.

Illinois

CHICAGO — John Amann, 5832 South Green street, manufacturer of wire products, is receiving bids on general contract for one-story plant addition, 65 x 115 feet, to cost over $50,000 with equipment.

ROCKFORD, ILL. — Burd Piston Ring Co., 2401 Tenth street, has awarded contract for construction of one-story plant addition, 40 x 65 feet, for expansion of heat-treating department, to Security Building Co., 717 East Jefferson street.

Indiana

ALEXANDRIA, IND.—Superior Mfg. Co. Inc., 215 East Berry street, has been formed to manufacture automatic coal stokers and insulation blowing machines. Incorporators are Noel P. Irwin, also named resident agent, Mildred Irwin and Raymond McCarty.

INDIANAPOLIS—Rite-Way Tool & Die Corp., 1931 Martindale avenue, has been formed to manufacture tools, dies and machinery, by Charles S. Henson and associates. Herbert S. Wright was named resident agent.

NEW ALBANY, IND.—Charles L. Gohmann Corp. has been formed to operate a foundry, by Charles L. Gohmann and associates.

RICHMOND, IND.—American Metal Door Co. Inc., Richmond, has been incorporated to manufacture metal doors, machinery and other metal products. Incorporators are Edith O. Winzer and associates. James J. McCauley is named resident agent.

WHITING, IND.—Federal Metals Corp., 600 West Forty-first street, Chicago, Ill., has acquired site for smelting and refining plant. Plant will consist of several one and multi-story units, including power house. Total cost is estimated at $1,000,000.

Pennsylvania

CORRY, PA.—Corry-Jamestown Mfg. Corp., West Main street, manufacturer of steel office furniture and other steel products, plans erection of three-story factory addition, 45 x 85 feet, at a cost of about $65,000 with equipment.

NORRISTOWN, PA. — Adam Scheidt Brewing Co., Marshall and Barbados streets, is having bids taken by E. Lane Crawford, Norristown Penn Trust building, until May 12, for construction of $300,000 brew house.

WARREN, PA. — Valvoline Oil Co. will spend $50,000 for alterations to vaseline plant here, closed for the past three years, and will reopen as soon as repairs are completed.

New York

BROOKLYN, N. Y.—Edwin B. Stimpson Co., 68 Franklin avenue, manufacturer of metal specialties, has awarded contract for two-story plant, 87 x 97 feet, to Caye Construction Co. Inc., Clarkson avenue and East Forty-third street. Cost, with equipment, will be about $60,000.

BUFFALO—Lake Erie Foundry Co., 218 Chicago street, manufacturer of gray iron castings, has awarded contract for construction of one-story plant addition to George J. Summers & Co. Inc., 1266 Seneca street. Cost is estimated at about $45,000.

JAMESTOWN, N. Y. — Art Metal Construction Co. has purchased building formerly occupied by Acme Worsted Mills, here, and is expected to remodel property for expanded production.

ROCHESTER, N. Y.—Eastman Kodak Co. plans to spend over $12,000,000 for plant modernization and expansion this year. Major part of expenditure will be at Rochester and at Kingsport, Tenn.

SYRACUSE, N. Y.—Carrier Air Conditioning Co., Newark, N. J., will occupy former plant of Franklin Motor Car Co., here, about June 1.

New Jersey

BAYONNE, N. J.—Atlas Steel Barrel Co. plant was damaged by fire recently.

Maryland

BALTIMORE — Industrial Paper Co., 503-505 Water street, has leased three-story warehouse, 613-615 West Pratt street, and will occupy when alterations are completed.

BERLIN, MD.—Eastern Shore Public Service Co., Salisbury, plans construction of auxiliary generating station, and power line to Ocean City, Md.

CRISFIELD, MD. — City will receive bids until May 18 for construction of sewage treatment plant, outfall sewers and appurtenances. Clarke Gardner, Salisbury, is consulting engineer.

LUKE, MD.—West Virginia Pulp & Paper Co., 230 Park avenue, New York, plans extension of boiler house facilities, including steam generating unit, at its plant here.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids until May 14 for one heavy-duty engine lathe, schedule 599, for delivery Boston, Mass., miscellaneous carbon and high-speed twist drills, schedule 640, for delivery various east and west coast points; until May 21 for miscellaneous motor-generator sets, schedule 647, for delivery various east and west coast points.

Florida

NEW SMYRNA, FLA. — City receives bids May 29 for furnishing diesel engine and crane, to be installed in power plant. W. E. Swoope is mayor.

ORLANDO, FLA. — Leonard W. Saine, 32 Wilson court, is in the market for miscellaneous boring, reaming and threading machines in diameters up to 12 inches.

Georgia

ATLANTA, GA. — Sloan Paper Co., 543 Whitehall street S. W., has acquired tract on north side of Fair street and plans erection of $80,000 building.

Kentucky

DRY RIDGE, KY. — City will take bids soon for construction of main pipe line for water supply from Williamstown to Dry Ridge, including 50,000-gallon steel tank and tower. H. K. Bell, McClelland building, Lexington, Ky., is consulting engineer.

Louisiana

BATON ROUGE, LA. — North Baton Rouge water works district No. 1 will vote June 1 on issuing $400,000 bonds to finance construction of waterworks improvements, including deep wells, 51 miles mains, 500,000-gallon storage tank

and 250,000-gallon standpipe. E. G. Blakewood is consulting engineer.

BOSSIER CITY, LA.—Compressed Industrial Gases Inc., 19 North Sheldon street, Chicago, Ill., subsidiary of Burdett Oxygen Co., has started construction of $100,000 plant for production of nitrogen, oxygen and acetylene on a site near here.

North Carolina

HIGH POINT, N. C. — Slane Hosiery Mills Inc. has completed plans for construction of $12,000 addition to plant on Mangum street. Willis H. Slane is secretary and treasurer.

YANCEVILLE, N. C. — Yanceville sanitary district of Caswell county receives bids May 21 for installing water distribution system, including steel elevated tank and tower. A. C. Linberg, Burlington, N. C., is consulting engineer.

Tennessee

ENGLEWOOD, TENN. — Englewood Citizens Corp. announced plans for construction of hosiery mill, to be in operation by October.

West Virginia

BENWOOD, W. VA. — Wheeling Steel Corp., Wheeling, is building pipe warehouse, estimated to cost about $275,000, near company plant here.

Missouri

AURORA, MO. — Majestic Milling Co. has awarded contract for construction of grain elevator, including seven round tanks, nine interstice tanks and 17 tempering tanks, to Ryan Construction Co., 103 Keeling building, Omaha, Nebr. Cost is estimated at $65,000. Horner & Wyatt, 470 Board of Trade building, Kansas City, Mo., are engineers.

ST. LOUIS—Carter Carburetor Co., 2834 North Spring street, has let contract to Austin Co., Arcade building, for construction of three-story addition, 60 x 180 feet, at an estimated cost of $100,000, including equipment.

ST. LOUIS — Owens-Illinois Can Co., Toledo, O., has acquired site near Goodfellow boulevard for erection of $500,000 can plant. Francisco & Jacobus, 511 Fifth avenue, New York, are architects. J. A. Benjamin, 904 South Fourteenth street, St. Louis, is plant manager.

ST. LOUIS — John Nooter Boiler Works, 1402 South Second street, has awarded contract for construction of plant addition at 1408 South Second street, to McKelvey-Felix Construction Co., 3743 West Pine boulevard. Builders Engineering Co., 3115 South Grand street, is engineer. Cost is estimated at $30,000.

WINDSOR, MO. — City plans construction of sewage disposal plant with auxiliary equipment and accessories. Bond issue of $28,000 is available. W. B. Rollins & Co., 339 Railway Exchange building, Kansas City, Mo., are engineers.

Oklahoma

MEDFORD, OKLA.—Grant County Cooperative Electric Corp. has REA loan of $180,000 for construction of 200 miles rural lines in Grant, Kay and Alfalfa counties.

Texas

AUSTIN, TEX.—Austin Concrete Works, 403 Paul street, has acquired site on East Fifth street and Pleasant Valley road for construction of plant for manufacture of concrete pipe up to 42 inches in diameter.

CLEVELAND, TEX. — City will vote May 25 on $90,000 waterworks and $50,000 sewer bonds. Garrett Engineering Co., P. O. Box 1726, Houston, Tex., is engineer.

KERRVILLE, TEX. — Schreiner Wool & Mohair Commission Co. will construct warehouse, 85 x 302 feet, with capacity for 2,000,000 pounds of wool.

Wisconsin

CHIPPEWA FALLS, WIS.—Board of education closes bids May 13 for furnishing metal and wood-working machinery to new vocational school, also lockers, furniture, etc. John J. Nibbe is secretary.

FOND DU LAC, WIS.—Simplex Mfg. Co., Chicago, manufacturer of sheet metal specialties, has purchased idle plant of Rosenthal Woodworking Co., 196 East Main street, here, and will remodel and equip at cost of about $25,000. W. B. Stephenson is principal owner and manager.

GREEN BAY, WIS.—Wisconsin Public Service Corp., Bellin building, has accepted bid of C. R. Meyer & Sons Co., Oshkosh, Wis., for general construction of $400,000 dam and power house across Wisconsin river at Tomahawk. A. G. Carson is chief engineer. (Noted May 3).

MILWAUKEE — Lincoln Scrap Iron & Metal Co., Fortieth street South and West Lincoln avenue, has been incorporated by Max Polcyn and associates.

MILWAUKEE—Brace Oil Filter Co., 329 East Brown street, manufacturer of lubricant purifiers and other specialties, has leased 14,000 square feet in Wellauer building, 234 North Broadway, for expansion purposes. R. Lyle Brace is president and chief engineer.

MILWAUKEE—Ampco Metal Inc., 3830 West Burnham street, manufacturer of copper, bronze and alloy castings, forgings, mill bearings, etc., has placed contracts for general shop extension, 80 x 200 feet, to increase production facilities. Melting capacity will be increased nearly 60 per cent. Investment is about $75,000. Carl J. Zaiser is president.

PRAIRIE DU CHIEN, WIS. — Martin Sebastian and Lawrence Fernette, have awarded contracts for construction of one-story cabinet and woodworking shop, 36 x 134 feet.

RACINE, WIS.—Western Printing & Lithographing Co. is about to proceed with construction of plant extension, begun in 1932. With equipment, investment will be about $80,000. E. H. Wadewitz is president.

WAUSAU, WIS.—City council has commissioned Jerry Donohue Engineering Co., Sheboygan, Wis., to make plans and estimates for construction of new sewerage system, sewage disposal plant and garbage incinerator. Entire project is estimated to cost $1,340,000, financial assistance from PWA has been applied for. J. L. Brown is city clerk.

Minnesota

MANKATO, MINN. — Mankato Brewing Co. has awarded contract for construction of three-story bottling house, 60 x 75 feet, to cost $50,000 with equipment, including bottling machinery, conveyors, etc. G. R. Martin is president.

MINNEAPOLIS — Advance Machine Co., manufacturer of floor surfacing machines, will rebuild machine shop damaged by fire recently. H. J. Pond is president.

MINNEAPOLIS — Cowin & Co., reinforcing steel jobber, has started construction of one-story warehouse addition, 42 x 78 feet, to be used for storage of reinforcing steel bars and other steel products. James Cowin is president.

WINONA, MINN. — Froedtert Grain & Malting Co., Milwaukee, Wis., has awarded contracts for alterations and improvements to malting plant estimated to cost about $50,000. Improvements will include three 1000-bushel steep tanks, switchboard system, conveyors, motors and controls, etc. E. T. Potter is chief engineer.

Kansas

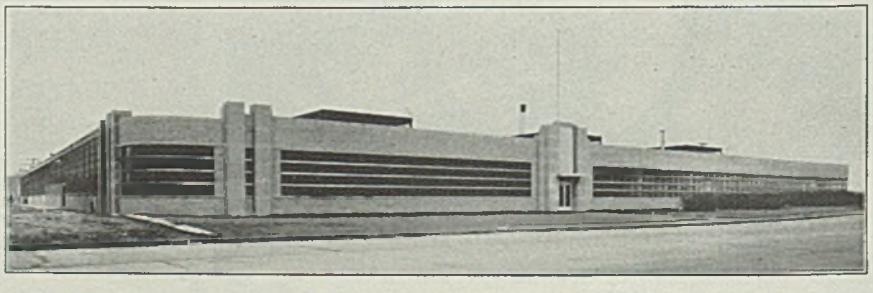
MORROWVILLE, KANS.—City has WPA approval of plans for construction of waterworks at a cost of $38,000. J. L. Halter is city clerk; Paulette & Wilson, 311 Farmer's Union building, Salina, Kans., are consulting engineers.

Pacific Coast

GOLDENDALE, WASH. — Texas Co. is building a district distributing plant for petroleum products, including erection of warehouse, offices, pump house and storage tanks.

SPOKANE, WASH. — Inland Empire Rural Electrification Inc., has signed contract with REA for $445,000 loan to build 465 miles power lines. D. I. Hopkins is president. Bids will probably be called for in June.

Herron-Zimmers Occupies New Moulding Plant



THE Herron-Zimmers Moulding Co., manufacturer of automobile and trailer moldings and special sections, has moved into this new building at 3900 East Outer drive, Detroit. The plant is equipped with facilities for economical, straight-line production, with capacity to supply increasing needs of automobile and trailer builders

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Bids Wanted

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., April 16, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., May 28, 1937, for construction of the U. S. P. O. at Worthington, Ohio. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Building Branch.

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Bids Wanted

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., April 16, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., May 20, 1937, for furnishing all labor and materials and performing all work for construction of the U. S. P. O. at Eaton Rapids, Mich. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

PROCUREMENT DIVISION, Public Buildings Branch, Washington, D. C., April 23, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., June 1, 1937, for remodeling the U. S. P. O., Custom House and Court House at Cleveland, Ohio. Upon application, two sets of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

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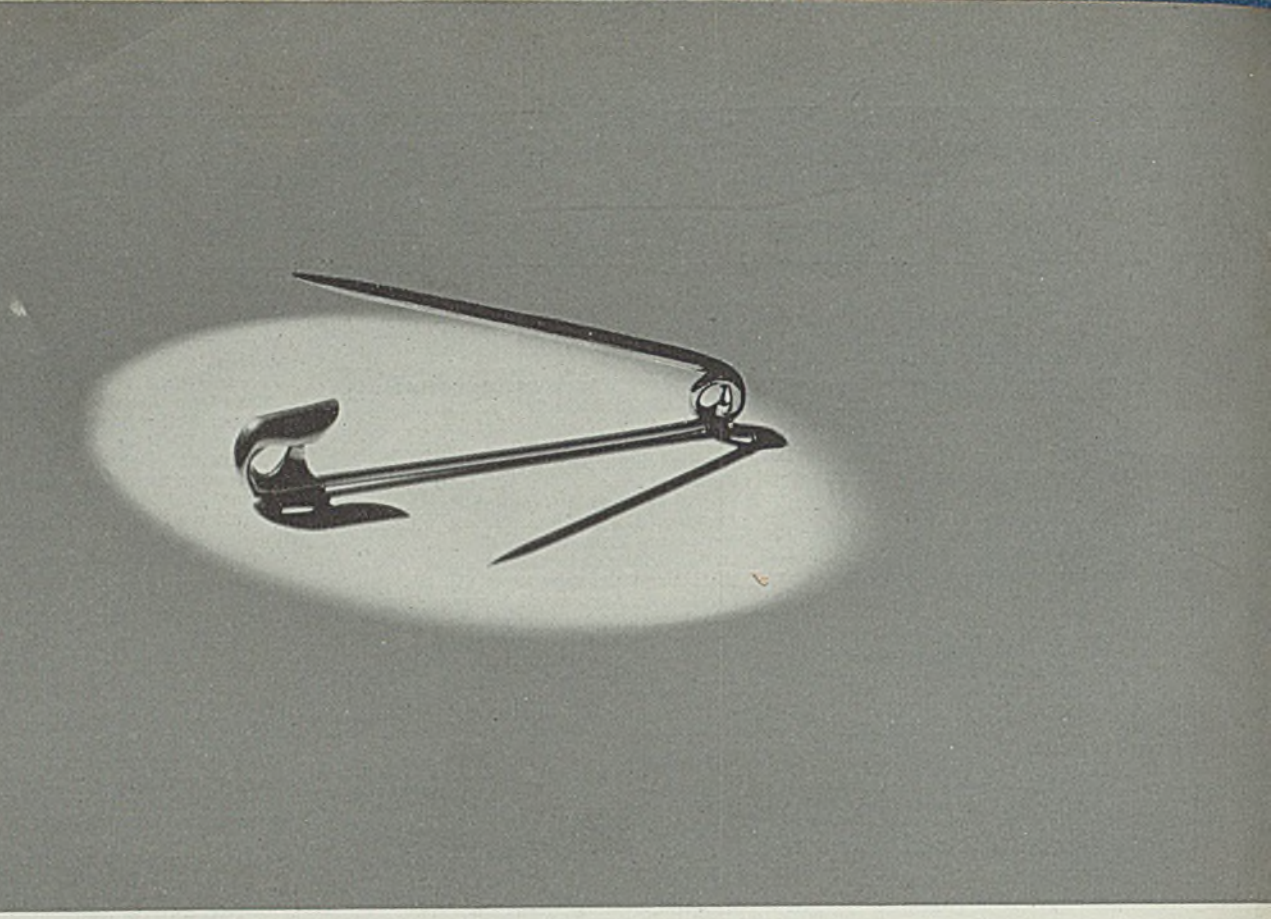

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