

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

Contents May 31, 1937

Volume 100 - No. 22



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Member, Audit Bureau of Circulations;
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Published every Monday. Subscription
in the United States, Cuba, Mexico
and Canada, one year \$4, two years
\$6; European and foreign countries,
one year \$10. Single copies (current
issues) 25c.

Entered as second class matter at the
postoffice at Cleveland, under the Act
of March 3, 1879. Copyright 1937 by
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Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, O.
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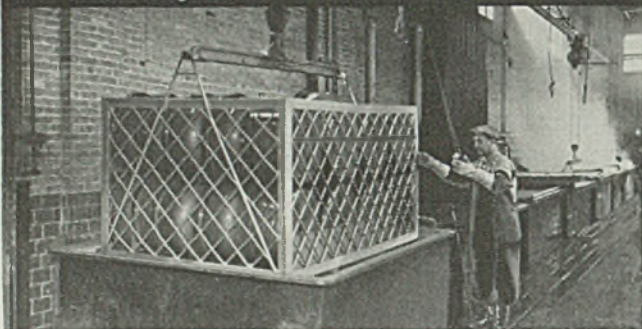
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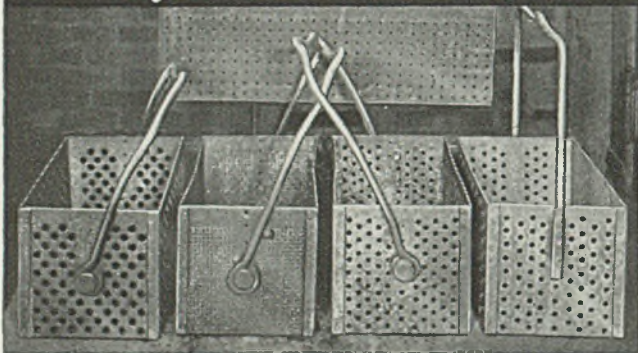
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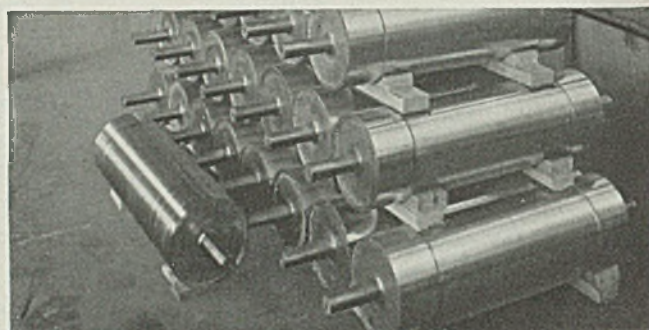
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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

INDUSTRIAL news of the past week centered largely upon the labor and convention fronts. Several thousand industrialists took time off to go to meetings of purchasing agents, steel warehousemen, gear manufacturers and steel producers. In all these conventions the topic of labor relations dominated corridor discussions and figured prominently in some formal programs. At the forty-sixth meeting of the American Iron and Steel institute, which climaxed the current spring convention season, interest was heightened by the knowledge that strikes were in effect in some plants of three leading independent steel producers.

The institute meeting stood out from its predecessors in several important respects. The program embracing three addresses at the morning session, technical papers at the afternoon, and banquet in the evening was marked by good taste and propriety in every detail. The presidential address by Mr. Grace was a model of constructive industrial statesmanship. The addresses by George O. May and Representative Wright Patman were well received by a large audience. Mr. Baker's after-dinner speech "Democracy in Industry" was timely, and undoubtedly the most scholarly address heard at any banquet in the institute's history.

Viewing the entire day's proceedings in broad perspective, one is impressed with the fact that industry, as reflected by opinions expressed by the institute spokesmen, is gradually working toward a more intelligent view of its labor and public relations problems. Several years ago institute speakers invariably spoke on these topics in terms of impatience and annoyance. Last Thursday Messrs. Grace and Baker touched up-

on the same problems in terms of patience, tolerance and thorough understanding of the realities of a delicate situation. We venture to believe that if the average man in the street could have been present at the last five institute meetings he would have been impressed much more favorably by the 1937 meeting than by its predecessors. That is a test of statesmanship, and it is gratifying that the steel industry is improving its position in that respect.

In his paper at the institute meeting, C. M. White, Republic Steel Corp.'s vice president in charge of operations, noted (p. 42) that there is a decided trend away from mere cost in production. Special services receive the emphasis instead of low cost, with special steels being held to close limits prescribed by the customer. Research and testing, with more expensive alloying elements, have caused marked rises in the price of finished steel. Mr. White stated that unionization tended to straight-jacket the industry and retard development of new and better methods of production, citing as an example the progress in steel and automotive industries, as against the building trades.

Last week reports of management studies by foundrymen were recorded; this week the same problems are discussed in the report (p. 48) of the American Gear Manufacturers' association meeting, reflecting a need for employer-education in the principles of management. Decentralization of industry was discussed (p. 56) by American Society of Mechanical Engineers. . . . Variety of uses of stainless steel is broadened (p. 64) through its application in equipment for paint and varnish manufacture, eliminating metallic impurities. . . . Induction heating uses increase with the development (p. 76) of new applications in forming and forging operations.



Labor Views
Conciliatory

Management
Discussed

Emphasis On
Special Service

E. L. Shaner

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Photo shows electrical pyrometer being used to check temperature inside the furnace

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TOM MERCER GIRDLER, elected fifth president of the American Iron and Steel institute May 27 . . . born on Indiana farm in 1877 . . . high school in Louisville, Ky. . . . mechanical engineer Lehigh University, 1901 . . . employed by Buffalo Forge Co., Oliver Iron & Steel Co., Colorado Fuel & Iron Co., Atlantic Steel Co. . . . Jones & Laughlin Steel Corp., assistant general superintendent of Aliquippa works, 1914, to president, 1928 . . . joined Cyrus S. Eaton and Mather interests in 1929 to form Republic Steel Corp., by merger of Republic Iron & Steel Co., Central Alloy Steel Co., Donner Steel Co. and Bourne-Fuller Co. . . . made chairman of Republic Steel Corp., 1929 . . . also president in 1930 . . . relinquished presidency to R. J. Wysor, April, 1937, retaining chairmanship . . . has been director, member of executive committee and vice president of the institute.



C Harris & Ewing

Workers Can Have the Representation They Want—Should Not Be Coerced

By EUGENE G. GRACE

+

IF THE steel industry is to do its job for the public in the way that it should, we must have a healthy industry. We must have a period of reasonable earnings to make up the losses of the depression, and to give a fair return to patient investors.

Over the past 12 years the average earnings of the major steel companies have been less than 4 per cent of the invested capital. And this is in a business, where, due to the large initial cost of plant construction and rapid obsolescence, the investment risk has been high. In 1936, in spite of better produc-

tion, the earnings on invested capital were only a half of one per cent above the 12-year average, or 4½ per cent.

This seems to me a most conservative return, not only compared with other manufacturing industries, but also when one considers that we are using up our basic raw material supplies which are irreplaceable at anything like their original cost.

The cost of making steel has reached a very high level. The high cost level is not because of inefficient facilities, or obsolete processes, but principally because of increases in the cost of labor, materials and government.

There is no better investment

than liberal pay to labor. Likewise no individual or interest should shirk responsibility in paying its share to meet the costs of government. But we have come to a point in national economics where government expenditures are of grave concern to all, regardless of party, and where they threaten the progress of the country's economic advance.

Government expenditures of an extraordinary character may be necessary and wise during a depression, but every dollar of taxes collected by the government from American industry is a dollar added to the cost of goods and services. Many overlook the fact that, under normal conditions, low taxes are just as

Abstract of the address by President Eugene G. Grace at the forty-sixth general meeting of the American Iron and Steel Institute, New York, May 27.

necessary for sustained buying power as are lower prices or increased wages. Industry cannot be expected to practice all the economy. Let's give the consuming public a few billions by reducing taxes and see what that will do to enhance buying power.

The accumulation of costs in labor, materials and government made the recent price advances in steel unavoidable. I am hopeful that the trend will go no higher, for the growth of industry in this country, including our own, has gone hand in hand with increased output, better products, and lower prices. . . .

The enterprise of steelmaking in recent months has been highly encouraging, in respect to production and markets. If the rate of operations for the first four months continues throughout the balance of 1937, the ingot output of the steel industry for the year will be close to 60,000,000 tons compared with 56,433,000 tons in the record year of 1929.

But I should like to introduce a word or two of caution. Unless the mounting costs to which I have referred can be held in check, the future may be disappointing. And we must be careful not to permit this high production to lead us into building excessive ingot capacity. Our present high production has been needed to satisfy a market starved during the depression. But we must not be stampeded into trying to meet existing demands over night. The subnormal demand for steel lasted for seven years, and it will take a considerable period of

super-normal operations to supply the accumulated shortage.

We should, of course, continue our development of new finishing processes, improved methods, and the efforts to make better and more products; but the situation today does not, in my judgment, justify any important increase in steelmaking capacity. Experience has taught us on more than one occasion that idle plant investment is an expensive luxury.

Another factor which must be carefully weighed in the appraisal of our industry and its opportunities is the labor situation. In fact, the labor question in its many aspects and ramifications is the outstanding problem in today's industrial life. What are we doing in our industry to promote permanent industrial peace?

Record of Steel Is Good

Certainly, no unemployment at this time can be charged to the steel industry—and that is true of industry in general. The steel industry today employs 577,000 men compared with 458,000 in 1929, an increase of 25 per cent. It is a pretty fine record for our industry that throughout the depression there was a minimum amount of governmental relief required.

While substantial progress out of the depression has been made in most industries, it is a fact that the labor unrest in many places is retarding that movement. Significantly the problem does not arise within the industry itself. The relations between management and

employees in basic American industries are and have been healthy. The pressure is coming from the outside. The employe is in between various factions seeking in one way or another to gain control. . . .

A prominent labor leader has said "There is no employer or group of employers who can keep employes from organizing if they want to organize." I agree with that statement. Irrespective of what an employer may think as to the merits of one form of labor organization or another, if the vast majority of the workers of this country have chosen not to join up with the trades union movement it is because they have made this choice of their own free will.

In the long run, if allowed to act without interference or coercion on either side, employes will choose for themselves the kind of organization or representation they want. That is as it should be.

The question has been much agitated in recent months as to whether those engaged in industrial enterprise have a voice in their working conditions. Within industry, real progress has been made along these lines over the past 20 years.

The phrase "collective bargaining" is new in popularity but old in fact. Wherever employes have freely chosen the form of organization through which they wish to deal, and the results of those dealings have promoted the interests of all concerned, a great public service has been rendered.

A fact somehow obscured in re-
(Please turn to Page 19)

Twenty-one Hundred Attended Steel Institute's Banquet



Record Attendance at Institute Meeting;

Conciliatory Spirit on Labor

BECAUSE of the strained labor situation, unusual significance attached to the forty-sixth general meeting of the American Iron and Steel institute at the Waldorf-Astoria hotel, New York, last Thursday.

About 2000 representatives of the industry—the largest number ever to attend—were at the opening session when President Eugene G. Grace called the meeting to order and delivered an address in which he took occasion “to restate in simple terms the fundamentals of good labor relationships as they have existed and as they should exist in the future.”

“With respect to representation and collective bargaining,” he said, “the employes can have what they want. We as employers want them to have what they want, but they ought not to be forced to have what they don’t want. The employe is protected in that right by the law and we as employers respect the law.”

The labor topic again came to the fore, when Newton D. Baker, Cleveland, lawyer, and secretary of war in President Wilson’s cabinet, spoke at the banquet on “Democracy in Industry.”

Optimism Dominates

He declared that the Wagner labor act—“which requires one side in a great and vital discussion to remain silent while the other does all the discussing will be amended.”

In the main, it was a cheerful and optimistic meeting. It was recalled that the industry has experienced some months of excellent business, has heavy backlogs, and new demand while tapering still shows surprising strength. Fiscal policies in Washington were considered far from reassuring. Rising taxes and mounting labor and material costs were forcing expense of making steel to a high level. That morning the newspapers carried large headlines announcing “80,000 steel workers

on strike in the Middle West.”

So it was a closely attentive audience that listened to President Grace as he delivered the keynote address. Incidentally, it also was his farewell address as head of the institute, Mr. Grace having declined renomination, and T. M. Girdler, chairman, Republic Steel Corp., having been elected in his place.

There must be a better return for capital invested in steel, he said.

He expressed concern over government expenditures. He warned the industry not to permit present high production to lead it into building excessive ingot capacity.

Mr. Grace then launched into a discussion of the labor question. He said the problem does not arise within industry itself but the pressure is coming from the outside.

Employment Is High

Discussing the steel industry’s contribution to industrial peace and welfare, he declared that no unemployment at this time can be charged to steel—and that this is true of industry in general. The steel industry today is employing 25 per cent more than it did in the previous boom time of 1929.

He cited some figures which had just been compiled for his own company for April which he thought were typical of the steel industry.

In that month his company employed 102,100 men, with an average hourly rate of pay of 90.1 cents, as against 73,500, at 68.3 cents, in 1929. At the present rate of operations and pay the employes are receiving on an average \$1900 annually for a 41-hour week, compared with \$1700 on a 48-hour week. (For an abstract of Mr. Grace’s prepared address see the preceding article in this issue of STEEL.)

Mr. Baker declared that the Wagner act when amended “will impose upon both sides responsibility for their actions as well as their words.”

In upholding the democratic form of government he stated the philosophy of Marx to him “is the most repellant and sterile of them all.”

He commented on other schemes of government and declared that

democracy is the answer to problems now facing society. Endorsing the Jeffersonian theory of government, he said: “Democracy according to Jefferson was not a scramble of the incompetent for the right to control things which they did not understand.”

“So I think when we make the analogy to industry we have to look and see what our industry actually has done. For it is certainly true that unless industry is democratized on the same theory that has made our political democracy a success our industrial democracy will destroy our political democracy.”

Mr. Baker appealed to the leaders of industry to be worthy of the faith the masses place in them, saying:

“Success is only possible as long as there is confidence in their leadership. In the long run in the rescue of our country from its trouble, in the rescue of a sound philosophy from all the boiling and eddying currents that are now abroad, I say to you that it is my conviction that the rescue must come by the leaders of industry and the leaders of public life, being true to principle and so winning and keeping the faith of the people.”

Introduces New Officers

In introducing Mr. Girdler as the new president at the banquet, Mr. Grace said:

“When I tell you it was a real election you will appreciate the selection.”

Mr. Grace then introduced William A. Irvin, president, United States Steel Corp., who was re-elected vice president of the institute and E. T. Weir, chairman, National Steel Corp., who was elected a vice president to succeed Mr. Girdler. Each stood up and bowed in acknowledgement of the applause.

Mr. Grace, who presided throughout the evening, explained that the terms of the new officers began at 11:30 p. m. He presented the Steel institute medal to Clyde E. Williams, director, Battelle Memorial institute, Columbus, O. Mr. Williams, who is in charge of that institute’s technical work on iron

and steel, was awarded the medal for his paper entitled "New Technical and Economic Importance of Iron and Steel Scrap," presented at the Steel Institute's general meeting May 28, 1936.

Walter S. Tower, executive secretary of the institute, subsequently was called upon to introduce the authors of the technical papers presented at the afternoon session. When C. M. White failed to respond to his call, Mr. Tower facetiously observed that he had gone "to join the picket line."

In introducing Mr. Baker, Mr. Grace observed that he hoped the speaker "would encourage us in believing that there was still democracy for the management and investors and employees in the conduct of business."

What many considered as a happy augury for the new regime, was an incident which occurred while Mr. Baker was speaking. Mr. Girdler tilted his chair so far that he fell over backwards, but was soon seen rising above the level of the speakers' table.

"How characteristic," remarked Mr. Baker, "Mr. Girdler always comes up smiling."

Attendance at the banquet was the largest on record, being over 2100, compared with 1900 last year, the second largest.

Tax Adjustments Seen

Speaking at the morning session on "The Growth and Incidence of Taxation," George O. May, senior partner, Price, Waterhouse & Co., New York, voiced the opinion that "if it is not to be repealed, the undistributed profits tax law should be amended so at least to permit the offsetting of losses of one year against the profits of another, to give substantial relief to those companies which are employing their profits to add to the capital equipment of the nation, and to mitigate the burdens which it imposes on financially crippled corporations.

"It must not be overlooked that during the depression steps were taken to increase the immediate yield of the income tax by a number of measures which clearly sacrificed justice to necessity and which subjected to income tax and so to the undistributed profits tax, when it was created, much that was not in any real sense income.

"Denial of deduction for losses on sales of capital assets, while profits are taxed, and withdrawal of the right to carry forward losses as a deduction from taxable income of subsequent years, are important illustrations. At the stage of recovery we have reached, industry seems to have a clear claim to the restoration of the old rules on these points

on the grounds of simple justice."

Wright Patman, congressman from Texas, and one of the authors of the Robinson-Patman act, explained intent and provisions of the law and predicted its rigid enforcement, with benefits to all business.

"This is not a price fixing law," he said, speaking at the morning session. "It does not grant a subsidy to anyone. It places all competitors upon the same competitive floor. There will still be the same premium on cleverness and efficiency in business that there has always been. The law merely grants equal rights to all and special privilege to none.

"The law is intended to restore equality of opportunity in business without penalizing service and effi-



Clyde E. Williams

Director, Battelle Memorial Institute, Columbus, O., and in charge of that Institute's technical work on iron and steel, was awarded the American Iron and Steel Institute's medal last week for his paper "The New Technical and Economic Importance of Iron and Steel Scrap," presented at the Steel Institute's general meeting, May 28, 1936

ciency. Only a small per cent of business men are unfair and guilty of bad practices. It is these Captain Kidds, who have been detouring the golden rule, that this bill will inconvenience.

"The Robinson-Patman law applies only to interstate transactions. To a retail, wholesale or manufacturing business operating wholly within a state, that is, if all the customers of such an establishment are wholly within the state, to such an institution as a seller, this law will not apply.

"As a buyer from outside the state it will be entitled to all the benefits of this law and subject to its penalties. Practically all retail establishments are affected only as buyers. I estimate that 90 to 95 per cent of all manufacturing, jobbing and wholesale business is affected by the law."

W. B. Gillies, vice president,

Youngstown Sheet & Tube Co., presided at the afternoon technical session.

"The iron and steel industry may take real pride in the fact that its leaders had the vision, the courage, the interest and the common sense to bring the frequency of industrial accidents to public attention, to establish the industry as a pioneer in accident prevention work, and to maintain its position of leadership through the years."

This tribute was paid by L. H. Burnett, vice president, Carnegie-Illinois Steel Corp. In his paper on "Fundamentals of Safety and Accident Prevention in Steel Plants," he outlined the fundamentals as:

"Proper attitude of chief executives toward safety and their continued interest in safety; a safe place in which to work and safe working conditions; the foreman, with all that the word implies in this work; careful choice of new employes and their proper training; safety organizations encouraged by top management; general educational program on safety for all employes."

He suggested a safety program to be sponsored by the institute including appointment of a safety committee and engaging the services of a safety engineer familiar with best practices in the steel industry.

Hazards Are Removed

"Men are much safer in a modern steel plant than on the public highway and safer even than in their own homes," he said.

"Labor in the nation's steel mills today has advanced so far from the hazardous days of 30 years ago that the average mill man is now a preferred risk of insurance companies."

Quoting records of the bureau of labor statistics, Mr. Burnett showed that the frequency of disabling injuries in steel mills dropped from 60.3 per million man-hour of work in 1913 to 6.3 in 1935.

C. M. White, vice president in charge of operations, Republic Steel Corp., presented a paper on "Technological Advances in Steel Products," in which he also commented on commercial and production features. His paper is printed in this issue, beginning on page 42.

Also featuring the afternoon session were papers by Dr. V. N. Krivobok, associate director of research, Allegheny Steel Co., on "Stainless Steels," and Dr. G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, on "Developments in Production Metallurgy of Iron and Steel," to which reference will be made in subsequent issues.

Mr. Burnett's paper was discussed by George T. Fonda, assistant to the president, Weirton Steel Co., and

Earl T. Blank, director, personal relations, Jones & Laughlin Steel Corp. Mr. White's paper was discussed by W. Mathesius, manager of operations at Chicago for Carnegie-Illinois Steel Corp. Dr. Krivobok's paper was discussed by Earl C. Smith, chief metallurgist, Republic Steel Corp., and M. A. Grossman, director of research, Carnegie-Illinois Steel Corp. There was no discussion of Dr. Waterhouse's paper.

Mr. Grace's Address

(Concluded from Page 16)

cent times is that many employers for years have recognized the need for cordial relationships with their employes. By and large that principle gained nation-wide impetus from President Wilson's industrial conference following the world war. An appeal was made for all parties to co-operate in promoting industrial peace.

Bargaining's Beginning

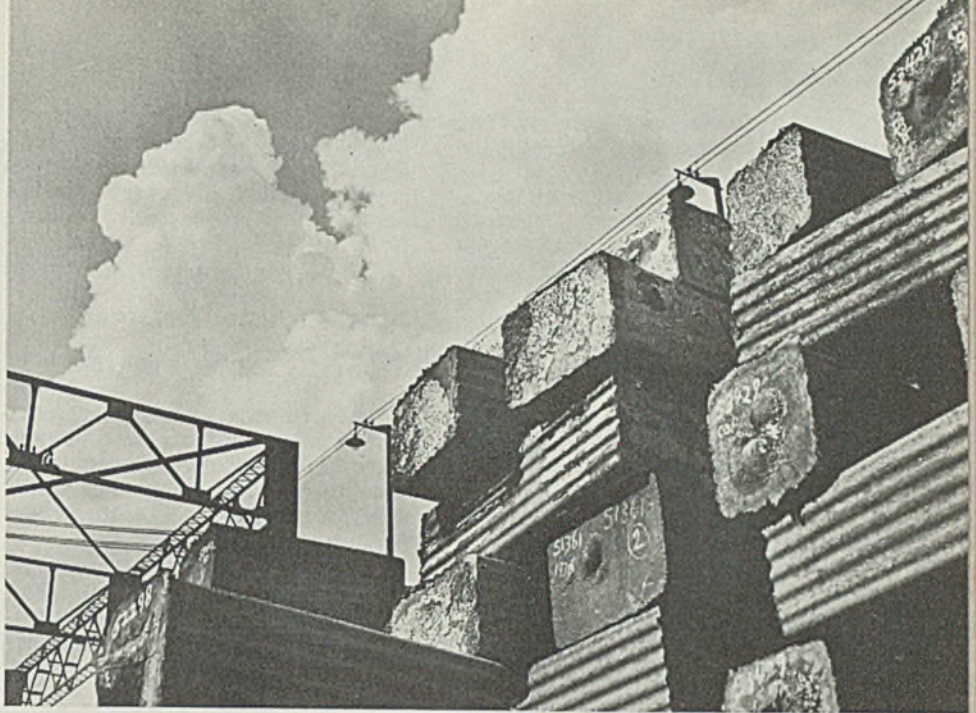
That conference marked a high point in co-operative relations between business and labor and government. The report of the conference signed by William B. Wilson, secretary of labor, and a roster of other leading citizens, was a magna charta of collective bargaining. It advocated no special type of organization.

It said representation is a definite principle rather than a form. It recognized the validity of employes representation, works councils, plant committees, national and local trade unions as effective forms of mutual dealing. But above all it stressed that the real objective was the goal of industrial peace.

There was a whole-hearted, nation-wide response to the constructive Wilson report. Over the intervening years through the relationships developed, wage standards were lifted, hours were shortened, working conditions were bettered, jobs were made more secure and a long reign of industrial peace was enjoyed throughout the country.

In the maze of present-day propaganda which is clearly designed to discredit the motives of employers, few people realize that what industry has done to build up good relationships with employes is largely the outcome of a sincere effort by high public officials, outstanding citizens and business leaders of this country to find the solution to this fundamental industrial problem.

Almost everything that the employer now does for the employes is being discredited. Next thing the employer will be accused of the domination if he provides free lily cups for the drinking fountains. The



By Ewing Gallowsay, N. Y.

Fluted Ingots—in Stock

real issue, which is the maintenance and promotion of industrial peace and the progressive improvement of the standard of living for the worker, is relegated to the background.

I wish, therefore, to restate in simple terms the fundamentals of good labor relationships as they have existed and as they should exist in the future. With respect to representation and collective bargaining, the employes can have what they want. We as employers want them to have what they want, but they ought not to be forced to have what they don't want. The employe is protected in that right by the law, and employers respect the law.

We have seen some shocking violations of law in industrial centers during recent months, but I believe that in the long run the public instinct for the safety and security of government by law will prevail. . . .

Our institute has a real job ahead

to continue to present to the country the facts about the steel industry. Steel has often been used as a whipping-boy by persons having ulterior purposes. As a consequence some sections of public opinion have been prejudiced against our industry. The leadership of steel in high wages, favorable working conditions and many aspects of social security has been largely ignored. Its contribution to the growth and stability of other industries has not been fully realized. But we do not need to give up, or become discouraged.

I am sure there is a better understanding and appreciation of steel today than there was five years ago. I believe that, if we continue to hammer away with the facts, the public at large will in time fully recognize the high purpose, the good faith, accomplishments, and progressiveness inherent in our industry.

How Institute Was Formed 29 Years Ago

TWENTY-NINE years have elapsed since the American Iron and Steel Institute was formed—long enough to test any organization—and it moves on as a vital force in the industry "for the commercial, economic and scientific progress," the principles to which the institute was dedicated at its inception.

Patterned after the Iron and Steel Institute of Great Britain, it provided the first real point of contact for all the struggling interests in a rapidly developing industry, at the beginning of the most remark-

able era of expansion in the country's history.

Origin of the institute goes back to the famous Gary dinners. The first of these to which E. H. Gary, then chairman of the United States Steel Corp., invited representatives of iron and steel companies—was held in November, 1907. The second, in February, 1908, seems to have supplied the necessary impetus for the organization, and that year the institute was incorporated.

About seventy, including the leading executives of practically all the important iron and steel companies

attended the second dinner. Only a few of those present are still living.

Officers of the institute at its inception were: President, Elbert H. Gary; first vice president, Powell Stackhouse; second vice president, Charles M. Schwab; third vice president, Willis L. King; secretary, W. J. Filbert; treasurer, Edward Bailey. The board of directors included these officers and W. E. Corey, J. C. Maben, E. A. S. Clark, John A. Topping, E. C. Felton, W. A. Rogers, J. F. Welborn, T. J. Drummond and Samuel Mather.

The steel industry, then as now, was producing about half the world's output of steel. In 1907 steel ingots and castings totaled 23,362,594 gross tons, compared with 47,767,856 tons in 1936.

History of Meetings

At the beginning of the institute statistics of the steel industry were being compiled by the American Iron and Steel association, but in 1912 this work was taken over by the institute after 40 years in the hands of the association headed by James M. Swank.

Two meetings of the institute were held each year, this plan continuing through 1931. Since then only one meeting has been held each year, in May.

The first meeting was in October, 1910, which included a tour to Buffalo, Pittsburgh, Chicago and Washington. Beginning in 1912 the spring meeting was held in New York and the fall meeting in some steel center. The New York meetings were at the Waldorf-Astoria.

The meeting last week was the forty-sixth, all but six of which have been held in New York.

The institute has had five presidents, Judge E. H. Gary continuing in that position from its inception until 1927, when he was relieved from the duties at his request.

He was succeeded by Charles M. Schwab. Mr. Schwab served as president until September, 1932 when he was named chairman of the institute—a new and temporary office. At that time Robert P. Lamont, secretary of commerce in the Hoover cabinet, was made president. Mr. Lamont resigned in September, 1933. Mr. Schwab retired as chairman in 1934, and E. G. Grace was elected institute president. He served until May 27 this year, now being succeeded by T. M. Girdler.

That the institute has been representative of the industry is indicated by the record of attendance. Starting in 1910 the registration was 212. In 1918 it had reached 990 and the next year 1200. From that time, with the exception of the fall meeting of 1931, when the registration

was only 800, it has not been below 1000 and in 1936 it reached 1900. These figures are conservative because in practically every instance actual attendance exceeds registration.

Steel Industry Enlarges 1937 Research Program

Research activities of steel companies in 1937 are broader and more intensive than in any recent year, according to reports to the American Iron and Steel institute by leading producers.

More than \$10,300,000 will be spent in research work this year, 12 per cent more than the \$9,200,000 spent in 1936 and nearly 20 per cent above the 1929 research budget, \$8,700,000.

In preparation for the expanded program, additional research facilities and equipment valued at nearly \$2,000,000 were put into use during 1936, increasing total investment in steel research equipment to nearly \$8,000,000.

More than 2350 engineers, metallurgists, chemists, physicists and other technical experts are now employed in steel research laboratories. In addition, almost 1200 other employes devote part time to research.

Reports also disclose a larger share of the steel industry's dollar spent for research will be devoted to possible new markets and uses for its products than last year.

Investigations to develop new products have consumed 20 cents out of each dollar both this year and last. Approximately \$3,400,000 will go to discovering means of improving quality of its various products.

United Engineering Books Many Foreign Orders

United Engineering & Foundry Co., Pittsburgh, has received an order from the Steel Co. of Canada, Hamilton, Ont., for a 44-inch blooming mill, complete with accessory equipment, through United's Canadian associates, Dominion Engineering Co., Ltd., Montreal. This blooming mill will be a duplicate of the large units now under construction for Republic Steel Corp. at Cleveland, and the Richard Thomas Co. in Wales, England, and similar to the mill furnished the Ford Motor Co. several years ago.

United is also building for the Steel Co. of Canada one of the newly-developed up and down-cut shears and a new type of billet shear.

A number of new orders from Japan have been received by United,

following the recent award of a 43-inch four-high hot strip mill by Nippon Seitetsu Kaisha Ltd. A four-high reversing 42-inch cold strip mill has been ordered by Toyo Kohan Kaisha Ltd. for the production of tin plate by the cold reduction process. This order includes the auxiliary and processing equipment, the shearing and cleaning lines and a rotary coil pickler.

For the Furukawa Denki Kogyo, the company will furnish one 32-inch four-high cold mill and two 56-inch four-high cold mills and auxiliary equipment for the production of nonferrous products, such as copper, brass, and duralumin in sheet and coil form.

For the Sumitomo Kinzoku Kogyo K. K. there will be furnished two stands of two-high mills, one 84-inch and one 65-inch, complete with the gear drive, for the hot and cold rolling of aluminum and magnesium alloy sheets.

It was also announced that the associate company in England, known as Davy & United Engineering Co. Ltd., has announced the construction of mills for a complete steel plant in Turkey.

World Tin Consumption Up; America Uses Half

World apparent tin consumption in March was more than 19,000 tons, against 14,600 tons in February, according to the International Tin Research and Development council. Total consumption in the first three months of 1937 was 49,432 tons, compared to 39,999 tons in the first quarter, 1936. Production in these periods amounted to 44,110 and 39,065 tons respectively, indicating this year's consumption exceeded production by 5000 tons. However, this was due to restocking by consumers; statistics indicate only 41,600 tons were used in manufacture during the first quarter.

For the year ended in March, world tin consumption totaled 164,927 tons, against 150,302 tons for the year ending March 1936. The United States used 82,675 tons in the year ending in March, half of the world consumption.

Weirton Plans Flood Wall At Steubenville Plant

Weirton Steel Co., Weirton, W. Va., will protect its Steubenville, O., plant with a \$250,000 flood wall. The proposed barrier has been designed by the company's engineering department to keep water out of the plant even though the Ohio river rises to more than 2 feet above the record flood of March, 1936.

Closed Shop and Check-off Held Real Strike Issues

DETERMINED to force its demand to be the sole bargaining agency for employes of the Republic Steel Corp., Youngstown Sheet & Tube Co., and Inland Steel Co., the Steel Workers Organizing committee last week declared strikes which led to the closing of plants and the loss of work by approximately 70,000 men.

It was impossible to determine how many of these are members of the Amalgamated Association of Iron, Steel and Tin Workers and those who were ready and willing to work. Picket lines were thrown around most of the plants, and the usual tactics employed to keep workers away.

Steelworks operations in the Cleveland, Youngstown and Chicago districts fell sharply. The average rate for the week at Chicago was down 10 points to 75 per cent. In the Youngstown district the rate was off from 80 per cent in the preceding week to 30 per cent. Cleveland was down 17 points to 65 per cent. The national rate declined 16½ points to 75 per cent.

Plants of the Youngstown Sheet & Tube Co. and Inland Steel Co. were reported virtually 100 per cent down and the union appeared to be concentrating its efforts against the Republic plants which were still operating.

Republic issued the following statement: "Previous to the strike, Republic Steel Corp. had been operating 60 of its open-hearth furnaces in plants where strikes were called. Tonight (Thursday) with the steel plants at Warren and Canton, O., Chicago and Buffalo working, there are a total of 23 open hearths in production."

Strikes Made "Official"

Union members at Republic, Sheet & Tube and Inland plants left their posts Wednesday night when the 11 o'clock shift changed. The walkout at Canton and Massillon, O., at first was unauthorized, SWOC officials said. However, union heads quickly took advantage of the situation and called strikes in these and other plants, making the uncalled strikes "official".

In Cleveland the situation in Republic's four closed plants at the close of the week was quiet. Corrigan McKinney works, Truscon, Upson Nut and Steel & Tubes were down. Its plants at Elyria, O., Can-

ton, and Massillon were closed and the Buffalo works affected.

At Youngstown, approximately 30,000 workmen were idle as the result of three plants of Sheet & Tube and three plants of Republic being closed.

At Pittsburgh, Republic's Dilworth-Porter plant was closed. Republic's subsidiary at Beaver Falls, Pa., the Union Drawn Steel Co., also was down.

In the Detroit district, operations of two Republic subsidiaries continued late last week despite a strike call by a district SWOC director. It was reported workers at the Newton Steel plant in Monroe, Mich., went to work as usual and ignored pickets placed around the plant by the union. Steel & Tubes Inc.'s branch at Ferndale, Mich., also was operating.

In lengthy statements to their employes, and publicly announced, Sheet & Tube Co., Republic and Inland explained their positions with respect to agreements with the Steel Workers Organizing committee.

Referring to an interview with Philip Murray, SWOC chairman, and others representing the committee,

on April 28, Sheet & Tube says:

"The company definitely stated that it would meet and negotiate with representatives of the CIO for bargaining purposes on behalf of such of the company's employes as are members of that organization. The company stated that it always has recognized the right of its employes to collective bargaining and at all times has been willing to meet and negotiate with duly accredited representatives of its employes for such purposes.

Company More Liberal

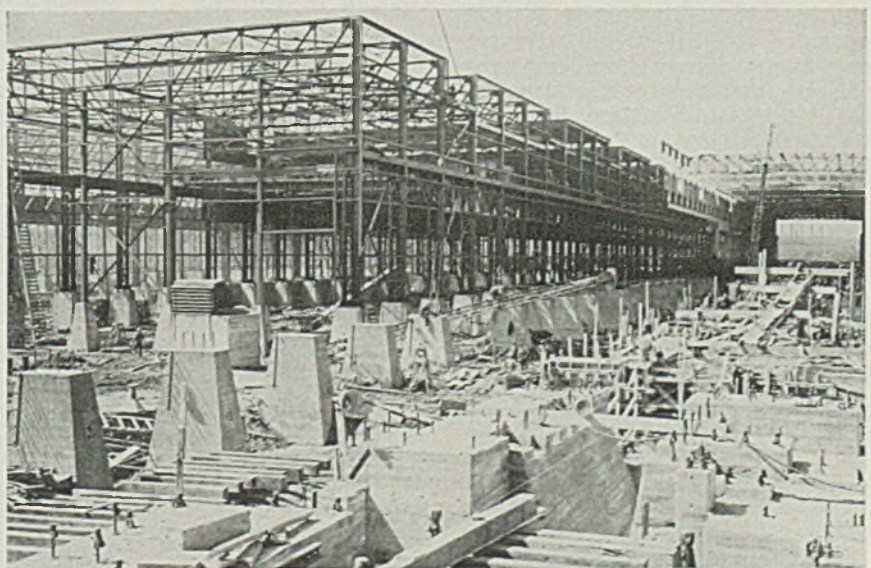
"The company explained that it had established a policy of vacations with pay more liberal to the employes than that requested by the SWOC and that it sees no present reason for withdrawing that advantage from its employes.

"The national labor relations act guarantees to employes the right of collective bargaining through representatives of their own choosing. A written contract to observe the law is a futile gesture.

"The act assures rights of collective bargaining to employes but does not require or suggest written agreements.

"A written agreement brings no advantages to employes which they do not now possess. It does create an artificial need for labor organization officials to negotiate annually a new agreement as each old one expires regardless of the necessity for any change in the provisions of the agreement. This creates the risk of

Building a \$15,000,000 Mill in Ten Months



SCHEDULED for operation by September, ten months after work began, Republic Steel Corp.'s 98-inch strip mill at Cleveland is well under way. One-third of a mile long and occupying 20 acres, the plant will cost \$15,000,000. The building proper requires 15,000 tons of steel, and 5000 tons was used in the foundation. Wide World photo

periodical shutdown during annual negotiations for new agreements. . .

"Another important objection to signed agreements lies in the use to which such agreements are subject by labor organizations. It has been stated by prominent labor organization leaders that such agreements definitely are intended to lead to the closed shop and the check-off. Establishment of the closed shop principle results in the infringement of the free right of individual employes to work regardless of membership or non-membership in a given organization. The closed shop is not practicable in the steel industry."

Check-off Is Real Issue

Republic Steel in a pamphlet mailed to all employes declared the closed shop and the check-off were the real issues.

It explained its stand in question and answer form. It denied the closed shop and check-off were consistent with a square deal. Principles of a square deal, as outlined, involve employes' right to bargain collectively without coercion from any source, the right to work without being forced to pay tribute, the right and duty of management to plan and supervise operations, and management's responsibility to pay the highest wages possible.

"If an employer advises his workers not to join a particular union, it is called coercion and intimidation. But if the same employer, by a closed shop contract, forces workers to join a particular union, it is not called intimidation and coercion. This view is illogical and false."

Inland Steel announced it will recognize the SWOC as collective bargaining agency for employes who are members of the Amalgamated Association of Iron, Steel and Tin Workers, and will not interfere with employes' right to join that association.

"No Intimidation"

"The company will insist that there be no intimidation of employes to compel them to join any organization," it stated. "It will not permit solicitation of organization membership on company's premises.

"The company recognizes and will abide by the principle of collective bargaining relating to wages, hours and working conditions, as provided by law.

"The company also recognizes the right of employes to bargain individually, and will deal individually with such employes as desire this method in preference to collective bargaining."

The exclusive bargaining contract

between SWOC and Jones & Laughlin Steel Corp., Pittsburgh, which resulted from the election May 20, was completed last week. In many respects it is similar to the contracts held by SWOC with United States Steel Corp. subsidiaries, except that the phrase "exclusive bargaining agency" appears in the Jones & Laughlin pact.

In the provision for adjustment of grievances in the Jones & Laughlin contract it is stipulated:

"The union reserves the right to refuse to take up a grievance on behalf of any employe who is not a member of the union, in which event such employe shall have to present and take up his grievance directly with the corporation."

Crucible Steel Co. of America and its subsidiaries signed an agreement which, like the United States Steel Corp. contracts, gives SWOC only the right to bargain for employes who are members of SWOC.

Crucible in an official statement pointed out that existing arrangements respecting wages, hours or other working conditions would be unchanged.

An election conducted by the national labor relations board in Sharon Steel Corp. plants at Low-ellville, O., and Sharon, Pa., was won by SWOC by a vote of 1773 to 721. Out of 2603 employes eligible to vote, 2549 went to the polls. Fifty-five ballots were void. At Sharon the vote was 1122 for the

Rare Mineral Sought for Use in Armament

TANTALITE, a rare mineral, of which small deposits have been found in Australia, is being eagerly sought by American, Japanese and German buyers for use in armament manufacture. Exploration in the interior of Australia is being undertaken to reveal further deposits. The United States is said to have the advantage by possession of the largest supply at present about 600 pounds.

Tantalite is an ore of tantalate of iron, manganese and niobium. Tantalum is the metallic base of tantalate of iron and is so named because of the difficulty experienced in isolating it from its compounds. It is closely allied to vanadium in its physical characteristics, being a hard, tough, white metal, resistant to acids. Its hardness exceeds that of glass and gives it great durability. The price recently has been doubled because of increased demand.

union and 396 against, while at Low-ellville it was 651 for the union and 325 against.

Pittsburgh Steel Co. employes will vote in an election June 9 and 10.

SWOC announced that 140 steel and metalworking companies had signed contracts.

HEARINGS ON NEW LABOR BILL JUNE 1

Announcement has been made in Washington that joint hearings on the administration's new labor bill will be held before the house and senate committees on labor beginning June 1. It is expected that the hearings will be opened by testimony from Assistant Attorney General Jackson, who will talk on the legal phases of the bill. (See also page 37.)

Sonnhalter President of Pittsburgh Crucible Steel

A. L. Sonnhalter, since 1932 vice president in charge of production, Pittsburgh Crucible Steel Co., Pittsburgh, has been named president. He succeeds F. B. Hufnagel who continues as chairman and president of Crucible Steel Co. of America, the parent organization. Mr. Sonnhalter became identified with Pittsburgh Crucible in 1922 as open-hearth superintendent. Later he became assistant general superintendent and in 1928 was appointed general superintendent of the company's works. A successor to Mr. Sonnhalter has not yet been named.

Five Steel Products Establish New Records

Heavy purchases of steel in the form of automobiles, tin cans, refrigerators, and other everyday products by individual consumers, brought new output records for three important steel products in 1936, according to the American Iron and Steel institute. New records also were established by two products bought by capital goods industries.

The total of 6,995,905 gross tons of steel sheets produced in 1936 was an increase of 35 per cent over the 1935 tonnage and fully one-third more than the previous record output of 5,254,998 gross tons in 1929. Strip steel production amounted to 3,224,916 gross tons in 1936, almost 22 per cent greater than the previous record production of 2,647,589 gross tons in 1935, and almost 30 per cent above 1929.

In 1936 for the first time in his-

tory tin plate production exceeded 2,000,000 tons, reaching 2,103,153 gross tons, nearly 25 per cent above 1935. The previous record output was in 1929, with 1,816,223 gross tons.

The 1936 record output of concrete reinforcement bars, 1,028,563 gross tons, was nearly double the 1935 production. The previous peak was 963,600 gross tons in 1929.

Production of seamless steel pipe and tubes in 1936 reached the record total of 1,414,723 gross tons, an increase of more than 60 per cent over the 1935 figure. The 1929 total of 1,303,485 gross tons was a record until last year.

Sumatran Iron Mines Opened by High Prices

Prevailing higher iron ore quotations on world markets have prompted resumption of activities in two South Sumatra iron ore concessions which had been abandoned some years ago, according to a report to the bureau of foreign and domestic commerce from the office of the American trade commissioner at Batavia, Java. No estimates of productive capacity are available but it is reported locally that the concessions are comparatively small.

While local reports indicate that Japan may be the principal export outlet for the iron ore there is some local opinion that all or most of it will be exported to Germany since German interests are said to be associated with the concessions.

Long-Term Outlook Good, Purchasing Agents' View

WHILE the long term business outlook is good, the next few months may be quiet, according to many of the 1392 purchasing agents who attended the twenty-second annual international convention of the National Association of Purchasing Agents in Pittsburgh last week.

Commodities dealt with at the sessions include coke and coal, copper, tin, lead, steel, zinc, aluminum, petroleum and others. The Inform-a-Show, with exhibits by 89 companies, was one of the most educational and graphic in the history of the association.

The business survey committee, headed by F. J. Heaslip, Fairbanks, Morse & Co., Chicago, said that while business is still brisk, having lost its feverish tone of a few months ago, a cautious buying policy should be followed for the next three months. H. N. McGill, editor, McGill Commodity Service Inc., and other forecasters who spoke to the delegates, expressed somewhat similar views.

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., told the convention that the nation has recovered to a point somewhere between 72 and 82 per cent of the business activity of 1929, but this has been done by the

provision of funds borrowed from the federal government and thrown into the general pool of purchasing power.

An iron and steel dinner meeting Monday night was attended by many executives of the steel industry. Discussing labor problems, J. H. Van Deventer, editor, *Iron Age*, said: "If steel is forced by political pressure, and indeed against the will of the majority of its labor, to go on the closed shop basis, I predict that within the space of two years steel production costs may be double what they are now." Leon Henderson, economist, Works Progress Administration, defended policies of the Roosevelt administration.

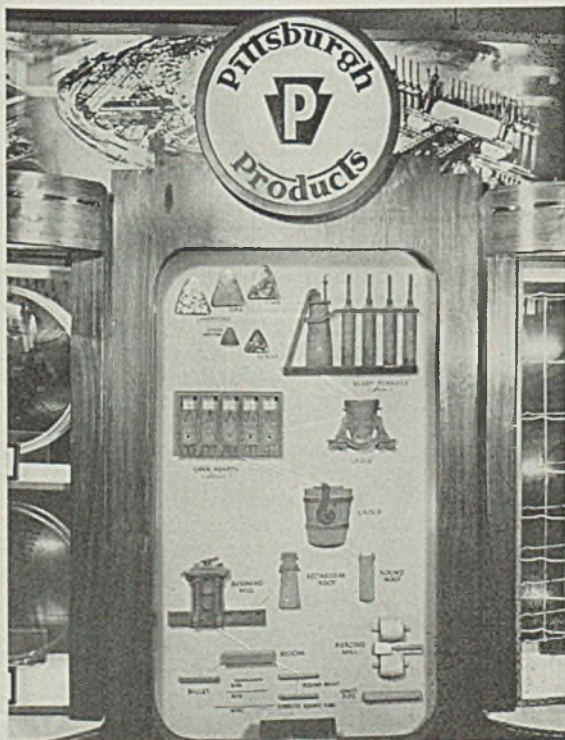
Improvements in refractories in the last decade were outlined by Dr. John D. Sullivan, Battelle Memorial institute, Columbus, O., at a meeting Tuesday. Discussion was led by Ralph M. Bowman, Republic Steel Corp., Cleveland, who paid tribute to the research work which has been done and said that there is a persistent demand for better refractories which will permit higher working temperatures and faster operating furnaces.

More By-Product Coke

C. J. Ramsburg, vice president, Koppers Co., Pittsburgh, discussing by-product coke oven developments, told delegates that in the United States in 1937 approximately 75,000,000 tons of coal will be put through by-product ovens.

At an informal coal dinner Tuesday night, Charles Hosford Jr., chairman, national bituminous coal commission, asserted that the 1937 bituminous coal act would be of "unquestioned benefit" to buyers. J. D. A. Morrow, president, Pittsburgh Coal Co., Pittsburgh, pointed out some of the administrative difficulties in applying the new act and said that buyers probably would not be able to get the little gradations in prices that represent the fine shades of values preferred in purchases. H. J. Rose, Mellon institute, Pittsburgh, spoke on coal classification and selection.

Price trends over the next two to three years will be upward, with occasional reactions from speculative excesses, A. W. Zelomek, economist, said Thursday. A report by Mr. Heaslip said that the rate of industrial activity for the balance of the year will be high and commodity prices will fluctuate only within narrow limits. Other speakers



MANY attractive exhibits featured the National Association of Purchasing Agents' Inform-a-Show in Pittsburgh last week. Central part of the Pittsburgh Steel Co.'s display illustrated steps in the manufacture of steel products

Thursday included Dr. Garson Meyer, Eastman Kodak Co.; Dr. Neil Carothers, Lehigh university.

George P. Brockway, American Optical Co., Southbridge, Mass., was elected president of the association, succeeding C. A. Kelley, Riverside, Calif. St. Louis was selected for the next convention. The following district vice presidents were chosen: E. R. Miles, Salt Lake City, Utah; R. E. Whitten, Dallas, Texas; J. W. Nicholson, Milwaukee, Wis.; F. H. Missig, Detroit; J. E. O'Brien, Cleveland; J. M. Alexander, Chattanooga, Tenn.; W. S. Barker, Toronto, Ont.; F. H. Carter, Baltimore, Md.; Benjamin Baylis, Rumford, R. I.

Youngstown Sheet & Tube Co. was awarded the annual prize for the most informative exhibit. Prize for the most attractive exhibit went to Scovill Mfg. Co., Waterbury, Conn. The Shipman memorial medal was awarded to E. T. Gushee, Detroit Edison Co., Detroit.

Firms Hold Open House

Pittsburgh firms held open house for delegates who desired to make inspection tours. Plants of Jones & Laughlin Steel Corp. were visited Wednesday; Westinghouse Electric & Mfg. Co., Mesta Machine Co. and Aluminum Co. of America, on Thursday. In addition, virtually every other iron, steel and metalworking plant in the city was open to delegations.

Among the companies represented in the Inform-A-Show were the following: Acme Steel Co.; Air Reduction Sales Co.; American Brass Co.; American Spring & Mfg. Corp.; Wallace Barnes Co.; Benjamin Electric Mfg. Co.; Bethlehem Steel Co.; Boston Woven Hose & Rubber Co.; Chase Brass & Copper Co.; Crane Co.; Joseph Dixon Crucible Co.; Firth Sterling Steel Co.; Graton & Knight Co.; Gulf Oil Corp.; Heltzel Form & Iron Co.; Heppenstall Co.; Homestead Valve Mfg. Co.; Jenkins Bros.; Jones & Laughlin Steel Corp.; Koppers Co.; Ludlow-Saylor Wire Co.; Lunkenheimer Co.; Mathews Conveyor Co.; Mesta Machine Co.; National Bearing Metals Corp.; National Metal Edge Box Co.; Oliver Iron & Steel Corp.; Pittsburgh Gear & Machine Co.; Pittsburgh Screw & Bolt Corp.; Pittsburgh Steel Co.; Raymond Mfg. Co.; Revere Copper & Brass Co.; Riverside Metal Co.; Royal Typewriter Co.; Signode Steel Strapping Co.; Standard Oil Co.; Sterling Grinding Wheel Co.; United States Steel Corp. subsidiaries; Vanadium Alloys Steel Co.; Walworth Co.; Wyckoff Drawn Steel Co.; Yale & Towne Mfg. Co.; Youngstown Sheet & Tube Co.

District Steel Rate

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended		Same week	
	May 29	Change	1936	1935
Pittsburgh ...	94	- 2	63	36
Chicago	75	-10	68	43
Eastern Pa. ...	72½	- 1	43	29½
Youngstown...	30	-50	76	48
Wheeling	96	+ 2	70	62
Cleveland ...	65	-17	75½	54
Buffalo	91	+ 3	81	37
Birmingham..	83	None	69	54½
New England 55		-45	77	63
Detroit	95	- 5	88	94
Cincinnati ...	90	None	72	†
St. Louis....	94	None	†	†
Average....	75	-16½	66	42½

†Not reported.

Production

SUSPENSIONS due to strikes in the Youngstown, Cleveland and Chicago districts reduced the national steelworks operating rate last week to 75 per cent, a loss of 16½ points.

Chicago—After reaching a new recovery peak of 86 per cent, production dropped sharply to 65 per cent at mid-week with the closing of the Inland Steel Co. and Youngstown Sheet & Tube Co. plants, giving an average for the week of about 75 per cent. Six blast furnaces have been closed but the union has permitted the operation of one stack each by Inland and Youngstown to consume the coke being produced by ovens which were kept in operation to supply gas to the public utility of the district. Carnegie-Illinois Steel Corp. for the first time since 1930 is operating its three bessemer converters at Gary works. Twenty-six of 39 blast furnaces are active.

Youngstown—Estimated at 30 per cent, off 50 points, as a result of strikes at Republic Steel Corp. and Youngstown Sheet & Tube Co. plants.

Detroit—Off 4 points to 95 per cent as one producer took off one unit, making a total of 20 out of 21 melting.

Cincinnati—Remained at 90 per cent, with three open hearths idle for repairs and reserve.

Central eastern seaboard—Decreased 1 point to 72½ per cent.

Pittsburgh—Down 2 points to 94 per cent, partly the result of repair operations.

Wheeling—Up 2 points to 96 per cent.

New England—Due to widespread repairs, ingot production declined 45 points to 55 per cent. Another drop is expected this week, when additional units will be down for repairs.

St. Louis—Held at 94 per cent.

Steel casting plants are at peak operations, particularly those specializing in railroad materials.

Birmingham—Unchanged at 83 per cent.

Cleveland-Lorain—Down 17 points to 65 per cent, as Republic Steel Corp. shut down its furnaces the last three days of the week because of strike. Otis Steel Co. and National Tube Co., Lorain, both continued with 8 and 11 on, respectively.

Buffalo—Gained 3 points to 91 per cent, as units down for repairs were again added to the active list.

General Motors Opens New Plant

WITH 500 state and municipal officials, General Motors distributors, industrial executives and press representatives as guests, General Motors Corp. executives, headed by Chairman Alfred P. Sloan Jr. and President William S. Knudsen, dedicated the newest of the corporation's assembly plants at Linden, N. J., May 27.

In connection with the exercises, Mr. Knudsen used a loud speaker system to address employes while they stood at their places in the plant. This was followed by a luncheon for the visitors, several brief addresses and a tour of the plant. W. S. Roberts, general manager, who supervised construction, introduced Mr. Sloan as master of ceremonies.

Continues Decentralizing

The new plant, according to Mr. Sloan, is part of a well-defined decentralization program which contemplates plants at 15 additional points. Total cost will be approximately \$60,000,000. Decentralization, he said, "is economically sound and socially desirable." He defined it as a plant which means "better jobs for more people in more places."

Built on a site of 78 acres, the plant is capable of producing 120,000 cars a year; at present, it is turning out between 200 and 225 a day, including Buicks, Oldsmobiles and Pontiacs. The four buildings comprise a two-story office unit, the assembly unit, a loading dock and a power plant, all of steel and concrete construction. Total floor area is about a million square feet. The main unit, 680 x 1080 feet, is one and two-story construction and houses complete body as well as chassis assembly operations.

Significant among remarks of speakers at the luncheon was President Knudsen's statement that a corporation which has grown big remains big only as long as it renders

service to its customers. A big company, he pointed out, can grow small much faster than it grew large if it fails in this requirement.

Other speakers were Governor Harold G. Hoffman of New Jersey; Walter Kidde, president, New Jersey state chamber of commerce; and Richard Grant, General Motors vice president in charge of sales.

German Machinery Trade Equals Record of 1928

Operations in the German machinery industry continued to improve during 1936, reaching 90.5 per cent of capacity toward the end of the year, according to a report to the machinery division, department of commerce, from Assistant American Trade Commissioner Roland Welch, Berlin.

The industry's turnover during the year totaled approximately 3 billion Reichmarks (approximately \$1,200,000,000) and was about equal to that of 1928, the previous best year in its history. This was the fifth consecutive year of improvement in the German machinery industry, and at the close of the year orders were being booked four to five months ahead.

Foreign Sales Rise

While recovery during the first four years of this period was based primarily upon the domestic rearmament and public construction program, during the last year foreign sales increased substantially and were largely responsible for the advance in operations to near capacity levels.

Since machinery is one of the few commodities which the Reich can export successfully, in the face of present economic conditions, the 21 per cent of exports is a vital item, and explains the sharp competition offered by German machinery builders in export markets for American-made machinery. While United States exports of machinery in 1936 were greater than German foreign sales of equipment, the American domestic production and market were so much greater than the German that our own equipment sales abroad represent a much smaller percentage of our total, according to Mr. Welch.

National Supply Co. of Delaware, Pittsburgh, for the March quarter shows net profit of \$2,644,750, compared with \$493,282 in 1936. Spang, Chalfant & Co., subsidiary, reported \$1,956,042 profit for the first three months, compared with \$313,522 in the March quarter last year.

National Metal Trades Association in Convention

A DETERMINATION to seek equitable and satisfactory relations between employer and employes, while at the same time adhering to legislation which has been enacted with reference to labor, was evidenced among members of the National Metal Trades association at the organization's thirty-ninth annual convention at the Palmer house, Chicago, May 27-28.

That the past 12 months have multiplied the problems of employer-employee relations was apparent from the free discussion and various questions raised by various of the nearly 300 registrants.

Activities of different committees of the association were described briefly in the opening address by President Charles H. Strawbridge, president, Goodman Mfg. Co., Chicago. Marked interest was reported in both foreman and apprenticeship training, and the industrial education committee plans to give further stimulus to this activity, it was stated.

The president announced that the association plans to issue a book shortly covering various phases of the Wagner national labor relations act, including rules, regulations, latest decisions by the board, etc., for guidance of members.

This act has done much to change the mental attitude of the employer and worker but has had little effect on the law, it was pointed out by David R. Clarke, Fyffe & Clarke, Chicago, in a comprehensive review of the provisions of this legislation. Employes always have had the right to bargain with their employers and to be free from coercion, restraint or intimidation, he maintained.

Hands Off Unions

It is a mistaken interpretation to assume that employers must have no contact with their workers and are not permitted to express an opinion on the desirability of union organization, according to Mr. Clarke. He added, however, that since the act prohibits management from aiding the activities of the so-called company union, it is desirable that a hands-off policy be adopted with reference to such organizations. Signing of a union contract he disapproved for the reasons that to date no responsible union exists and that the signing with one group results in coercion to force other employes into that body.

C. S. Craigmile, vice president, Belden Mfg. Co., Chicago, in dis-

cussing "An Employer's Present Responsibilities" urged that business men take a more active interest in local and national government as well as in its relations with labor. Terming the foreman the greatest force in industry today because this individual has the most intimate contact with workers, he emphasized the importance of training such men. Fair dealing and a minimum of authority were recommended in dealing with employes.

The need for a better selling job on the part of industry in telling its story to its employes and the public was pointed out by Phil S. Hanna, editor, *Chicago Journal of Commerce*. He lauded those companies which have resisted efforts of organizers to dominate the formers' employes through control of bargaining privileges.

Community Education Needed

Henry W. Johnson, vice president, De Laval Steam Turbine Co., Trenton, N. J., stressed the need for business to put its house in order if it is to hold the respect and confidence of the employe. Emphasis should be placed on the mutual interest of both employer and employe in arriving at satisfactory relations, he stated.

Collective action in the community in disproving various fallacies with regard to business and industry was recommended by Louis Ruthenburg, president, Serval Inc., Evansville, Ind. Such notions, which have gained wide acceptance, include those that bigness in business is always wrong; that the 30-hour week is the solution to unemployment; that machines cause unemployment; and that business is interested only in oppressing workers, making money and cheating its customers. Cooperation with various members and agencies of the community offers the best opportunity to combat these fallacies, and to bring about an understanding between all concerned, he remarked.

Speaking on "Industry and Transportation Under the Commerce Clause—Wagner Act Decisions," Samuel O. Dunn, chairman, Simmons-Boardman Publishing Corp., Chicago, asserted that production limitation is inimical to both business and labor and that the only means of improving living standards is through greater distribution of goods which must result mainly from technological development. He also pointed out the paradox of

unions demands for higher income and limited production.

Howard Goodman, works manager, Goodman Mfg. Co., Chicago, described the apprentice training programs maintained by his company, these programs including a four-year general training course carried on for the past 14 years and a one-year course for specialized training in individual machine operation. Continuation of this work through the depression has proved invaluable in meeting the demands of recent years, Mr. Goodman contended.

Stressing the need for development of apprentice programs, Harry W. De Bruin, vice president, Jeffrey Mfg. Co., Columbus, O., urged co-operation between industry and the public schools in this work. He described the complete service of the Metal Trades association in surveying needs of companies, furnishing instruction material and supplying consultation on methods of establishing apprenticeship courses.

Officers Re-elected

Mr. Strawbridge was re-elected president of the association for the coming year. N. W. Pickering, Farrel-Birmingham Co. Inc., Ansonia, Conn., was re-elected first vice president, while A. H. Timmerman, Wagner Electric Corp., St. Louis, in addition to being re-elected second vice president also was made treasurer.

Four new councilors were chosen to succeed retiring members. These are G. W. Cannon, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; T. H. Doan, Foote-Burt Co., Cleveland; J. C. Nelson, Easy Washing Machine Corp., Syracuse, N. Y.; and H. H. Kerr, Boston Gear Works Inc., North Quincy, Mass.

Iowa Iron Ore Mine Dismantled for Scrap

High price for steel scrap has brought about dismantling of an iron ore mining plant in the Mississippi river hills near Waukon, Iowa, which has not been in operation for more than 20 years. A scrap firm has bought the equipment and is scrapping steam shovels, cranes, railroad track and cars, buildings and machinery used in the mining operations.

The mining project was undertaken 25 years ago by St. Louis capitalists, who invested about \$1,250,000, built a railroad 4½ miles long and operated for about two years. The project was abandoned because the ore could not be produced at a profit under conditions and prices then prevailing.

Steel at Great Lakes Exposition

GRAPHICALLY depicting the steel industry's contributions to modern civilization are five large dioramas in the 1937 Great Lakes exposition which opened in Cleveland, May 29. These were made possible through co-operation of leading steel producers.

Although exhibits in the industrial section are not as large as in the "Romance of Iron and Steel" of the 1936 exposition, a number of interesting displays are to be seen.

Exhibitors announced as the exposition opened included: Ferro Enamel Corp., Thompson Products Co., National Malleable Steel Castings Co., P. A. Geier Co., Murray Ohio Mfg. Co., Sherwin-Williams Co., Osborn Mfg. Co., Eaton Mfg. Co., Standard Tool Co., Cleveland Tractor Co., White Motor Co., all of Cleveland;

Bender Body Co., Elyria, O.; Cycle Trades of America Inc., New York; Nash Engineering Co., South Norwalk, Conn.; Timken Roller Bearing Co., Canton, O.; National Cash Register Co., Dayton, O.; Tappan Stove Co., Mansfield, O.; General Electric Co., Schenectady, N. Y.; Studebaker Sales Corp., South Bend, Ind.; and Chrysler Corp., Detroit.

National Machine Tool Builders association's exhibit includes three large dioramas showing the interior of an industrial plant with a large

lathe in operation, a farm scene and an industrial city view.

June 12 has been designated "Gray Iron Founders' Society day" and members of the society, in Cleveland for the annual meeting June 12, will attend the exposition.

The band of the Carborundum Co., Niagara Falls, N. Y., will appear in two concerts Saturday, July 24, designated as "Carborundum day."

Questionnaire Reveals Skilled Labor Shortage

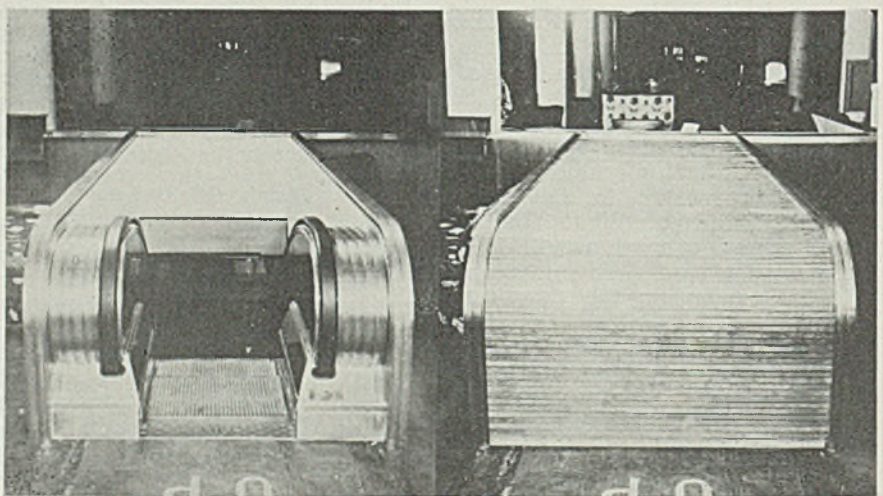
A serious skilled labor shortage is revealed by a recent survey by the Warney & Swasey Co., Cleveland, based on replies to a questionnaire from 229 industrial concerns employing 791,820 persons.

To the question, "Are you experiencing a shortage of skilled labor?", 195 firms said "yes", 34 said "no". Types of workmen chiefly needed were given as machinists, tool makers, machine operators, lathe operators, and boring mill operators.

One hundred and thirty-three firms said the best way to train new men was to employ and teach them in company's plants; seven recommended joint training schools co-operatively run by industries; and 18 relied on trade and vocational schools.

While some firms believed men on relief or government projects belonged in the unemployable class, comments on the whole indicated a certain share could be trained and re-absorbed into industry.

Steel Shutters Close Escalator Openings Against Fire



STEEL fireproof shutters for escalators have been installed recently in Eastern department stores. The shutter is drawn over the escalator by hand or electric power, but may be provided with an automatic closing mechanism actuated by a fusible link, melting in case of fire. On the right the shutter is shown covering the floor opening. In the other view the device is coiled in a hidden recess at the rear. The shutter has been developed by Cornell Iros Works Inc., Long Island City, New York

Warehouse Meeting Weighs Effect of New Legislation

PROBLEMS far more disturbing than those which usually follow a depression confront the iron and steel warehouse industry because of new and proposed legislation.

This was the opinion expressed by Ralph J. Stayman, president, American Steel Warehouse association, speaking to delegates to the association's twenty-eighth annual convention in White Sulphur Springs, W. Va., last week.

"It is impossible at this time to name all these new laws and to summarize their actual and probable effect upon our business," he said. "I do wish to emphasize, however, that they mean vital changes in the operation of steel warehouses, and I want to drive home the urgency of remodeling our practices and policies in conformity with these legislative acts, if we would preserve the business enterprise in which we are engaged."

He classified these new laws in three groups, one including those which increase the financial burden—the surplus profit tax and the social security tax. Another group embraces those dealing with labor, and in the third are regulations governing commercial practices.

Sales Ahead of Last Year

Speaking on "Candid Costs and Canny Profits," Walter S. Doxsey, executive secretary, pointed out dollar sales in the industry for the first four months of this year were about 75 per cent ahead of the like period of 1936. He ventured the opinion that an all-time record for tonnage moved through the steel warehouses has been established since Jan. 1.

"It is a fact not generally appreciated that many warehouses handle more orders in a day than a large size steel mill," said Mr. Doxsey. "The cost of handling the individual order, therefore, becomes a matter of real importance. Especially is this so when we find that half of these orders amount to less than \$10.

"Intensive cost studies by all sizes and types of warehouses, both large and small, show that the actual cost of handling each order runs from \$4 to \$6, not including the steel supplied. These small orders account for only 1½ to 3 per cent of the total tonnage sold by the warehouse, yet they involve, as recapitulation shows, an excessive part of total handling costs.

"From the insight into a few of

the warehouse problems we have presented here, it would seem essential to obtain a clear conception of warehouse operating costs as the fundamental basis for improvements in management practices and sales



J. Frederick Rogers

Elected president of American Steel Warehouse association

policies. Equally necessary, it would seem, are margins commensurate with rising costs. Another problem is to reduce the excessive cost of handling small orders and finally to take every possible measure to increase the average size of warehouse orders."

"Sources of supply are as valuable and essential to the warehouse industry as are its customers," Charles Dickerson, of the Miami-Dickerson Steel Co., Dayton, O., told the delegates.

Provides Cushion for Depressions

A policy of management-salesman relationship followed by his own company was outlined by Mr. Dickerson.

"We feel that management has a definite obligation to labor," he said. "And that obligation embraces the necessity of providing a cushion in depression times. We have devised a schedule paying disproportionately higher salary in lower sales brackets and accelerating salary with increased sales, making the acceleration in salary sufficiently high to induce effort but not as high as it would be if we were not making an effort to provide a cushion in the lower brackets. In other words, our percentage of sales cost related to sales with low volume is high and

related to sales with high volume is low, but should average over a period of boom and depression years about where it should be."

James A. Farrell, former president of the United States Steel Corp. and a leading foreign trade authority, spoke at the Monday session, commenting on the general business situation and its relation to the warehouse industry.

On Tuesday, Whiting Williams, industrial consultant and author, discussed problems of management and labor.

The report of the committee on flat rolled products, presented by Chairman Fred S. Doran, Joseph T. Ryerson & Son Inc., Cleveland, stated that the principal task has been to find a workable plan which will result in improved market conditions in the sale of galvanized sheets. As a result of meetings with producers, a plan is under consideration which if adopted will institute an item extra on flat galvanized sheets without reference to any differential for the total weight of the order.

T. W. Hager, Peter A. Frasse & Co. Inc., New York, delivered the report of the committee on mechanical tubing, of which he is chairman. The report stated a movement has been started by some of the mills to eliminate the manufacture of small quantities under 100 feet of a size, and it is felt distributors should co-operate with the mills as much as possible in this respect, thus not only helping to improve mill shipping schedules but also diverting considerable small business for shipment out of warehouse stocks.

Need Larger Margin on Tool Steel

Reporting for the committee on tool steel, Chairman C. M. Inman, Pratt & Inman, Worcester, Mass., said that the only way to effect equalization for small lots is by discontinuing the 2-cent warehouse charge which the distributor can ill afford to lose. Under the present set-up of the steel mills, there is an unsatisfactory percentage of profit on the finer quality tool steels for many distributors. In the opinion of the committee, there is a sound basis for proper revision of extras with equalization on small lots and a new set-up on cutting charges from a warehouse standpoint.

Reporting for the committee on stainless steel, Chairman W. D. Monroe, Chicago Steel Service Co., Chicago, said merchandising and distribution of stainless steel require new practices and new methods since it is a new product. In an effort to seek a solution of the problem, distributors have been asked to give detailed information regarding their operations and from the data col-

lected the committee hopes to formulate an aggressive program.

At the banquet Tuesday evening, Dr. James S. Thomas, president, Clarkson's College of Technology, spoke on "What the Machine Has Done for Mankind."

Speaking at the Wednesday session on "Current Price Trends—Their Significance to the Steel Warehouse Industry," G. Wright Hoffman, professor of markets and prices, Wharton School of Finance and Commerce, University of Pennsylvania, presented facts of considerable significance to the industry. At this session, Earle M. Jorgensen, of Earle M. Jorgensen Co., Los Angeles, spoke on "Broadcast Stock Record System."

"Some Fundamentals of Steel Distribution," was the title of a paper read by George Satterthwaite, executive secretary, Cold Finished Steel Bar institute. A paper on "Basic Principles of Warehouse-Mill Relationships" was read by Guy P. Bible, Horace T. Potts Co., Philadelphia.

New Officers Elected

J. Frederick Rogers, Beals, McCarthy & Rogers Inc., Buffalo, was elected president to succeed Ralph J. Stayman, Jones & Laughlin Steel Corp. Other officers elected: Executive secretary, Walter S. Doxsey, Cleveland; treasurer, L. H. Jostes, Beck & Corbitt Co., St. Louis; vice presidents, A. C. Castle, A. M. Castle & Co., Chicago, C. C. Dodge, George D. Blake Inc., Worcester, Mass., E. D. Graff, Joseph T. Ryerson & Son Inc., Chicago, Charles Heggie, Scully Steel Products Co., Chicago, E. L. Parker, Edgar T. Ward's Sons Co., Pittsburgh, and Ralph J. Stayman.

Directors at large for a three-year term are: Mr. Stayman, J. Frederick Rogers, Buffalo, and A. Oram Fulton, Wheelock, Lovejoy & Co. Inc., Cambridge, Mass.

Meetings

AIR CONDITIONING AND HEATING MEETING TOPICS

National Warm Air Heating and Air Conditioning association will conduct its midyear meeting at Hotel Cleveland, Cleveland, June 8-10. Committee meetings will occupy the first day; business and technical sessions are scheduled for morning and afternoon of the second day and morning of the third day.

Among papers scheduled for the opening session is one entitled "Corrosion of Air Conditioning Ducts," by F. H. Ramage, sales promotion manager, Republic Steel Corp., Cleveland.

Allen W. Williams, 50 West Broad street, Columbus, O., is managing director of the association.

MEETINGS ARE PLANNED BY AGRICULTURAL ENGINEERS

University of Illinois, Urbana, Ill., has been selected by the American Society of Agricultural Engineers for its annual meeting, June 21-24. Headquarters will be at the Urbana-Lincoln hotel. The winter meeting of the society is set for Nov. 29-Dec. 1 at the Stevens hotel, Chicago.

Financial

U. S. STEEL DECLARES \$2 ON ARREARAGES

United States Steel Corp. directors last week reduced accumulations on preferred to \$3.25 a share or a total of \$11,709,136, when they declared a dividend of \$2 a share, amounting to \$7,205,622, payable June 29 to holders of record June 4.

At the close of 1936 the \$17.50 per share arrearage had been cut to \$9.25

and on April 27 this year it was reduced to \$5.25.

DIVIDENDS DECLARED

National Steel Corp., Pittsburgh, declared a regular quarterly dividend of 62½ cents, payable June 20 to record of June 19, on the 2,167,777 shares outstanding.

Republic Steel Corp. declared the quarterly dividend of \$1.50 per share on the 6 per cent cumulative convertible prior preference stock, series A. Dividend of \$1.50 per share also has been declared on the 6 per cent cumulative convertible preferred stock. Both are payable July 1 to stockholders of record June 12.

Otis Steel Co., Cleveland, declared a quarterly dividend of \$1.375 per share on the convertible first preferred stock, payable June 15 to holders of record June 1. Time before which prior preference stock must be exchanged pursuant to the plan of recapitalization has been extended to June 30.

Directors of the Budd Wheel Co., Philadelphia, declared the regular quarterly dividend of \$1.75 plus a participating dividend of 25 cents per share on preferred. A dividend of 20 cents per share also was declared on the common. Both dividends are payable June 30 of record June 16.

Ohio Foundrymen's Group Installs New Officers

B. G. Parker, Youngstown Foundry & Machine Co., Youngstown, O., was installed as new chairman of the Northeastern Ohio chapter of the American Foundrymen's association at the year-end meeting of the chapter in Cleveland, May 20. Frank G. Steinebach, editor, *The Foundry*, Cleveland, is the retiring chairman.

L. P. Robinson, Werner G. Smith Co., Cleveland, is the new vice chairman; J. H. Tressler, Hickman, Williams & Co. Inc., Cleveland, secretary; and R. F. Lincoln, Osborn Mfg. Co., Cleveland, treasurer.

Newly elected directors are: Dan McAvoy, Grabler Mfg. Co., Cleveland; F. R. Fleig, Smith Foundry Supply Co., Cleveland; Frank J. Dost, Sterling Foundry Co., Wellington, O.; and Mr. Steinebach.

24,599 at "Open House"

All attendance records for American Rolling Mill Co.'s "open house" programs were broken in Butler, Pa., recently when 24,599 persons, exclusive of many mill men were listed at the four-day session.

Visitors under the direction of trained guides were conducted in marked safety routes through the mill.

Billboard Trimmed with Stainless Has Two-fold Purpose



A 40-foot streamlined billboard recently erected at Chicago as plant identification for Joseph T. Ryerson & Son Inc. employs what is believed to be the first use of stainless steel for outside billboards. Besides "dressing up" the billboard, the gleaming metal affords excellent opportunity for unusual and brilliant color contrasts. It presents a direct tie-up between product and advertising

Activities of Steel Users and Makers

TIMKEN ROLLER BEARING CO., Canton, O., is filling orders for bearings for 80 locomotives now on order with builders, as follows: For driving axles and engine trucks for 30 locomotives for the Chicago, Milwaukee, St. Paul & Pacific, by Baldwin Locomotive Works; driving axles for 11 locomotives remodeled in Rock Island's shops; driving axles and trucks for five locomotives for the Lackawanna railroad by American Locomotive Co.; driving axles and trucks for 17 locomotives for Northern Pacific by American Locomotive Co.; all axles for six units for Spokane, Portland & Seattle railroad by American Locomotive Co.; all axles for eight locomotives for Northern Pacific and three for Spokane, Portland & Seattle by Baldwin Locomotive Works.

Alton Iron Works Inc. has removed its general offices to 145 West Fortieth street, New York.

Curtis Pneumatic Machinery Co., New York, and Curtis Refrigerating Machine Co. have moved to new and larger quarters at 30 Vesey street.

Kloster Steel Corp., Chicago, has completed erection of a new large modern tool steel warehouse at 224-228 North Justine street, and plans to move into the new quarters June 1.

Texlite Inc., Dallas, Tex., has purchased from Ferro Enamel Corp., Cleveland, a high side-wall gas-fired tube type porcelain enameling furnace, equipped with electric door.

Stran-Steel division of Great Lakes Steel Corp., Detroit, has shipped two carloads of light metal framing for house construction to Venezuela, ordered by one of the major oil companies for employe dwellings.

W. A. Jones Foundry & Machine Co., manufacturer of speed reducers, gears and transmission appliances, announces that its Buffalo office, in charge of Frank W. Stuker, is now located at 361 Delaware avenue, in the Curtiss building.

Consolidated Machine Tool Corp., Rochester, N. Y., manufacturer of heavy machine tools, has opened an office in the Hudson Terminal building, 50 Church street, New York, with Albert Meyers in charge. The company also has established an office in Philadelphia, with Robert L.

Arms as representative in that territory. Mr. Arms will be located at 105 Los Angeles avenue, Fox Chase.

Harnischfeger Corp., Milwaukee, held a sales convention recently to inaugurate the marketing of its new product, the P&H Hansen smooth-arc electrodes. Welder salesmen from the company's branch offices attended the conference.

Pressed Steel Tank Co. has completed construction of a new office building at 1437 South Sixty-sixth street, Milwaukee. The general office staff, purchasing, timekeeping, engineering and sales departments will move into the new quarters early in June.

Tubular Service Corp., Pittsburgh, has established a warehouse at 1031 Beaver avenue. This is the company's fourth warehouse and will be used exclusively for distribution of tubular goods. Other warehouses are at Cambridge, Mass., Brooklyn, N. Y., and Philadelphia.

Williams & Wilson Ltd. have been appointed agents for N. A. Strand & Co., Chicago, manufacturer of flexible shafts and machines, and will cover the territory including Quebec, Ontario and the Maritime provinces. A stock of machines will be carried in both Montreal and Toronto.

Cutler-Hammer Inc., Milwaukee, has opened a new sales office in Dallas, Tex., to provide better service facilities for its customers in the southwestern territory. Located at 624 Santa Fe building, the new office will handle sales of the com-

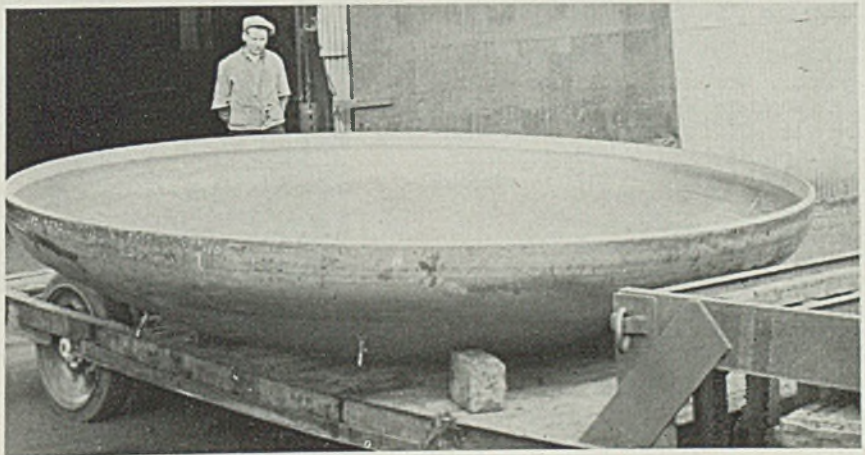
plete Cutler-Hammer line of electric control apparatus.

Following an experimental period with insulating fire brick for incinerators, New York city has specified 2600-degree insulating fire brick in combustion chambers and flues because slag was reduced to a minimum. Two years ago Armstrong's EF-26 brick was installed in one of the city's combustion chambers, directly exposed in an area 12 x 16 feet, and 9 inches thick, laid and faced with air set cement. Results were reported highly satisfactory.

Patterson Foundry & Machine Co., East Liverpool, O., has begun an expansion program which will double its production facilities within the next two years. As an initial step, additions to the machine and fabricating divisions have increased the capacity of those departments approximately 50 per cent, while construction of a new tunnel kiln at the Poro division will greatly increase the capacity of that department in the production of Poro lining blocks and grinding balls.

American Cutting Alloys Inc., 500 Fifth avenue, New York, is exhibiting before private groups its new imported motion picture film on the "Manufacture and Use of Cemented Titanium-Tungsten-Carbide Tips and Tools in High Speed Cutting of Steel and Cast Iron." The film was made abroad by Dr. Ing. Paul Schwarzkopf, Reutte, Austria, president of American Cutting Alloys and inventor of titanium carbide, who worked in co-operation with the Deutsche Edelstahlwerke A. G. Krefeld, Germany.

16-Foot Oil Vessel Heads Cut from Welded Plates



SO LARGE were eight flanged and dished heads made recently by the Lukens Steel Co., Coatesville, Pa., to be used in fabricating oil refining vessels, that it was necessary to weld two large plates together for each head. Then the flat circles were gas-cut, flanged and machined. Six of the heads are 16 feet, outside diameter, and weigh 10 tons each. The other two are 18 1/2 and 19-3/4 inches, outside diameter, and weigh 14 and 16 tons.

Men of Industry

WILLIAM P. BROWN has been elected president and general manager, Briggs Mfg. Co., Detroit, succeeding Walter O. Briggs who will continue as chairman of the board. Mr. Brown has been with the company 19 years, for the past two as vice president.

W. Dean Robinson, a son-in-law of Mr. Briggs, has been named vice president and assistant general manager.

E. E. Lundberg, hitherto chief engineer, becomes vice president in charge of engineering. F. J. Kennedy, manager of Detroit plants, is now vice president in charge of manufacturing. A. D. Blackwood, controller, has been appointed assistant secretary and treasurer.

Harold C. Hatch, assistant engineer, Mead-Morrison division of Gar Wood Industries Inc., Detroit, has been named sales engineer.

Louis M. Challis has been named personnel director of the newly established personnel division of Covered Wagon Co., Mt. Clemens, Mich.

William W. Peattie has been elected president, and Reed C. Zens, secretary-treasurer, Northern Engineering Works, Detroit, builder of overhead traveling cranes and hoists.

J. P. Boore, for several years vice president of Summerill Tubing Co., and for 20 years prior to that associated with Pittsburgh Steel Co., has been named assistant general sales manager, Babcock & Wilcox Tube Co., Beaver Falls, Pa.

Floyd M. Erlenmeyer has been appointed western New York representative for Maas & Waldstein Co., Newark, N. J., maker of industrial finishes. He will make his headquarters at 253 Alexandria street, Rochester, N. Y.

Charles R. Honce, cashier for 15 years, has been appointed assistant treasurer, United States Steel Corp., New York, succeeding the late John H. Gewecke. Mr. Honce, who is 49, entered the employ of the Steel corporation as an office boy 32 years ago.

C. C. Jordan, sales engineer for the past ten years in the steam turbine division, Allis-Chalmers Mfg. Co., Milwaukee, has been appointed assistant manager of that division. Graduating from Purdue university in 1923 in mechanical engineering,



S. M. D. Clapper

Who recently was elected chairman of the board, General Refractories Co., Philadelphia. He has been actively engaged in the management of the organization since early in 1933. Mr. Clapper is also chairman of a number of other companies

Mr. Jordan began by way of the company's graduate student course.

Kenneth B. Komp, of Detroit, has been appointed direct factory representative for Billings & Spencer Co., Hartford, Conn., covering the states of Michigan and Ohio. He will devote his time to the sale of Billings forged tools, and assist distributors in these two states.

Charles A. Van Bergen has been appointed representative and application specialist for Textolite roll-neck bearings by General Electric Co., Bridgeport, Conn. Mr. Van Bergen, with his home office at West



Floyd L. Greene

Formerly executive vice president, General Refractories Co., Philadelphia, who has become president of the company, as noted in STEEL, May 3, page 28. He succeeds S. M. D. Clapper, who has been made chairman of the board

Lynn, Mass., will serve all rolling mills.

Edward J. Casey has been made sales manager, Federal Pipe & Supply Co., Chicago. He was formerly western district manager for the National Radiator Corp. and special representative for the Standard Sanitary Mfg. Co. Ray F. Cronin has been elected vice president of the Federal company.

Martin Rieger Jr. has become associated with the New York office of Foxboro Co., Foxboro, Mass., as a specialist in the pyrometer division. Mr. Rieger, an electrical instrument engineer, was formerly connected with the Weston Electrical Instrument Corp.

Carl E. Sprout has been appointed an associate of B. W. Sayer, district manager of the Portland, Oreg., office of Foxboro Co.

J. A. Harlan, manager of the commercial division, Nash-Kelvinator Corp., Detroit, has been elected president, Air Conditioning Manufacturers' association. Other officers elected at the annual meeting of the association in Hot Springs, Va., are: Vice president, William H. Price Jr., vice president, Carrier Corp., Newark, N. J.; treasurer, P. A. McKittrick, general manager, Parks-Cramer Co., Fitchburg, Mass.

J. E. Power, manager mechanical sales, New York district, United States Rubber Products Inc., has been transferred to 1790 Broadway, as assistant sales manager, mechanical goods division. R. V. Hilands, manager of the Philadelphia and Baltimore districts, has been appointed manager mechanical sales, New York branch. A. B. Means, of the Philadelphia sales organization, becomes manager mechanical sales, Philadelphia and Baltimore branches. R. F. Jackson, of the Baltimore sales organization, has been promoted to assistant manager mechanical sales, Baltimore branch. E. P. Cole, of the Denver sales organization, has been named manager mechanical sales, Denver branch.

D. P. Downing has been appointed manager of the steel department, San Francisco branch, Ducommun Metals & Supply Co., Los Angeles. For the past seven years he was associated with the sales organization of Alan Wood Steel Co. on the Pacific coast and before that with the sales organization of Bethlehem Steel Co. in the same district.

Tyler W. Carlisle, formerly vice president, has been elected president, Strong, Carlisle & Hammond Co., Cleveland, machinery and mill supply dealer, to succeed the late Herbert W. Strong. L. J. Hammond, who retired about ten years ago,

after serving as president for several years, will again take an active part in the affairs of the company as chairman of the board. George J. Zimmerman has been elected vice president, and will continue in charge of machinery sales. J. J. Stephens and R. L. Keech have been re-elected treasurer and secretary, respectively.

Julius P. Heil, president, Heil Co., Milwaukee, maker of tanks, motor truck bodies, and hydraulic hoists, has been elected president, Jambor Tool & Stamping Co., Milwaukee, maker of tools, dies, jigs, fixtures and metal stampings. L. H. Brown has been re-elected secretary and treasurer. He also is sales manager.

Harry D. Myers has been promoted to purchasing agent, Thompson Products Inc., Cleveland. He succeeds E. C. Williams, whose assistant he has been for the past five years. Mr. Williams recently was named director of purchases for all divisions of the company.

Charles D. Brenner has been appointed manager of the steel product lines in Los Angeles of Maydwell & Hartzell Inc., factory distributor for such lines as Russell, Burdsall & Ward Bolt & Nut Co. and Positive Lock Washer Co. Mr. Brenner has been connected with Maydwell & Hartzell since 1930.

D. R. Grandy has been promoted to assistant sales manager in charge of publicity, General Electric Vapor Lamp Co., Hoboken, N. J. He has been succeeded as commercial engineer by G. J. Taylor. L. F. Gerisch has been transferred from the commercial engineering department to the publicity department. Several additions to district staffs include: H. W. Conklin, Cincinnati; C. J. Mason, Hoboken, N. J.; C. K. Lambka, Chicago, and C. W. Powell, Detroit.

George F. Roeder, of Joseph T. Ryerson Sons Inc., Buffalo division, has been elected chairman, Buffalo chapter of American Society for Metals. Other new officers include Leon H. Nelson, Republic Steel Corp., vice chairman; Raymond C. Spencer, Bliss & Laughlin Inc., treasurer; and John H. Birdsong, Buffalo Testing Laboratories Inc., secretary.

William Ufer and Walter Lischett have been transferred to the sales department, Mercoid Corp., Chicago, after a training period in the factory and several years as service men on automatic controls for heating, air conditioning, refrigeration and industrial applications.

R. M. Keatts and J. F. McCauley, completing a training course in the factory, have also been transferred



S. D. Mahan

Who, as noted in STEEL, May 24, page 25, has become general advertising manager, Westinghouse Electric & Mfg. Co., with headquarters in Mansfield, O.

to the Mercoid sales organization. Mr. Keatts will work out of the Cincinnati, office and Mr. McCauley will confine his efforts to the Cleveland area.

W. H. Pape, recently manager of the oil sales department, Crane Co., Chicago, has been made manager of a new department which co-ordinates all activities concerned with the estimating, engineering and sale of valves, fittings, pipe and fabricated piping. The former industrial and engineering sales departments are being consolidated into a new section—the engineering sales section of the valve and fitting department, with E. Burke as manager. G. F. Wright now is assistant manager in charge of estimating and other activities dealing with fabricated pipe and allied products, and W. F. Lahl, assistant manager supervising the industrial zone men in the field. J. H. Barker is manager of the sales quotation section of the new department.



E. E. Wright

Recently appointed to take charge of the Cleveland office of Electro Metallurgical Sales Corp., New York, as noted in STEEL, May 24, page 24

Died:

HARLOW BELDING WHEELER, 79, pioneer industrialist, May 22, at his home in Pittsburgh. Until his retirement in 1931, he was secretary-treasurer and director, American Sheet & Tin Plate Co. He had served in executive capacities for 32 years with United States Steel Corp. and its various subsidiaries.

Robert C. Campbell, 39, associated for 20 years with American Radiator Co., New York, as engineer in Norfolk, Va., May 21.

Charles E. Heath, 65, vice president and general manager, Fate-Root-Heath Co., Plymouth, O., at his home in that city, May 19.

Robert M. Heinrichs, vice president, director, and general manager, Bendix-Westinghouse Air Brake Co., Pittsburgh, May 18.

Oscar Luetke, 84, designer and manufacturer of wrought iron art work, at his home in New York, May 21.

Karl Kendig, 66, executive vice president, National Tool Co., Cleveland, and a former executive of the old Whitman-Barnes Co., at his home in Akron, O., May 21.

Samuel E. Frazee, 74, vice president, Ewald Iron Co., Louisville, Ky., in Louisville, May 17. Previous to joining the company in 1915 he was associated with Hickman, William Iron Co. for 20 years.

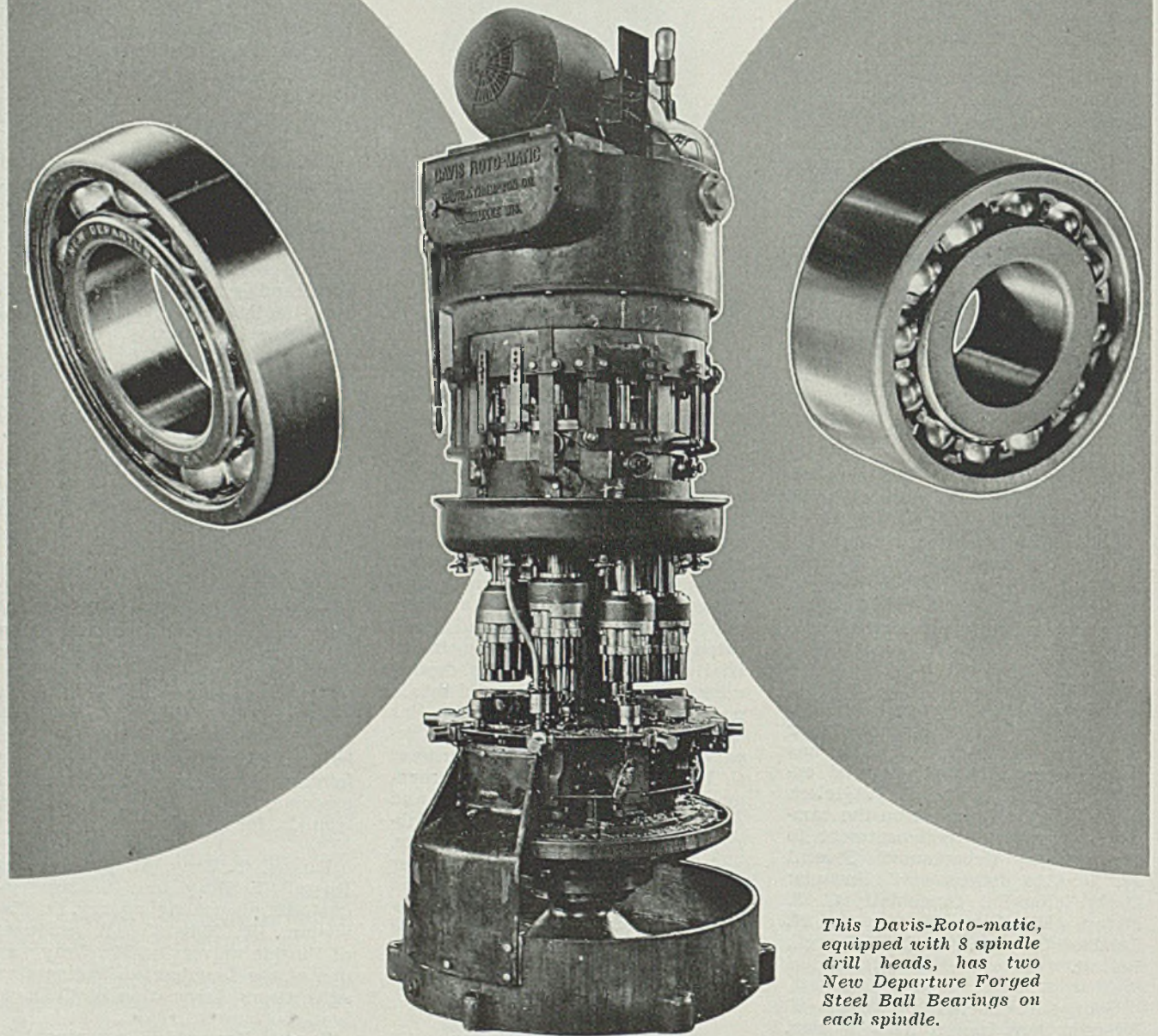
Russell T. Gray, 44, president of Russell T. Gray Inc., Chicago, industrial advertising agency, in Evanston, Ill., May 25. A graduate of Purdue university, Mr. Gray was one of the founders of Engineering Advertisers Association of Chicago.

Samuel Barnett, 53, prominent in Cleveland scrap iron business for more than 20 years, in that city, May 18. He had been vice president and general manager, M. Cohen & Co., scrap firm, and was a director, Peerless Steel Products Co., Detroit.

W. E. Miller, electrical and mechanical superintendent, Bethlehem Steel Co., Johnstown, Pa., and past president, Association of Iron and Steel Engineers, May 24, in Johnstown.

W. J. Dickinson, 59, manager of freight car manufacturing plants, Pullman-Standard Car Mfg. Co., Chicago, at his home in Michigan City, Ind., May 20. He had been with the company 41 years.

PRODUCTIVITY + RELIABILITY
= *Continuity*



This Davis-Roto-matic, equipped with 8 spindle drill heads, has two New Departure Forged Steel Ball Bearings on each spindle.

• In modern mass production, important machine tools must be more than accurate and fast—they must be utterly reliable. The flow of work to many dependent machines and men must not be interrupted.

In the Davis Roto-matic 8 spindle vertical Drilling

Machine, 104 New Departure Forged Steel ball bearings not only guarantee continuity of production, but they assure the low maintenance cost so essential to profits.

New Departure, Division General Motors Corp.
Bristol, Connecticut, Chicago and San Francisco.

NEW DEPARTURE

THE FORGED STEEL BEARING



MIRRORS OF MOTORDOM

DETROIT

AS THE peak month of the current model year draws to a close, it appears automobile production will come fairly close to the 600,000-mark for May, which, figuring 21 days of actual assemblies, represents something over 28,500 cars a day. While all these cars do not emanate from plants in the Detroit district, a walk through some of the city's freight docks and terminals almost convinces you they do, for in large buildings and lots along the river front are seas of new cars as far as the eye can see. It taxes the ingenuity of shippers to keep them moving and make way for new thousands each succeeding day.

Sixty-three per cent of all automobiles produced are assembled in Michigan plants, according to John W. Scoville, Chrysler statistician, so apparently 18,000 cars are being fed out daily from Michigan at current operating rates. And if statistics intrigue you, this amounts to about 38 cars every minute of an 8-hour day.

Outlook for the coming month is for continuation of present production levels, with possibility of a slight tapering toward the first of July. Conclusion of the first half of the year should see approximately 3,000,000 cars assembled and if the balance of the year can be gaged from last year's totals, 1937 will find auto assemblies topping the 5,000,000 level.

LABOR unrest is again cropping up to plague automobile producers. Sporadic slowdowns, sit-downs, "skips" and other forms of dissension continue to break out here and there, union officials apparently being unable to cope with their restive members. The "skip" is one of the newest wrinkles, being the term applied to the practice of letting an occasional unfinished car proceed to the end of the assembly line from which point it must be rerouted back to the start, with a

BY A. H. ALLEN
Detroit Editor, STEEL

consequent disruption in scheduling and material handling.

Of chief moment currently is the advance which the UAW is attempting to make on Ford's Rouge plant, where 90,000 workers are seen as choice fodder for organizers. A new UAW office for the Ford campaign has been opened, the first applicant arriving Monday on a bicycle to plank down his \$3 for a UAW membership. The office is a former bank with cathedral-style windows, an entrance flanked with Corinthian columns, and ornate bronze booths where three dollars may be deposited for a shiny new UAW button. The office, ½-mile from the Ford plant, is in the city of Detroit. A silver loving cup has been offered by the union for the individual or local signing up the most Ford workers.

Pamphlets Handed Ford Workers

One of the first moves by the UAW was to print thousands of pamphlets for distribution to the Ford day shift as it emerged from the plant. Permission was obtained from the Dearborn council to distribute the literature which was headed "Unionism not Fordism," the title being aimed at printed "Fordisms" which the company recently distributed to its men. The UAW pamphlet lists the following program for the Ford drive: "Higher wages and better working conditions; stopping the speed-up by union supervision; 6-hour day and \$8 minimum pay; job security through seniority; abolishing the Ford service department; and union recognition."

It is safe to say the Ford organization has drawn up rather complete plans for handling this invasion of their working force by the UAW. One report goes to the effect Ford officials informed Governor Murphy they were prepared

fully to meet the situation, even including artillery.

Experience of an employe of the engineering department of another car builder in gaining entrance to the Ford plant illustrates the precautions which Harry Bennett and his staff have taken to supervise intra-plant affairs. This man was stopped at the gates of the Rouge plant, asked to show his badge from his own plant, his credentials then being verified by checking with his driver's license. After admission he passed between two rows of service department watchmen lined up along a barbed-wire enclosed passageway, these men scrutinizing him carefully. Finally upon entering the building where he was headed, he passed four or five more service department men before gaining entrance to his final destination.

The opinion of Henry Ford on the union movement is too well known to bear repetition and those who have followed Mr. Ford's activities for the past quarter-century are firm in their belief he will close his plants down tight before relinquishing their management and supervision to outsiders in the form of union organizers. Closing down Ford plants would put an end to the livelihood of probably 1,000,000 persons, if workers' families and everyone else connected with the organization be figured in. Such a move would generate a storm of public opinion and more than likely not in the direction of Mr. Ford.

Crisis Will Be Reached Soon

A week or two more will tell the story of the UAW versus Ford and it may write a new and interesting chapter in the young life of the CIO movement, to the edification of other industries which have been compelled to bow to its current surge.

At present, Ford production holds strong at approximately 7000 daily, and estimates on what total production will be at the end of the current model season are placed at about 1,300,000. Development work



MIRRORS OF MOTORDOM

is well under way on designs for 1938 and from what meager information is available, it appears only minor changes will be introduced. Among these is a slightly wider hood and a probable increase in the wheelbase of the 85-horsepower engine model to 114 inches, compared with the present 112 inches. The larger-engine car is out-selling the 60-horsepower model by about 2 to 1, and by increasing the wheelbase it would be possible to elevate the 85 into more of a deluxe class.

UNAUTHORIZED, so-called "spot" strikes which several of the General Motors divisions outside of Detroit have been experiencing are being excoriated in no uncertain terms by UAW leaders. In the union's official weekly publication, an editorial observed that "nothing is to be gained and everything is to be lost by bleeding a union to death through a consistent stream of 'wildcat' strikes." Blame for the strikes is assigned to "false leaders who know better." Treason to the principles of the labor movement is charged to these provokers of uncalled-for strikes.

How hopeless is the role of the employer in dealing with militant UAW members is shown by a recent occurrence at Pontiac where a crew of men had been assigned to load a car of scrap for delivery to a local dealer. Before the car was half loaded, a slight drizzle set in and the union shop steward called the men off the job. Hearing of this, the dealer, who was in a hurry for his scrap, protested that the men would not be seriously affected by the light rain which was falling, but it did no good and he was forced to send his own men to finish the work. The dealer complained to a foreman at the plant who merely shrugged his shoulders and replied he could do nothing, that the union was running the men.

At another plant in this district where a contract with the UAW is in force, efficiency men are getting gray hairs because nearly every proposal made to improve efficiency meets with a storm of protest from union shop stewards. It has become difficult even to relocate a piece of machinery without incurring discontent. The union viewpoint is that if a machine is relocated to

Automobile Production

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

	1935	1936	1937
Jan.....	300,335	377,244	399,634
Feb.....	350,346	300,810	383,698
March....	447,894	438,943	518,977
April....	477,059	527,625	553,415
4 Mos....	1,575,624	1,644,622	1,855,724
May.....	381,809	480,518	.....
June.....	372,085	469,368	.....
July.....	35,297	451,206	.....
Aug.....	245,075	275,934	.....
Sept.....	92,728	139,820	.....
Oct.....	280,316	230,049	.....
Nov.....	408,550	405,799	.....
Dec.....	418,317	519,121	.....
Year	4,119,811	4,616,437	.....

Monthly figures for 1936 and first three months of 1937 just revised by department of commerce.

Calculated by Cram's Reports

Week ended:	
May 1	139,475
May 8	140,188
May 15	140,396
May 22	*137,490
May 29	134,940

	Week ending	
	May 29	May 22
General Motors	53,790	*54,200
Ford	32,900	35,835
Chrysler	28,900	*29,550
All Others	19,350	*17,905

*Revised.

improve the output of an operator he should not be required to work at the old rate, but should be given an increase because he is turning out more work. In such a predicament, an efficiency man might as well give up and take a vacation.

EMPHASIS on price of 1938 models at this stage looks to be particularly heavy. Little doubt exists about prices moving higher, but there is plenty of argument over just how much they will be boosted. Already, a number of increases, ranging from \$25 to \$100, have been put through on certain makes. It may be possible that some producers will seize on the advertising opportunity of guaranteeing prices for 1938—that is, announcing a price and then guaranteeing it will not be raised over a certain period of time.

To do this it would be necessary to require material and parts suppliers to guarantee prices for a certain period, which is precisely what Chevrolet, for example, is attempt-

ing to do now. Bidders on material for new models are being requested to guarantee their prices through April, 1938, but it is believed not much success is being had in getting such clauses through. The feeling is that such a move merely throws the burden of added labor and material costs on the parts suppliers, and relieves the automobile producer from this responsibility.

Chevrolet, incidentally, is lining up three sources of supply on parts for new models, with the idea that an interruption to any one source could be covered up by increasing releases from the other two.

Steel Buying Falls Sharply

Steel buying in the past week has fallen off sharply, although mills have sufficient orders on hand to keep up production through July. Additional buys for current models will be in the nature of fill-in tonnages and for the next two weeks, no important specifying is looked for from automotive steel consumers. Early in June some tonnages will be coming through for die tryout work, but these in most cases will be small. Pontiac will be among the first to release such material, it is understood, although Packard has already reached this stage in its 1938 models, being probably farther along on new models than most other builders.

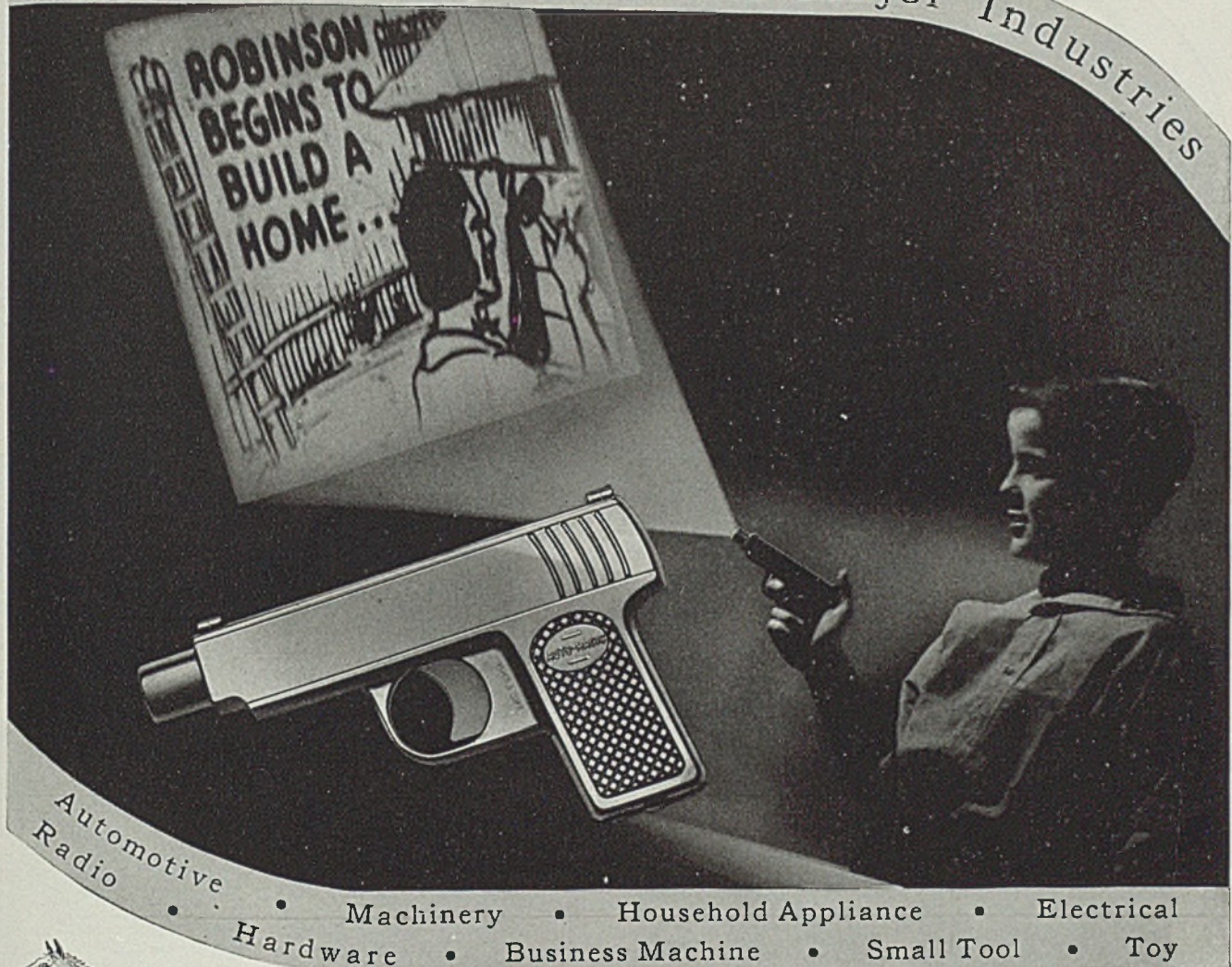
Chevrolet has installed some new equipment in its No. 4 motor plant in Flint for turning faces of clutch plates, supplanting former grinding methods. Leader of the General Motors group, Chevrolet is finding it difficult to keep up with the pace set by Ford, chiefly because of previously mentioned "wildcat" strikes in some of its divisions. A half-day's production was lost recently, for example, when the UAW arbitrarily shut off electric power in Consumers Power Co. which supplies the Flint, Saginaw and Bay City areas.

MANUFACTURE of all-welded steel passenger trailers will be started about June 10 by General Body Corp. here in a new 70,000-square foot plant on Charlevoix street. A 1200-foot assembly line will be installed for three types of trailers. Equipment for stamping body panels is being bought, although large roof stampings will be made elsewhere. H. Jay Hayes, former president of Hayes Body, is head of the new company Proposed merger of Briggs Mfg. Co. with Motor Products Corp. is expected within a short time . . . Gabriel Co. has installed equipment for manufacture of a direct action, telescope-type shock absorber, un-

(Please turn to Page 105)

ZINC ALLOY DIE CASTINGS

—their place in the Major Industries



DETAIL!

—The basic factor in toy realism

CLEAN cut detail is an important quality in many products of industry—in certain fields, such as metal toys, it is an absolute essential. The remarkable detail of a ZINC Alloy Die Cast gun body has given this toy picture gun the realistic appeal that makes it a 1937 "best seller."

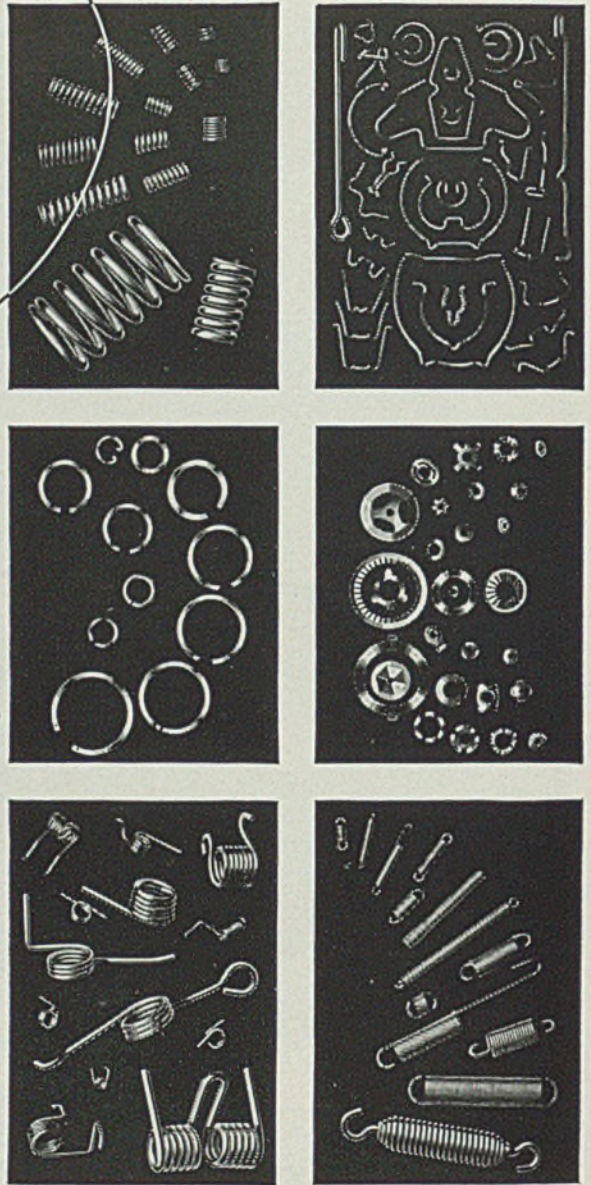
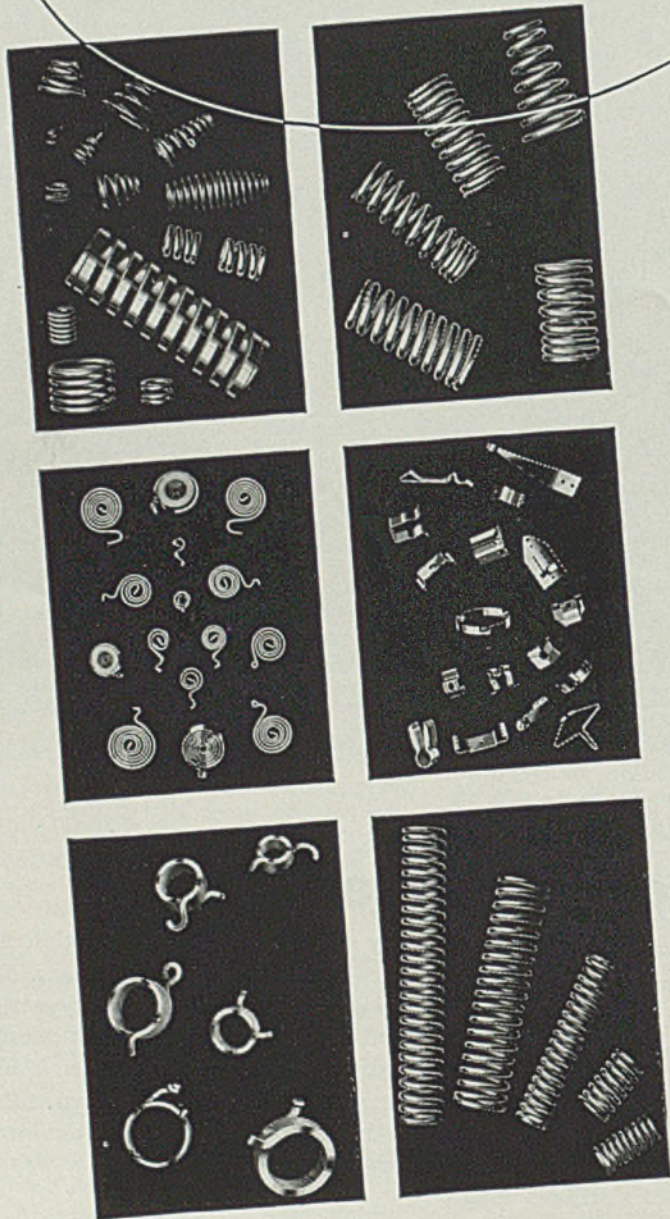
Such sharpness of detail—imparting a feeling of fine quality—is being successfully and profitably applied in the production of a multitude of die cast products. Manufacturers in many industries have found in this metal and method, a means of economically securing this important quality—often the difference between success and failure in consumer product design.

Your problems may not include the reproduction of detail, but there are other specific advantages of ZINC Alloy Die Castings—dimensional accuracy, savings in machining and assembling, weight reduction, rigidity—that are solving production problems in many fields. If you are not thoroughly acquainted with ZINC Alloy Die Castings and their potentialities, we suggest you consult a commercial die caster—or write to this Company.

THE NEW JERSEY ZINC CO.
160 Front Street
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The Research was done, the Alloys were developed, and most Die Castings are specified with
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Springs for any Mechanical Purpose



B-G-R makes every conceivable type of spring, from a wide variety of materials. A complete stock of flat and round wire is always available for instant use. If you look for value—and economy—fortified by conscientious delivery promises—then you'll find the answer to your spring requirements at

BARNES - GIBSON - RAYMOND

DIVISION OF ASSOCIATED SPRING CORPORATION

DETROIT PLANT
DETROIT, MICHIGAN

← TWO PLANTS →

COOK PLANT
ANN ARBOR, MICHIGAN



WINDOWS OF WASHINGTON

WASHINGTON

BY L. M. LAMM

Washington Editor, STEEL

THERE was much underground talk here last week dealing with the presidential message to congress and the suggested labor bill submitted by the administration at the same time.

Frequently Mr. Roosevelt has submitted carefully thought out bills with the message dealing with the subject. There has been considerable jocular comment at various press conferences on this matter.

But be that as it may. When the President sent his labor message to Capitol Hill last week he sent with it a bill, complete in every detail, worked out after months of study by experts both within and without the government.

Now, it so happens that this bill contained the 40-40 clauses. That is, it provided for a 40-hour work week and a 40-cent per hour wage minimum. This had the approval of the President. What was the surprise then, when the administration found that the bills, in both the senate and the house, had been introduced with no 40-40 clause and in fact no hour or wage provisions. Space was simply left for this to be filled in by the congress.

New Provisions Inserted

The bills were introduced by Senator Black, chairman of the labor committee of the senate, and Representative Connery, chairman of the same committee in the house.

This is most interesting when it is recalled that Senator Black has been and still is an ardent advocate of the 30-hour work week. Connery has been favoring that also.

Of course the President has many times stated, both privately and publicly that he does not favor the 30-hour week. This will naturally lead to differences of opinion on this legislation.

Also in the house bill Connery took it unto himself to insert a provision to the effect that imported goods must be certified as having been manufactured on the same la-

bor basis. Of course this is not taken seriously because that would mean that goods could not be imported into the United States.

However, there is every reason to believe that the proposals of these two members of congress will not meet with the approval of the administration, certainly not after months of time have been spent on the drafting of the bill.

Several Speeches Spoiled

Apropos of this situation it is known that several members of the cabinet and the little cabinet have been on the verge of making speeches having in mind the Presidential draft of the bill. In fact it is certain that one member of the cabinet had his speech entirely written in support of the administration measure, because being a former business man, he believed that the 40-40 plan would not work great hardship on industry. He has cancelled entirely all reference in his speech to this bill.

Under the original 40-40 plan the steel industry would have little to fear. Information here is to the effect that most, if not all, of the industry works on a 40-hour per week basis, its wage level is certainly 40 cents per hour and no child labor is involved. Under the proposed new set-up, however, everything is up in the air.

Reference was made in these columns recently to the hearings under way in connection with the Ellenbogen NRA textile bill. A number of these have been held, but under the proposed new labor bill the textile bill will be "ditched" entirely.

There is an interesting fact that the new labor bill provides for a labor standards board of five members which will inquire into each industry as to hours, wages and

child labor conditions. An entirely similar provision was contained in the Walsh-Healey government contract act, allowing the secretary of labor to do the same thing. All of this leads to the conclusion that this labor bill, if passed at this session, which has been asked by the President, will entirely supersede the government contract law. That may possibly be the reason that Madam Perkins some time ago suggested that no amendments be made at the present session.

There was considerable discussion among experts working on the draft of the labor bill as to whether the new labor standards board should be composed of three or five members. The three member provision was stricken out and five members inserted. It was insisted by some of those in charge of the bill that on a board of three two members might gang up against the third member.

The President in his message to congress on this legislation called attention to the fact that "the overwhelming majority of this nation has little patience with that small minority which vociferates today that prosperity has returned, that wages are good, that crop prices are high and that government should take a holiday."

Seeks Better Buying Power

"Today," said the President, in further reference in his message to the labor situation, "you and I are pledged to take further steps to reduce the lag in the purchasing power of industrial workers and to strengthen and stabilize the markets for the farmers' products. The two go hand in hand. Each depends for its effectiveness upon the other. Both working simultaneously will open new outlets for productive capital. Our nation, so richly endowed with natural resources and with a capable and industrious population, should be able to devise ways and means of insuring to all our able bodied working men and women a

fair day's pay for a fair day's work. A self-supporting and self-respecting democracy can plead no justification for the existence of child labor, no economic reason for chiseling workers' wages or stretching workers' hours."

The President continued, "Enlightened business is learning that competition ought not to cause bad social consequences which inevitably react upon the profits of business itself. All but the hopelessly reactionary will agree that to conserve our primary resources of man power, government must have some control over maximum hours, minimum wages, the evil of child labor and the exploitation of unorganized labor."

In concluding his rather long message on this subject the President said, "Legislation can, I hope, be passed at this session of the congress further to help those who toil in factory and on farm. We have promised it. We cannot stand still."

It is well known, of course, that the new bill authorizes administrative action to require elimination of substandard hours and wages, child labor, and other labor practices which place goods produced under fair labor conditions at a competitive disadvantage in interstate markets, or which lead to labor disputes that burden interstate commerce or disrupt the orderly and fair marketing of goods in interstate markets.

Authors of the bill contend that a degree of general flexibility is achieved by authorizing the new labor board to vary the minimum wage and hour standards upward or downward and by permitting work for longer hours without the necessity of a specific exemption if the incentive to abuse is removed by the payment of time and a half for the excess hours.

The bill further seeks to build up, through appropriate administrative machinery, standards of fairness and reasonableness, industry by industry, with due regard to local and geographical diversities, that is, to bring about in interstate industries the payment of a minimum "fair wage" and the maintenance of a maximum "reasonable work week."

SUPREME COURT REFORM NOT DROPPED BY PRESIDENT

There was much talk in Washington last week, as the result of the Supreme Court's decision upholding the social security act, that the President might give up his court reform program. However, at the White House press conferences there was no evidence of that. Many thought that the props had been knocked out from under the Presidential program, but apparently he does not think so.

In connection with this matter and specifically answering a question of a newsmen at the conference, the President called attention to the fact that it is not what the court has done, but what it yet has to do. He said that there are many issues which will come up to the court for decision in the near future and he spoke specifically of four issues. These include, the child labor question, minimum wages, maximum hours of work and collective bargaining. All of these matters were contained in his one labor message to congress and sooner or later the court will have to rule on these questions.

There was the thought in the minds of some Washington observers, however, that the President might be willing to let the court question go over until the next session of congress, although nothing the President has said would seem to lead to that conjecture.

DOMESTIC MANGANESE AID SOUGHT BY HIGHER DUTY

The United States today faces an increasingly dangerous situation on account of a possible shortage of manganese ore, while most domestic mines remain closed on account of the reduction in the manganese ore import duty under the trade agreement with Brazil, J. Carson Adkerson, president of the American Manganese Producers association, told the house military affairs committee last week.

Adkerson recommended restoration of the full manganese duty to stimulate domestic production. Restoration of the tariff would bring forth approximately 200,000 tons of ferro-grade manganese ore the first year and 300,000 tons the second year, he testified.

He told the committee that he approved the accumulation of a stockpile of manganese ore provided the ores be of domestic origin. The ores should be bought during periods when no other domestic outlets are available, he said. Mr. Adkerson told the committee that the United States has known reserves of low-grade ores from which high grade ores may be recovered sufficient to supply the United States for over 100 years and further developments will disclose additional manganese reserves.

NLRB AIM NOW TO OBTAIN WAGNER LAW COMPLIANCE

The future of the work of the national labor relations board was discussed last week by Charles Fahy, general counsel of the board, in an address in which he said that "the task ahead is now in its broad outlines the securing of compliance with the law. It is to be expected,

and daily experience justifies this expectation, that the great body of American industry, part of which has long since placed in operation the principles of the act, will accept it as the charter of its present and future relations with employes."

Fahy pointed out that, "it is unthinkable that this should not be true, now that the rights of employes protected by the statute have been characterized by the Supreme Court as 'fundamental' and the Supreme Court has placed ultimate judicial approval upon it as the law of the land."

Mr. Fahy criticized some of the information being fed to industrialists of the country about the Wagner law and said that "the most authoritative sources for guidance of employers are not agencies disseminating half baked information about the act, or circularizing employers, who, they think, desire to scuttle the law. The body of decisions rendered by the board and the court decisions thus far rendered should be the source material of those interested in the problems which it seeks to solve."

MANUFACTURERS' SUGGESTION BROADENS CHILD LABOR LAW

William B. Warner, president of the National Association of Manufacturers, has sent a letter to Senator Burton Wheeler, Montana, chairman of the senate committee on interstate commerce, suggesting amendments to the pending child labor bills. The association, of course, endorsed the principles and purposes of these bills.

In the pending bills child labor goods are subject only to the laws of the states into which they are shipped and the association proposed that they also be subjected to the laws of the states in which they are produced. Such an amendment, the association suggested, would strengthen local law enforcement.

BERRY COUNCIL FATE HANGS

Considerable merriment was occasioned at a White House press conference last week when the President was asked what will become of the Berry council for industrial co-operation. The President only answered by stating that he had not been back in Washington long enough to know what the council is doing. However, the matter is no laughing one when it is remembered that a lot of high salaried men and women are still employed by the council and as far as can be learned not a wheel is turning. As pointed out in this column, the council is largely staffed by personal friends of the new senator from Tennessee.

Editorial

NRA Substitute Fails To Give Aid to Forgotten Man

LAST week the long contemplated effort of the government administration to introduce a substitute for NRA took definite form when the President presented a message to congress outlining a program to terminate child labor and to fix maximum hours and minimum wages. These objectives are embodied in the Connery-Black bill.

In view of the discussion of these problems during the past few years, the great majority of citizens is favorable to the principles involved in the bill. With few exceptions, industrial employers believe that it is desirable to discourage and to prevent the payment of wages that are manifestly unfair. Also they are against unduly long working periods and child labor in hazardous occupations.

But while approving the broad objectives, they cannot agree with some of the methods proposed. Fortunately the child labor problem does not arise in the metalworking industries and therefore the provisions of the bill applying to that subject do not directly concern employers in that field. But in the case of provisions for maximum hours, employers will object strenuously to the apparent intention of the sponsors of the Connery-Black bill to use the device for "spreading work."

Spreading Employment by Short Week Is Unsound Economically; Minimum Wage Must Be Flexible

The idea of spreading employment by shortening hours was accepted by industry during the acute period of the depression as a temporary expedient. It is unsound economically and at a time when industrial activity is at high levels it cannot be justified on any grounds. Therefore, while industry may favor flexible provisions intended to protect employes from oppressively long hours, it certainly cannot agree to a plan which tries to "create jobs" by means of cutting the work week to unreasonable limits. It is doubtful whether a straight 40-hour week is flexible enough to meet the various conditions confronted in many branches of industry. A 30-hour week, as proposed by numerous legislators and others in Washington, not only would be foolhardy, but it would defeat the purpose of the bill.

As for the minimum wage provisions, industry probably will endorse any law which discourages the pay-

ment of unfairly low rates. However, it will be extremely difficult to draft a law that will be flexible enough to accommodate the varying requirements to be found in different parts of the country. On the other hand, one may doubt whether any law of this nature can penetrate into the industrial and commercial life of the nation deeply enough to prevent wage abuses in places where they are most likely to prevail.

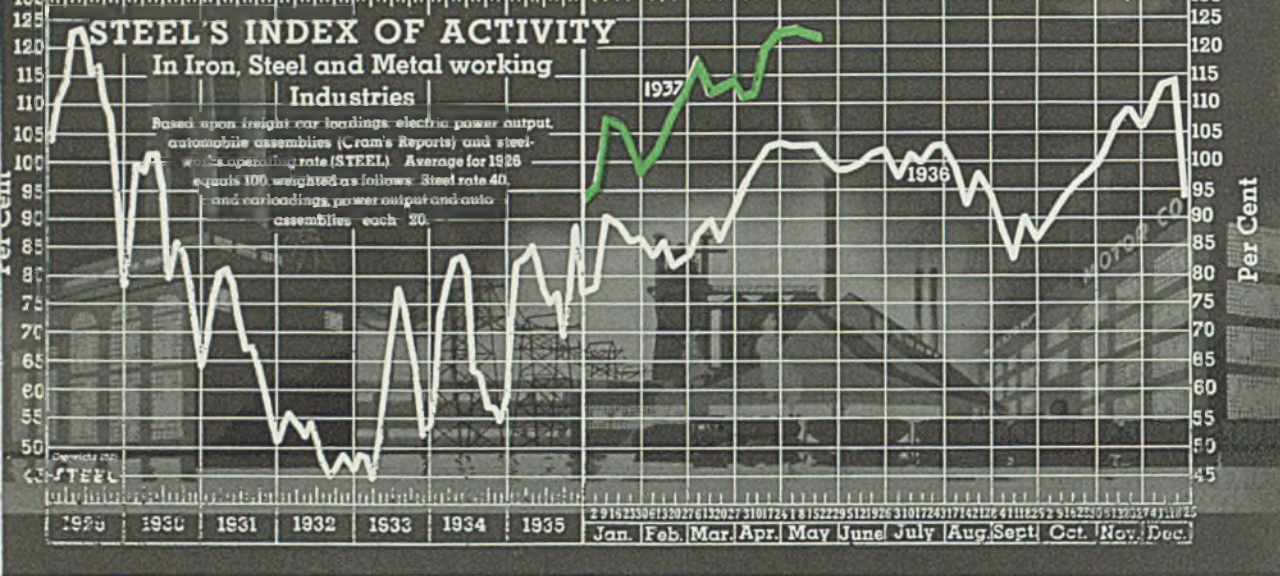
For instance, the proposed law would exempt employes of employers who have fewer than 15 names on their payrolls. Also employes of companies not engaged in interstate commerce are not subject to the wage provisions of the law. A thorough-going examination of wage and hour conditions undoubtedly would show that the most flagrant cases of unfair treatment of employes are to be found in these companies which would be exempt from the provisions of the proposed law.

New Deal Efforts Aid More Fortunate Workers; Leave Out Real Forgotten Man in Small Shop

For this and other reasons, the Connery-Black bill, if enacted, might not accomplish its purpose any more satisfactorily than NRA achieved what its sponsors expected of it. As we understand the philosophy of the new deal, it is that the rights of the "forgotten man" shall be protected and that he be assured of a "more abundant life." The "forgotten man," who really needs a "more abundant life," is more likely to be found among the employes of small establishments hiring two to six workers than among the employes of large responsible concerns whose wage policies are subject to public scrutiny.

The administration-aided unionization drive has been directed at the automotive and steel industries where wages already were high in comparison with those in many other industries. One would think that the way to help the underpaid worker would be to rectify conditions in the industries where men and women are underpaid. But unionization has not been directed toward companies where the conditions really need correction, nor does the Connery-Black bill seem to offer any hope of reaching the sore spots where sweat shop conditions, with low wages and long working hours, exist.

To date the new deal seems to be helping the fortunate employe to gain more power and to acquire increased income, at the same time it is ignoring the unfortunate worker and actually making it harder for him to survive. Perhaps it is another case of producing conditions making the "rich richer and the poor poorer."



The

STEEL'S index of activity declined 0.2 points to 123.0 in the week ending May 22.

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
April 3	112.0	86.8	83.4	79.6	49.1	53.4	81.5	97.6
April 10	112.8	99.6	83.4	82.2	52.6	52.6	80.9	102.9
April 17	119.6	103.1	86.3	85.0	55.8	53.4	81.1	103.1
April 24	122.0	103.6	84.9	87.5	59.5	52.3	80.6	103.7
May 1	123.9	103.2	84.6	86.0	60.3	52.5	80.7	103.3
May 8	123.5†	103.0	79.3	84.4	62.5	54.7	79.7	102.8
May 15	123.2†	103.1	80.5	82.4	65.2	54.3	78.7	102.5
May 22	123.0*	100.4	82.8	81.9	66.1	55.1	78.3	102.3

*Preliminary. †Revised.

Business Outlook for Summer Clouded by Labor Situation

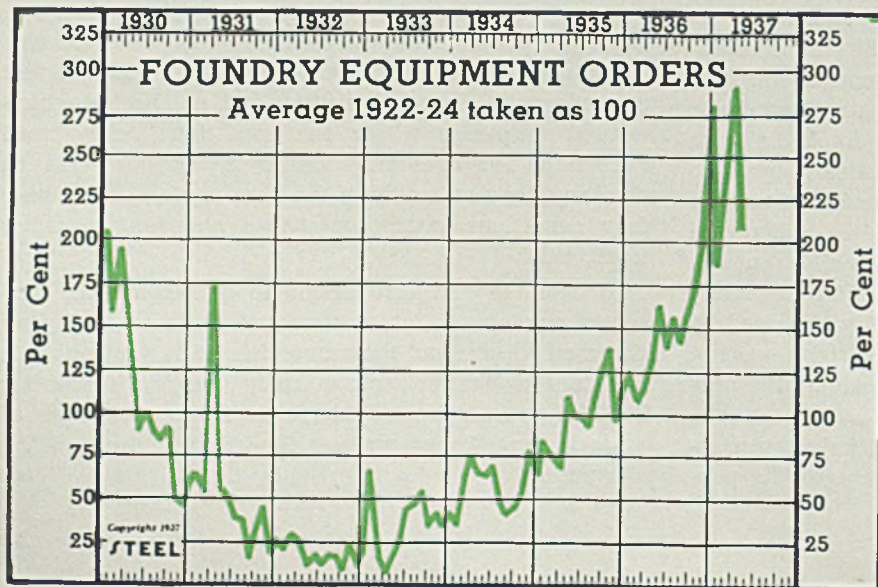
AS THE fifth month of 1937 draws to a close, industrialists are debating the questions of the extent and timing of the expected easing of activity in the iron, steel and metalworking field. Observers who believe that the stock market is a forecaster of industrial events are somewhat pessimistic over the prospect for the remainder of the year. A few of them think that steelworks operations may drop to as low as 50 per cent during the summer slump.

Others whose opinions are based upon sentiment

among consumers of industrial materials and products are slightly more optimistic. Many of them doubt whether steel ingot production will drop below the 75 per cent mark.

Speculation at this stage of the year may prove to be futile for the reason that unknown factors, such as strikes, may exert a stronger influence upon business during the summer months than the tangles of supply and demand. Again the information on these factors is not too conclusive. It is known that, in general, inventories are higher now than at any time in the recovery period. However, it is difficult to ascertain the extent of this influence upon future buying, or to know accurately in what degree the extension of second quarter prices to third quarter curbed speculative buying.

Looking back over the first five months of 1937, it is apparent that industry has enjoyed an unusually



	Per Cent		
	1937	1936	1935
Jan.	190.9	127.0	76.6
Feb.	249.5	110.4	75.7
March	294.2	115.0	69.4
April	208.3	134.0	113.2
May	.....	165.4	100.7
June	.....	141.4	100.2
July	.....	159.6	94.0
Aug.	.....	144.8	118.0
Sept.	.....	161.0	128.5
Oct.	.....	173.8	149.0
Nov.	.....	200.4	100.4
Dec.	.....	283.3	118.1

BUSINESS TREND

long run of stability at high levels. STEEL'S index of activity has been running consistently at above the 100 mark, with the exception of two weeks in January. Throughout May it has remained within a fraction of a point of 123. Such uniformity would be remarkable

Where Business Stands

Monthly Averages, 1936=100

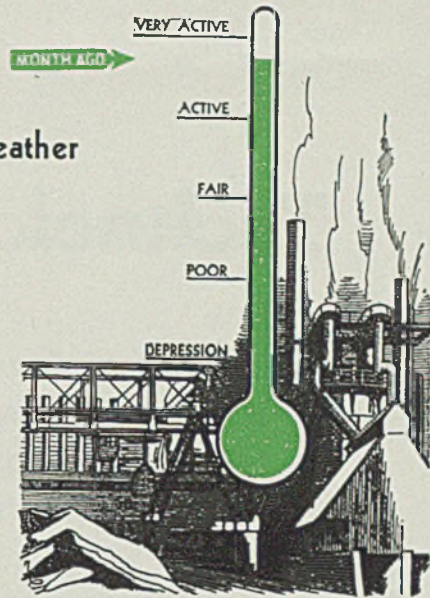
	April, 1937	March, 1937	April, 1936
Steel Ingot Output	129.7	128.8	100.8
Pig Iron Output	135.3	132.7	95.8
Freight Movement	106.5	108.3	91.7
Building Construction	141.7	121.7	109.7
Automobile Production	141.2	127.4	137.2
Wholesale Prices	117.0	112.4	97.6

under any circumstances, but to achieve it in an atmosphere of labor disputes, disturbing government

Industrial Weather

TREND:

Steady



activities and disconcerting court decisions is phenomenal. The record was made possible by steady steelworks operations, stable freight car loadings at around 775,000 cars weekly, uniformly high electric power output and record-breaking automobile output.

In spite of the gratifying average of activity that has prevailed since the first of the year, the industrial picture still is distorted by the failure of building construction to show a degree of recovery commensurate with that of other important branches of industry.

The Barometer of Business

Industrial Indicators

	April, 1937	Mar., 1937	April, 1936
Pig iron output (Daily average, tons)	113,469	111,951	80,316
Machine Tool Index	219.8	192.4	114.4
Finished Steel Shipments	1,343,644	1,414,399	979,907
Ingot output (Daily average, tons)	195,072	193,683	151,625
Dodge Bldg., awards in 37 states (sq. ft.)	48,396,100	41,567,800	37,467,900
Automobile output	553,415	518,715	527,726
Coal output, tons	25,735,000	51,315,000	30,452,000
Business failures; number	786	820	830
Business failures; liabilities	\$8,906,000	\$10,922,000	\$14,157,000
Cement production, Bbls.		8,443,000	8,519,000
Cotton consumption, bales		779,000	576,672
Car loadings (weekly average)	738,810	750,875	636,211

Commodity Prices

	April, 1937	Mar., 1937	April, 1936
STEEL'S composite average of 25 iron and steel prices	\$40.39	\$39.92	\$33.10
Bradstreet's index	\$11.81	\$11.34	\$9.85
Wheat, cash (bushel)	\$1.54	\$1.58	\$1.12
Corn, cash (bushel)	\$1.43	\$1.29	81c
Petroleum, crude (Bbl.)		\$1.20	\$1.08

Financial Indicators

	April, 1937	Mar., 1937	April, 1936
25 Industrial stocks	\$215.62	\$226.69	\$201.98
25 Rail stocks	\$46.27	\$48.39	\$36.41
40 Bonds	\$85.79	\$87.92	\$86.59
Bank clearings (000 omitted)		\$29,412,000	\$24,711,000
Commercial paper rate (N. Y., per cent)	1	1	¾
*Commercial loans (000 omitted)	\$9,428,000	\$9,366,000	\$8,343,000
Federal Reserve ratio, per cent	79.7	80.5	78.3
Railroad earnings	†\$69,379,328	\$38,358,638	\$35,205,513
Stock sales, N. Y. stock exchange	34,613,169	50,344,355	39,616,438
Bond sales, par value	\$294,936,800	\$422,053,300	\$235,664,800

*Leading member banks Federal Reserve System.
†March, February and March respectively.

Foreign Trade

	April, 1937	Mar., 1937	April, 1936
Exports	\$256,390,000	\$193,490,000	
Imports	\$306,699,000	\$202,437,000	
Gold exports	39,000	\$51,000	
Gold imports	154,371,000	\$28,106,000	

Technological Advances in the

• Analysis of developments in the past decade indicates a transition in emphasis from cost to physical characteristics in the finished product and increased production efficiency

THE seven lean years are history; the spring of 1937 finds the industry at almost peak operation. Changes have occurred. It will be the purpose of this paper to inspect the status of our raw materials, survey some of the physical changes of equipment, cite individual furnaces or mills which are generally conceded to be representative of the latest practice, discuss the present methods of production, consider the standards of manufacture, scrutinize the cost of our operations, comment on our merchandising methods and speculate as to our future.

To present this study properly one must go back a little beyond the year 1929, to 1926. The year 1926 is frequently used as an index of our affairs, and is far enough into the former economic cycle to permit analysis before the boom year. It might be summarized as a year of very active business, with severe competition in the more important lines of manufacture. "Profitless Prosperity" was an expression frequently used to describe the economic situation.

Earned Almost 7%

The steel industry in the United States in that year made 39,373,000 tons of pig iron and ferroalloys, and 48,294,000 tons of steel. Twenty-six major companies, whose rated annual ingot capacity was 49,088,000 tons, showed earnings of 6.7 per cent on their capitalization.

Under present conditions a ton of finished steel requires about 6 tons of raw materials for its manufacture. The basic materials are as follows:

Material	Gross tons
Iron ore	2.196
Coking coal	1.506

Fuel coal or equivalent....	0.732
Flux	0.666
Scrap iron and steel.....	0.594
Metals and alloys	0.114
Miscellaneous	0.192

In 1926 the industry was centered about Pittsburgh, converting Lakes ores and Appalachian coals. Essentially the same situation exists in 1937. Lake ores are ample for some years of operation. Beneficiation will cause these ores to appear in new forms, and sintering will make them more workable.

Coal mining, incident to steel making, is carried on in the same area as in 1926, and underground operations are very similar. Preparation of coal for metallurgical purposes has made great advances both below and above ground.

Methods of mining which permit the sorting of coals have provided satisfactory coking coals from areas previously considered unsuitable for blast furnace cokes.

Cleaning of coal above ground is making satisfactory progress, with both wet and dry cleaning methods being used.

The pressure for maximum capacity from the blast furnaces will continue to force the reduction of ash and sulphur in coke in order to get the ultimate in furnace production.

The coals for gas producers will return as a problem with the increased cost of liquid and gaseous fuels. This type of coal is receiving attention as to sizing and hand picking, but will still remain largely a matter of mining selected areas.

Beehive Revival Temporary

In the handling of coking coals we saw a temporary revival of the beehive ovens in late 1936 to provide sufficient metallurgical coke.

This will hardly last, and may be considered as of curious rather than fundamental interest, although the return on the upper 30 per cent of capacity of the coking industry does not warrant new by-product oven construction at existing prices of by-products.

The by-product oven is undergoing changes, and although in the period from 1928 to 1936 the increase in ovens in the United States was from 12,756 to only 13,331, the added 575 ovens embodied many new and interesting features.

The present day ovens are 16 inches to 17 inches in width instead of the extremely narrow 14-inch ovens. A number of underjet oven batteries have been built, which make possible very accurate temperature control.

This period has seen the successful application of self-sealing doors, with their economy in labor, double collecting mains, which minimize the degradation of gases within the ovens, and improvement of design of flue system, which makes possible much greater uniformity in heating.

Heating with blast furnace gas, where this is available and where the coke oven gas released can be utilized, has become universal practice, so much so that today no one would consider building any but the combination oven.

No important changes in source of flux stone have occurred within recent years. Decidedly better knowledge of the use of flux in the open hearth has developed with slag control. Clearer stone is now obtainable and is required to take full advantage of the use of flux both in blast furnace and open hearth.

In regard to blast furnaces, the

Production of Finished Steel

BY C. M. WHITE

+

year finds the industry in a position that has not been duplicated since late 1920.

The industry is dependent upon primary units (mines and furnaces) for its iron.

Available open-hearth scrap is scanty in amount, doubtful in quality, and unreasonable in price when compared with the prime raw material — molten blast furnace iron.

Since 1928 no additional blast furnaces have been built. There have been reconstruction programs, increasing the capacity of existing furnaces both in actual size and accessory facilities. The most modern 1926 furnaces were of 800 tons daily capacity.

Good Practice in 1927

The Weirton furnace, constructed and ready for operation early in 1927, was 21½ feet in the hearth, 92 feet high, with a volume of 27,000 cubic feet. This furnace was blown with 60,000 cubic feet of air at 20 pounds pressure. Four stoves, each with 91,400 square feet of heating surface, 2-pass, side combustion, were provided for hot blast.

Foreign furnaces pointed the way to increased iron production through better preparation, such as sintering fines, and sizing of all materials.

The Jones & Laughlin No. 3 blast furnace at Aliquippa is a good example of a modern American furnace. In 1930 this furnace was enlarged from 18 feet 8 inches hearth diameter to 28 feet 6 inches. The dimensions of the enlarged furnace are:

Hearth diameter28 ft. 6 in.
Bosh diameter30 ft.
Stock line diameter19 ft.
Big bell diameter14 ft.
Total height90 ft.

Bosh angle86° 36'
Number of columns12
Number of tuyeres18
Total volume39,640 cu. ft.

The four stoves were relined with 2½ inches square checkers, and each stove has a heating surface of 141,400 square feet, or 565,600 square feet total. Disintegrator cleaned gas is used on the stoves, the gas being cleaned so that solid matter ranges between 0.01 and 0.02 grains per cubic foot.

The basic open-hearth furnace is the dominant steel-producing unit of the United States. Stationary basic furnaces are far more common than tilting furnaces.

During the period of time under review, the sloping backwall, insulation, instrument control, slag control and pressure air have been added to the operator's list of aids.

Though these were not all adopted between 1926 and 1936, it was during this period that it became common to think of all these aids as desirable, and they were incorporated in the rebuilding and operation of existing furnaces.

Grain Control Key Factor

This period also coincides with the commercial acceptances of the fact that steels of identical chemical con-

stituents could possess widely differing physical characteristics.

The urge to melt steel, with low cost as the most important factor, disappeared under the pressure of the customer's demand for McQuaid-Ehn grain control. Precision melting became the order of the day, and has fostered better furnaces with the maximum of instrument control feasible.

Tap 160 Tons Per Heat

Carnegie-Illinois's open hearth shop No. 5 at Gary represents a plant which has embodied the proven points of physical change in a way that may safely represent the developments of the period.

There are 7 furnaces in a building now large enough for one more, although the layout provided ground space for a total of 12 furnaces.

The furnaces are rated at 150 tons but tap slightly more than 160 tons per heat. They make 10,000 tons per month per furnace, using producer gas for fuel, consuming 335 pounds of coal and up to 160 pounds of limestone per ton of steel.

This means 13.9 tons per hour, using up to 60 per cent of metal. Included is a considerable tonnage of alloy and high manganese steels, which use lower hot metal charges.

The fan air supplied is metered and is manually controlled by the first helper through the medium of a butterfly valve. Checker work is 13 feet deep, laid up 4½ x 9½ x 2½ inch brick, leaving 6½ vertical flues and 4½ x 6½ inch horizontal flues. These furnaces have pressure control and checker chamber temperature control. They are insulated on the bottom, the entire checker chambers, fan tails, slag pockets, uptakes, port ends, sidewalls and

PRESENTED here in its entirety is a paper given by Mr. White, vice-president in charge of operations, Republic Steel Corp., Cleveland, before the general meeting of the American Iron & Steel Institute, New York, on May 27, 1937

port roofs to the knuckle. The main roof is not insulated.

The shop has a high level floor, providing for deep checkers. The important statistical information is about as follows:

Furnace length.....78 ft. outside
 Hearth size48 x 16 ft.
 Bath depth32 in.
 Gas checker. .31½ x 9¼ x 22 ft. high
 Air checker. .31½ x 13¼ x 22 ft. high
 Slag pockets—air. .6 ft. 6 in. x 18 ft.
 Slag pockets—gas. .5 ft. 6 in. x 18 ft.
 Uptakes—air
 6 ft. 3 in. x 3 ft. 3¼ in.—20.7 sq. ft.
 Uptakes—gas
 ...31½ in. x 31½ in.—6.9 sq. ft.

This shop with necessary layout has cost approximately \$1,000,000 per furnace. To replace all the open-hearth furnaces in the country with this design on basis of cost saving over existing furnaces would give a return on the money invested of less than 11 per cent.

Bessemer operations during the period of 1926-1936 have assumed a new importance, which indicates a new balance of melting relations in the process of establishment.

The basic open hearth, with its very broad range of raw materials, has been favored during the long periods of cheap scrap. The ability of the bessemer to deliver steel at a rapid rate is being capitalized during the present scrap shortage. The reinstatement of duplexing operations continues to grow, with new plants under consideration.

These are but incidental to the better understanding of bessemer steel at this time. The studies of slag and non-metallic inclusions in the basic open-hearth and electric furnace steels has led to a better understanding of the equilibrium of the bessemer process.

This period has seen the addition to the usual slag practice of the use of alkalis for slag fluidity, and various agents for agitation of the bath to mix slag and metal.

To Broaden Bessemer Range

Higher sulphur contents are usual, until today we find bessemer screw stock available with 0.400 per cent sulphur and very considerable amounts produced around 0.350 per cent. Some experimental alloy steels have been made predicting a wider range of bessemer compositions.

As the result of refinements and control in this process, production of machine parts in automatic machines per tool change and per hour, have in many cases made phenomenal increases, incidentally at no return to the steelmaker.

The electric arc furnace has eliminated the crucible furnace, but shares with the high frequency furnace the higher quality steel field. This period has proven the sound

commercial sense of larger arc furnaces.

The single transformer furnaces with 50-ton hearths and 13,000 KVA transformers have proven successful.

It is our understanding that a 50-ton furnace with a 15,000 KVA transformer is now under construction by one of the major steel companies.

Timken Furnace Performs Well

The two transformer, 80-ton furnace of Timken continues to perform satisfactorily. It is doubtful whether additional large furnaces would exceed the capacity of a single transformer because of the problems of power delivery from the transformers.

The Simpson furnace, a fuel-fired open-hearth furnace with roof burners for gaseous or liquid fuels, competes with the electric furnaces in making special steels. The flexibility of control of the fuel-air mixture is such that reducing atmosphere reactions are possible. This type of furnace is producing stainless steels at Bethlehem Steel Co. and American Rolling Mill Co.

The wide strip mill requiring, as it does, ingots several times larger than ordinarily required, made obsolete some of the existing soaking pit equipment, and in many cases the blooming mills.

Heating steel for rolling was, until about 1926, an art that received but little aid from the metallurgical group. During the last ten years several soaking pit layouts have been installed in which heating is really a heat treating operation. In fact, many of the customary alloy steels require exact heat treatments prior to rolling.

The modern soaking pit lends itself to instrument control and provides for proper temperature distribution, fuel economy, capacity for production and very low maintenance costs. The old regenerative

pits now have at least three well developed competitors, namely, the one-way pit, the circular ingot heating furnace, and the center-fired soaking pit furnace.

Blooming mills have become larger and the manipulating mechanism so strengthened that it is now as massive as the mill. Shock absorbing couplings protect the motors, and the operation is so speeded that high production is possible. When it is realized a single wide strip finishing mill may require 100,000 tons of ingots per month from the blooming mill, we better visualize the production facilities demanded of this new unit.

Hot Scarfing Is Successful

Hot scarfing or burning out of surface defects has been added to the blooming mill operation in an attempt to handle the problem of surface imperfections. The process appears to be successful in eliminating the fine seams usually encountered in steel.

If time proves this method to be commercially successful, we can expect better general surface conditions in our steels which require freedom from such defects. To this may be added some recent developments on scarfing of cold billets which have been astonishingly successful.

The bar mill conversion of steel billets has become a decidedly more difficult problem since 1926.

The conventional mill has been forced to accept a number of very important additions to the problems of shape and surface. A larger proportion of steel must be so rolled that its later responses to heat treatment will be satisfactory. These heat treating steels are often subject to decarburization requirements.

An increasing large proportion of our rolled products must be specially processed after rolling by methods of controlled cooling to insure

Table I

Estimated Distribution of Finished Steel

	Avg. 1922-1926		1927		1936	
	M Tons		M Tons		M Tons	
Buildings	5250	17.2%	7100	22.0%	4000	12.5%
Railroads	7680	25.1	6100	19.0	3300	10.3
Automotive	3600	11.8	4500	14.0	6500	20.3
Oil, Gas and Mining.....	2860	9.4	2750	8.5	1500	4.7
Metal Containers	1230	4.0	1450	4.5	3000	9.4
Agriculture	1130	3.7	1800	5.5	1300	4.1
Shipbuilding	—	—	—	—	300	0.9
Machinery	890	2.9	1300	4.0	1700	5.3
Exports	1760	5.8	1800	5.5	1200	3.8
Highways	—	—	—	—	900	2.8
Miscellaneous	6130	20.1	5500	17.0	8300	25.9
Total Accounted for	30530		32300		32000	

freedom from all internal ruptures.

Decreased tons per hour and increased costs have resulted in attempting to meet the close tolerances on the ordinary mills that are possible on special tolerance bar mills. Even temperature of billets, lower roll pass life, high rejections and many other factors contribute to the higher cost of close tolerance bars.

The problem of increased cold shearing of steel in forging plants has added a serious burden to the rolling mill, since the very narrow limits of rolling temperatures required to produce structures that are safer in shearing seriously hamper the mill tonnage possibilities.

Likewise, more critical surface requirements add greatly to the cost of rolling and to finished inspection and rejections. Descaling equipment has been installed, and is maintained at considerable expense.

The problems associated with the rolling of steel, and its later fabrication, have become so intimately bound together that the proper cost of rolling, at the present time, should be a combination of the production per hour, size of order that absorbs mill changes, mill delays and other expense encountered in attempting to insure against trouble in later fabrication.

The fundamental physical change of the period under discussion is to be found in the wide strip mill which has been developed since 1926.

Start of Continuous Mills

The American Rolling Mill's Butler mill was started in that year, about two years after the Ashland sheet mill. The Weirton and Trumbull mills were both ordered at practically the same time and went into production a few months after the Butler mill. Since that date we have seen almost one-fourth of the steel

production of this nation go to the wide hot strip mills.

Wide strip mills are essentially the commercialization of improved precision rolling assemblies. The backed-up mill with contoured rolls and the backing-up rolls mounted on improved precision chuck assemblies permit the speed-strength combinations which commercially roll steel to gage tolerance impossible on the sheet mills, and with crown tolerance that is the despair of the best of the light plate mills.

The Great Lake's strip mill at Ecorse, Mich., summarizes the change since the shift from sheet to strip. It is 96 inches wide, designed to roll 60,000 tons of strip per month in widths up to 90 inches.

This mill has a slab yard 100 feet wide, 735 feet long, with 25-ton cranes for charging the magazine pushers feeding the furnaces. There are three furnaces which are three-stage fired with gravity discharge.

High Pressure Water Descales

The mill proper has a scale breaker followed by 1000-pound pressure water descaling. The slab then enters a four-high spreading stand and passes through a hydraulic squeezer. It is next passed through three stands of 4-high universal mills.

At this point there is a hundred feet of open table for metallurgical control of temperature, followed by a scale breaker and more 1000-pound pressure water descaling. Following this are six 4-high finishing stands equipped with pressure water descaling.

The product can be cut to length on a rotary flying shear or coiled to 24 inches inside diameter and 44 inches outside diameter. The hot-rolled product may be normalized, annealed, or pickled.

The cold-finishing mill is equip-

ped with two continuous pickling lines. The tanks are 96 inches wide, and can handle up to 165 feet of strip per minute.

The cold mills are one 54-inch 4-high, three stand tandem, one 93-inch 4 high, three stand tandem, three 93-inch 4-high, single stand skin pass mills and one 54-inch 2-high single stand skin pass mill.

The annealing equipment consists of 5 batteries of four double box length annealing furnaces of the "in and out" type.

Back of this wide strip mill is a blast furnace smelting iron ore to make pig iron satisfactory for strip steel making, an open hearth whose production limit is the amount of steel that can be melted to satisfactory metallurgical standards for strip steel and soaking pits and blooming mills, chipping beds and storage yard.

Back of all this is a metallurgical control crew carrying to the mill the requirements of the trade and each month, establishing more stringent standards of manufacture, ranging from grain boundary characteristics of the strip slabs to grain count on the final strip.

The standard of manufacture of any commodity is a variable which fluctuates not only with the type of material but to some degree with the specific application to which the material is put.

It is reasonable to expect that steel for the automotive industry will be manufactured to a different set of standards than a similar composition of material intended for concrete reinforcement or railroad car construction.

Outlets for Steel Shift

If we study the records of steel outlets we find that in the last ten years there has been a decided shift in the steel consuming industries. Records of this point are given in Table I.

It will be noted that both the 1927 and the 1936 surveys include almost identical tonnages. We note some very interesting shifts in consumers. The simple requirement consumers, such as building and railroads, have fallen off, while automotives has increased.

It is of interest to comment that about one-third of agricultural steels are bars and strip for implements and tractors, which today might be considered synonymous with automotive steels. This makes the total of the automotive type of product about 7,000,000 tons, or approximately 22 per cent of the tonnage included in the study.

Deeper drilling in the oil fields has changed the standards of manufacture of products used in the oil country. Higher standards of manufacture in the bolt, nut and rivet

Table II

Production of Finished Steel

	Avg. 1922-1926		1927		1936	
	M Tons	%	M Tons	%	M Tons	%
Rails	2703	8.9%	2806	8.7%	1220	3.6%
Plates	3735	12.2	3718	11.5	2527	7.5
Black plate for tinning.....	1515	5.0	1657	5.1	2283	6.8
Other sheets	3902	12.8	4245	13.1	7343	21.7
Strips	960	3.1	1318	4.1	3225	9.5
Wire rods	2763	9.1	2770	8.6	2998	8.9
Shapes	3384	11.1	3742	11.6	2898	8.6
Bars—merchant	4684	15.3	4682	14.5	5063	15.0
Bars—concrete	709	2.3	814	2.5	1029	3.0
Skelp and tube rods	3763	12.3	4152	12.8	3773	11.2
Hoop, bands, cotton tie.....	527	1.7	499	1.5	147	0.4
Track accessories, inc. crossties	716	2.3	828	2.6	485	1.4
Other finished products	1185	3.9	1130	3.4	810	2.4
Total	30546		32335		33801*	

*Includes 202,000 tons of iron products.

field are due to the influence of the automotive and tractor industry.

No statistics are available which show the tonnage of steel manufactured to critical standards. It is safe to say, however, that compared to the period immediately preceding 1926, the volume now going to consumers who have established critical requirements has doubled.

A further confirmation of this fact is proved by a study made recently by a major producer of 1-inch bar stock and larger, which showed the following distribution among major grades:

	Per cent
Specified as soft steel.....	20
Specified as free cutting.....	15
Specified by SAE designation or equivalent	65

There is no way of determining that a buyer ordering automotive steel always requires that rather than simple steel, but it is a reasonable assumption that any material ordered to a manufacturing standard equal to SAE standards is no longer ordinary soft steel.

The claim department of an ordinary steel plant is familiar with more than 200 reasons of customers' complaints resulting from purely chemical and physical properties. Add to these the standards of size,

finish, length, straightness, loading, and the list increases.

As the amount of flat rolled material for difficult stamping, welding and treating increases, the list of peculiar standards will be greatly extended.

There has been an interesting shift in products manufactured during the past ten years, as shown in Table II.

Our study indicates that for nearly identical tonnages surveyed (1927 and 1936) the amount of strip steel and sheets, other than for tin plate, have doubled. There is a considerable decrease in the amount lumped as miscellaneous (1922-1936), with a corresponding increase in the amount involving designated specifications.

Special deoxidation, rolling and handling of steels have increased the use of certain steels in automotive and railroad fields. The heat treated rail and the low alloy high tensile steels are examples.

The strip mills are producing material for tin plate, high strength stainless, electrical products, pipe skelp, and all manner of high finished flat rolled steel.

The pipe industry has a new aspect since welding by gas, electric arc and electric resistance have been established. Much has been

accomplished by the use of air and oxygen as an aid to butt and lap welding.

The high chromium family of commercially noble metals furnish stainless steels for decoration, strength or heat resistance, and have pioneered the way for the hard carbides.

The wire industry with its carbide dies and electroplated products is changing so rapidly that it is impossible to evaluate even the immediate future.

The operating group of the steel industry, with the use of capital and the aid of labor, control the conversion of raw material into finished product.

From the labor side of this study the investigation made by the United States Department of Labor in 1935 is interesting. It concerns the man-hours required to produce a ton of steel. This report contained information that has become of increasing interest in light of recent conditions.

Labor Factor Is Analyzed

The study included 15 mills operating at about 55 to 60 per cent. Data are given in Table III (p. 19) to give some idea of the extent to which labor is a factor in steel cost.

Any manufacturing standard that slows up production must be reckoned with in the man-hours per unit of production and its resulting labor cost per unit.

It is only by keeping abreast of the times and taking full advantage of the latest design and improvements in mills, furnaces and various kinds of accessories that our industry has been able to make these fine steels.

Returns on these investments show that the new installations were fully justified. Many steel executives feel, after carefully surveying their figures, that the bulk of their earnings during the past ten years have come, almost entirely, from the capital invested in improvements.

It should not be necessary to cite definite improvements in individual plants to justify that statement. If you will think of your own plant or any other plant with which you are familiar you will undoubtedly arrive at the same conclusion. However, due to the exacting requirements, smaller orders, etc., there has been no improvement in the man-hours per ton of product sold.

From the department of labor's figures of hours required to manufacture one ton of steel product we can select an item for critical analysis. Our earlier discussion of the standards of manufacture indicated that merchant bars were being consumed in larger quantities in those industries which have established

Table III

Man-Hours Required To Produce a Gross Ton of Finished Steel Products

Product	Total	Number of Man-Hours				
		Extraction	Trans- porta- tion	Manu- fac- ture	Manu- fac- ture	Admin- istra- tive*
Average, all products	53.00	7.75	8.00	1.50	34.43	1.32
Billets and slabs	29.03	6.69	6.48	1.33	13.98	0.55
Structural shapes, in rolled form, not fabricated.....	33.91	7.27	7.04	1.45	17.46	0.69
Wire rods	35.60	6.92	7.70	1.38	18.85	0.75
Plates, sheared and universal	36.54	7.96	7.70	1.58	18.56	0.75
Concrete reinforcing bars..	36.97	7.38	7.64	1.47	19.70	0.78
Standard rails, including fastenings	38.54	7.80	7.55	1.55	20.82	0.82
Bar steel (merchant steel bars, light shapes, etc.)..	39.35	7.85	7.60	1.56	21.49	0.85
Hoops and bands	42.00	7.85	7.60	1.56	24.04	0.95
Wire, drawn	51.19	7.17	8.04	1.43	33.23	1.32
Sheets, all grades	58.19	8.70	9.62	1.73	36.68	1.46
Wire fencing	60.37	7.38	8.24	1.47	41.63	1.65
Wire nails	61.61	7.48	8.24	1.49	42.70	1.70
Pipe and tubing	62.72	9.00	9.02	1.80	41.26	1.64
Steel car wheels (rolled)...	63.97	9.75	9.44	1.94	41.20	1.64
Railroad axles	64.07	10.28	10.15	2.05	40.00	1.59
Wire, flat, incl. steel in strips	67.00	8.43	9.46	1.68	45.62	1.81
Tin plate—terne plate.....	80.63	8.64	9.56	1.72	58.39	2.32
Fabricated structural work	84.00	8.00	8.95	1.60	62.95	2.50

*Includes salaried workers, sales force, and other general administrative employes. The allocation of man-hours to the respective classes of finished products is obviously to some extent made arbitrarily. The figures are based on 55-60 per cent operations.

(U. S. Dept. Labor, Vol. 40, No. 5, May, 1935)

more stringent requirements.

Merchant bars, requiring only 39.35 hours, are in the lower bracket of man-hours and cannot therefore be designated as a highly finished form of steel with a large amount of stored labor. Merchant bars are a common product and 39.35 hours per ton is below the average figure of 53 hours per ton.

But the steel industry, it seems, has placed entirely too much confidence in "average" figures. Though having the highest regard for the accounting people in the industry, the sizes and types of steel are so numerous that it is almost impossible to set up a basis of accounting which will at a glance give us full information on any given size and variety of product.

To overcome this difficulty, a number of companies have instituted what are known as order costs—costs which show all of the items entering into orders of individual sizes or for individual customers. In the last year, a number of companies have made some rather startling discoveries through the medium of order costs.

Fig. 1 illustrates a typical example of the misinformation which might be given to any of us. It shows the costs entering the production of one of the most common products in the steel industry, a common carbon steel bar, compared with the cost of producing a bar of exactly the same size, rolled on the same mill, but calling for a cold upset test.

Why Costs Mount

Factors which have received but minor consideration in the past in the production of special requirement steels are better bottom requirements, higher percentages of selected scrap, special blocking and reboiling alloys, high amounts of aluminum even exceeding 1½ pounds per ton of steel, special deoxidizing silicons such as zirconium silicon and the increased use of hot top ingot molds and special pouring.

In order to secure the desired qualities and meet the metallurgical tests, it takes approximately 1½ hours longer to produce a 100-ton heat of this type of steel in an open hearth furnace than it does a heat for common bars.

Add to this the cost of hot tops, shorter mold life, and the cost of disposing of off-heats, and you arrive at a figure for ingots which is \$3 higher than that of the common product.

In the same manner we are listing the various items on blooming mill, billet sheds, merchant mill and inspection department, for a total cost over common steel of \$17.74 per ton.

Another factor generally lost sight

of is the size of orders. Over a period of time it costs about \$60 to change rolls from one size to another size on a bar mill. Thus a roll change for 60 tons of a size is \$1 per ton.

If an order for 10 tons of steel cannot be grouped with other orders, as is frequently the case, the cost of changing rolls is \$6 per ton.

It may occur to many of you that the occasions when size changes of less than 20 tons are required—which, incidentally, involve a cost of \$3 per ton for roll changes—are quite rare.

If the experience of other companies is similar to that of the mills with which I am familiar, it is suggested that you mill men go home and check up on your tons per size change over a period of several months.

Some of the business placed with steel producers comes pretty close

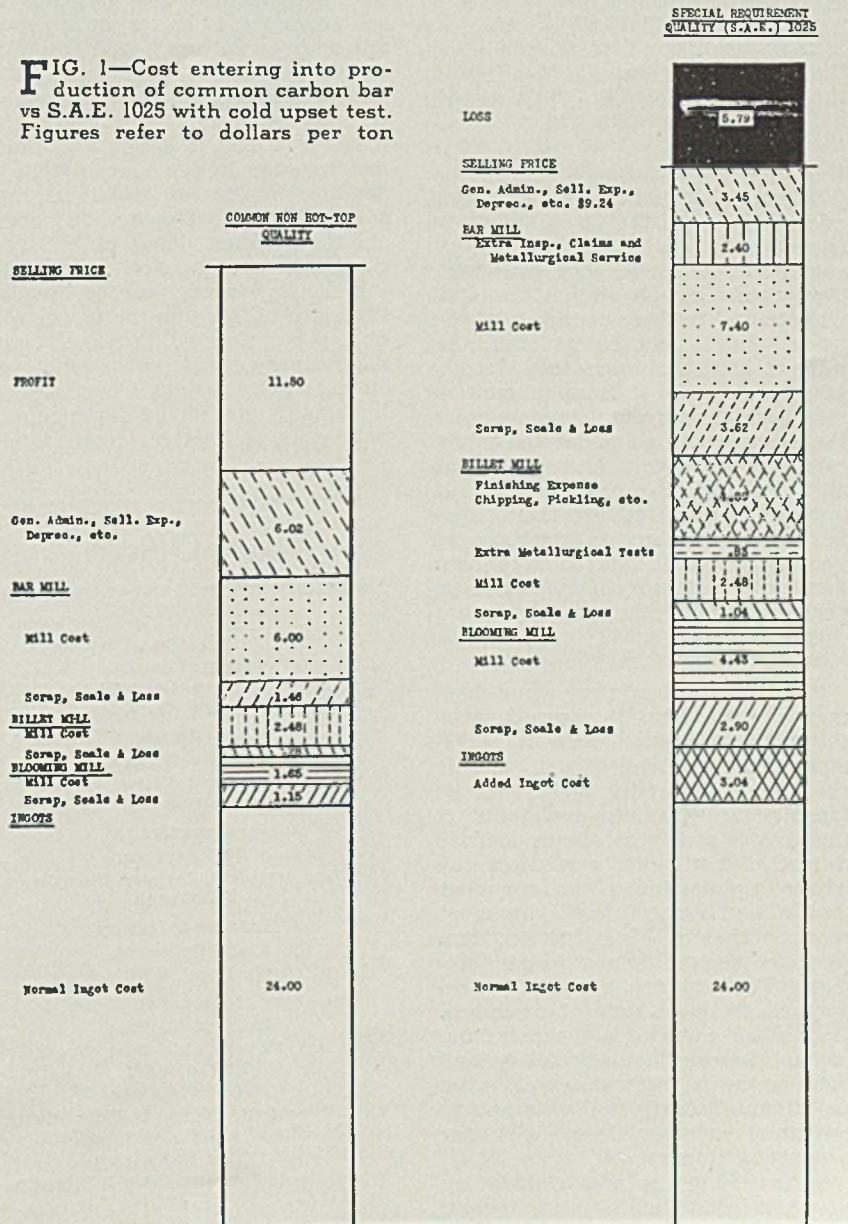
to being warehouse business, and it is our feeling that because of the valuable service warehouse men render, both to users and producers of steel, every effort should be made to keep the steel industry out of the jobbing business.

Inasmuch as added metallurgical requirements are primarily responsible for the factors entering into this tremendous additional cost, it is of interest to review the various accepted metallurgical tests which these special requirements make necessary.

It should be noted that in addition to extra metallurgical cost, important factors are also the higher cost of materials, the additional time required, and the low yields throughout the operations from the open hearth to the bundling benches.

About 20 physical tests are necessary to check these specifications (Please turn to Page 81)

FIG. 1—Cost entering into production of common carbon bar vs S.A.E. 1025 with cold upset test. Figures refer to dollars per ton



Gear Makers Find Present Conditions Demand Emphasis on Management

PROBLEMS of management received emphasis in the deliberations of the American Gear Manufacturers' association at its twenty-first annual meeting at Wernersville, Pa., May 24-25. Relations with employes, training of foremen, wage incentive systems and allied factors were regarded as of much greater importance under present conditions than ever before. In general, it was the consensus that the industry is in a sellers' market as to product but that the reverse is true with respect to labor.

"Companies that followed a policy of making a profit out of labor are approaching nonexistence today," said E. S. Sawtelle, vice president, Tool Steel Gear & Pinion Co., Cincinnati, and retiring president of the association. "Do not cuss labor"; he admonished the members, "study your problems. It is up to you to take care of your employes, not only the man in the shop but the white collar office worker. Remember that all these men have ambitions and it is more desirable to help them satisfy those ambitions as members of your organization than to have them leave and set up somewhere else, perhaps in competition with you.

Foreman Is a Key Man

"And remember that your best means of contact with your organization is through your foremen. Foremen follow the lead of the boss. If the boss is friendly and fair, the foremen are friendly and fair. If the boss is unfair or apt to criticize unjustly, that spirit permeates the whole organization. And remember that if you want results you must pay for them. We have a system whereby we pay bonuses to our foremen. For instance, we pay for reductions in down time of machines. This whole subject is the most important before industry today and there is much that may be done by each manufacturer to enable him to function more satisfactorily under present conditions."

At no time in our industrial history has there been such universal desire to study all phases of management

and adopt new policies in place of those outmoded, according to a paper by H. H. Kerr and Neal W. Foster, Boston Gear Works Inc., North Quincy, Mass.

"One of the points which has interested us to the greatest degree is that the foreman now is generally acknowledged to be one of the most valuable executives," said Mr. Foster. "No matter whether he is working under preplanned production or whether he lays out all the work for his department, there is a common denominator in the fact that he is dealing in human relations and stands directly between management and the workers. Many of the larger companies are, in effect, decentralizing their personnel offices by placing more reliance on the foreman to deal promptly and humanely with all ordinary problems of employer-employee relationships. They feel that thoroughly instructed foremen will handle these matters more intelli-

gently than even the most efficient central offices, at the same time creating more respect for the foreman and the company in the mind of the worker.

"Training of foremen must be systematized and well thought out policies be passed down through the line organization until they reach the employe," continued Mr. Foster. "Sound labor policies may be so sadly mishandled by a tactless foreman that, under present conditions, serious labor trouble may occur with little or no warning. Troubles over technical instructions become insignificant when compared with troubles caused by flare-ups of human emotions. Our representatives must be mentally alert and well trained in meeting difficult situations. Foremen should have considerable authority and must make more on-the-spot decisions.

"Adjustments of wage scales," concluded Mr. Foster, "is going to lead far beyond 1929 wage standards. It cannot be helped, nor can the results be regarded by any cost of living index."

New Officers

AMERICAN GEAR MANUFACTURERS' ASSOCIATION

President

H. H. KERR
President, Boston Gear Works Inc.,
North Quincy, Mass.

Vice President

HOWARD DINGLE
President, Cleveland Worm & Gear Co.,
Cleveland

Treasurer

J. H. JACKSON
Vice president, Jackson Gear Co.,
Pittsburgh

Manager-Secretary

J. C. MCQUISTON
Penn Lincoln Hotel, Wilkensburg, Pa.

Members of Executive Committee

RUSSELL C. BALL
President, Philadelphia Gear Works Inc.,
Philadelphia

U. SETH EBERHARDT
Vice President, Newark Gear Cutting
Machine Co. Inc., Newark, N. J.

FRANK B. DRAKE
President, Johnson Gear & Mfg. Co.,
San Francisco

Warns Against Inflation

Wage incentives were discussed in a paper prepared by the same authors and read by Mr. Kerr. "We must obtain far higher returns from higher paid labor with little advance in our sales prices. If we attempt to pass all additional labor and tax costs on to our customers we are inviting inflation to the highest degree," said Mr. Kerr. "It is timely to consider the effect of wage incentives on production in order that we may obtain, through increased productivity, a full return on our material investments in men and machines."

This incentive, to be effective, must be predetermined and the worker must know beforehand what he will receive. Many a slip has been made, said Mr. Kerr, in installing a system so complicated that only the specialists making the installation could understand it. Mr. Kerr's company has developed a successful and satisfactory method of paying

premium wages even though the wages are on an hourly basis. The work is carefully assigned and planned and the company constantly surveys each man for quantity and quality of production, for ability to follow instructions, for versatility, and for his attitude toward his job and the company.

While Mr. Kerr admitted the piecework system has a place, he personally felt that the pieceworker is somewhat divorced from his employer in that he is practically an independent contractor. Unless he can have a feeling of security in the form of continuous employment his loyalty is apt to lag. In commenting on piecework systems Mr. Kerr warned that any tendency on the part of management to cut rates as soon as earnings have passed a theoretical maximum cause workers to govern their production accordingly.

Mr. Kerr reported his company, because it was willing to pay a bonus for night work, had little difficulty in building and maintaining a second shift. It gives 45 hours pay at regular rates for 40 hours work on this shift, with 20 minutes free time for lunch. The company gets its extra compensation back in quality for it has had no wrangling over spoiled work, usually prevalent and always laid to the night shift.

Pay Rates Must Be Fair

An example of procedure in establishing fair hourly rates was given. The job was on a lathe and required 10 hours as an average over several lots done as straight day work. A 10-hour allowance was set and the lathe operator told that if he did the work in 8 hours he would be paid for 9 hours. This arrangement, a 50-50 split between worker and management, allows the operator 2 hours in which to do other work and appeals to the worker's sense of fairness.

An interesting comment was made by a speaker representing a plant where all employes are represented by a union affiliated with the CIO. Under the law, said this speaker, there is nothing the company can do but deal with the representatives of this union. Under these circumstances it is fortunate that, because it for many years had an employes' representation plan, the union leaders are men who formerly represented the employes under this plan and hence are in a fine position to understand the problems of the management. Because of this circumstance the relations with the CIO union have been entirely agreeable.

In reporting for the cost accounting committee, H. N. Mathias, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., said industry is confronted by a difficult problem. Because of the growth in business there are more work hours over which to

distribute overhead costs. Eventually the future again will bring a drop in the number of work hours. Should a manufacturer mark up his hourly burden charge to take account of present higher costs of labor or materials, thus passing increased costs along to the customer? Or should the manufacturer refrain from making such a mark-up, and absorb his higher costs by distributing them over the increased



H. H. Kerr

Newly elected president, American Gear Manufacturers' association. He is president, Boston Gear Works Inc., North Quincy, Mass. A native of Boston, he became connected with this company in 1906 in the department manufacturing steering devices. He rose rapidly and when the organization was incorporated in 1924 became vice president and assistant treasurer. In 1929 he was made president and assistant treasurer. Mr. Kerr has held many offices. He served as chairman of the NRA code authority for the gear industry and as employers' representative on the Massachusetts adjustment board of NRA. For three years he was president of the Employers Association of Eastern Massachusetts and in 1936 was president of the Boston branch of the National Metal Trades association

number of work hours? Discussion revealed that manufacturers generally are refraining from handling full cost advances along to customers even though they are building up another problem in the form of inventories on which a loss will have to be taken at such time as costs drop below the present level, which have had a rapid growth in industry in the last few years.

Thrift Is Encouraged

Credit unions were discussed in a paper by Mr. Sawtelle. At this company's plant the employes conduct a union, members obligating themselves to a regular weekly saving out of their pay. As the funds accumulate, employes are privileged to make applications for loans. These are passed upon by a credit committee. This system has led to greater contentment on the part of employes. It teaches them thrift. It

has enabled a number to escape the clutches of loan sharks. Losses under the system are practically nil. Out of the company's 250 employes 129 are members of the credit union and borrowers have numbered 24. Total savings for the first two months amounted to \$2582.50, with \$2100 out on loans.

In a paper "Some Problems of Management," N. M. DuChemin, assistant manager, West Lynn, Mass., works, General Electric Co., revealed some preliminary results of an interesting study of the utilization of machine tools. This shows that many machines are performing their primary functions only a small fraction of the time and that they are used as very expensive workbenches the remainder of the time. Actually the average utilization of machines was found to be no greater than about 20 per cent.

Machine Capacity Lost

"Several years ago in our die department it was evident that a jig-borer had become the neck of the bottle," said Mr. DuChemin. "There always were many jobs awaiting their turn to be bored. We actually checked, over a period of time, the number of minutes per day that the spindle of the jig-borer was revolving. Obviously it could be performing its primary function, boring holes, only when the spindle was in motion. The measurements indicated that the spindle revolved only an average of 60 minutes in an 8-hour day, a 12½ per cent utilization. Seven-eighths of the working day we were supplying that mechanic with a \$6500 workbench. The figures so shocked us that we applied our talent and designed and built several inexpensive removal setup plates upon which the die makers delivered their work to the jig-borer and increased the utilization of the machine to 72 per cent. We then had the equivalent of six jig-jobbers based on past performance of the machine.

Development of "methods" men is a process which calls for as much attention as training of foremen, said Mr. DuChemin. There is no supply of this talent in the present labor market and a thorough knowledge of the plant's product and facilities is necessary before a man can make worthwhile contributions. The author said that as a result of experience he rates a methods man as contributing about five times his annual rate in annual savings. He recommended that the methods room be a restricted area, a laboratory in which processes may be perfected and accurate estimates of the anticipated costs established. Studies of methods of assembly have yielded savings ranging from 30 to 50 per cent. Possibilities from such studies are enormous, said Mr. DuChemin. He

declared that the surface so far has only been scratched in this field.

"Factors Influencing the Durability of Automobile Transmission Gears" was the title of a paper by J. O. Almen, head of the dynamics department, research laboratories, General Motors Corp., Detroit. The table set forth a mortality chart for such gears. Test methods used will be submitted to the association by Mr. Almen in written form at a later date and will then become available to members.

It was shown conclusively by the results that large variations in fatigue resistance are due to mechanical differences and not to metallurgical differences. Production of good gears is a problem for the gear designer rather than for the metallurgist. In these tests six alloy steels, each with its own heat treatment, were involved. There was little indication that any one was better or worse than any other in resistance to fatigue under high stress concentrations. Results with carburized and uncarburized steels showed little difference. While the study was concerned primarily with the breakage of gears, the author pointed out that localized loading produces other types of failure such as wear and pitting but added that wear of this type is of secondary importance in automobile transmissions.

Overcoming Helix Angle Error

"Numerous methods have been proposed for cutting spur and helical gears to obtain a tolerance for helix angle error as is done in spiral bevel and hypoid gears but none have come into extensive commercial use," said Mr. Almen. "The desired result may be obtained by running straight cut teeth against slightly curved teeth or both sets of teeth may be curved on slightly different radii. The relative curvature of the mating teeth should be proportional to the relative change in helix angle through the load change and to the initial error of gear alignment. The less the change in total helix angle, the less need be the difference in curvature. If commercial means can be found to cut gears in this manner the result will be to increase the fatigue strength of the gears and reduce gear noise."

The association accepted a report by the gear geometry committee, A. H. Candee, Gleason Works, Rochester, N. Y., chairman, setting forth a short cut method of making gear tooth calculations. This may be used with spur, helical, worm, straight bevel and spiral bevel gears. Accompanying the report were data sheets providing formulas for direct calculation of addendum and thickness corrections for setting calipers to measure gear tooth thickness. By this method slide rule calculations are sufficiently accurate for all requirements, the errors

by this method being so small as to be negligible. This method of calculation is not new. Although it has been in use for at least 18 years this is said to be the first time it has been set up in data form.

Members of the association voted to discard three recommended practices, those covering transmission nomenclature, differential gears and automotive engine flywheel housings. It was thought advisable to leave such standards to the Society of Automotive Engineers and the American Standards association.

In a paper entitled "Application Factors for Helical and Herringbone Speed Reducers," S. L. Crawshaw, application engineer, Westinghouse Nuttall Works, Pittsburgh, set forth a table grouping 84 different applications under the classifications of uniform load, moderate shock load and heavy shock load. This table represented experience of a number of engineers in the helical and herringbone speed reducer industry. In the author's opinion it never will be possible accurately to describe all possible load combinations in simple terms so that a list of applications based on experience is essential, such a list to serve as a guide to manufacturers in rating their equipment. Mr. Crawshaw submitted his table as a start in this direction and recommended it for review and amplification. The resultant co-ordination of experience, Mr. Crawshaw thought, would increase the field of gearing by virtue of winning more satisfied customers. This recommendation was referred to the speed reducer committee for further attention.

Describes Steel Casting Process

An interesting paper by H. F. Scatchard, Birdsboro, Pa., described the Randupson process now being used by this company and a number of licenses in casting steel in cement bonded molds. After experience covering more than a year, the company now is producing about 85 per cent of its steel castings by this method and expects eventually to go up to 100 per cent. It finds that this method results in castings of superior quality. Mr. Scatchard exhibited a motion picture showing the process in operation at Birdsboro.

"Gear Castings with Special Reference to Cast Iron" was the title of a paper by O. Smalley, Meehanite Research institute, Pittsburgh. This comprised a thorough description of the properties of Meehanite metal as a material for the manufacture of gears.

New officers for the association were elected as shown in an accompanying box. The organization now has 99 members, representing prac-

tically the entire gear industry in the United States. Four companies were elected to full membership, these including the Chicago Gear Mfg. Co., Chicago; Gear Specialties Inc., Chicago, Ottumwa Iron Works, Ottumway, Ia.; and Jackson Gear Co., Pittsburgh. Four companies were elected to company associate membership, including Eastman Kodak Co., Rochester, N. Y.; Goodman Mfg. Co., Chicago; Otis Elevator Co., New York; and Reliance Electric & Mfg. Co., Cleveland. New academic members are Herman C. Hesse, University of Virginia, Charlottesville, Va., and Horace W. Leet, University of Rochester, Rochester, N. Y.

Index Covers Canadian Trade in Full Detail

Canadian Trade Index, compiled and published by Canadian Manufacturers Association Inc., 67 Yonge street, Toronto, Canada; 842 pages; cloth cover, supplied by STEEL, Cleveland, for \$6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This 1937 revision is an authoritative directory of products manufactured in Canada with the names of the companies making them. Its five divisions include: Part I, special export section; Part II, alphabetical list of manufacturers with addresses, branches, export representatives, trademarks, brands, etc.; Part III, alphabetical list of products with names of manufacturers; Part IV, directory of producers, shippers and exporters of agricultural produce and allied lines; Part V, an alphabetical list (a) in French, of the headings in Part III, with parallel English, (b) in Spanish (in limited edition only).

Should information be desired regarding specialized lines, the publishers offer the gratuitous service of their commercial intelligence department.

New Micrometer Tipping Service Is Announced

Special micrometer tipping service is now available to all micrometer users, according to the Carboly Co. Inc., Detroit. Worn micrometers are sent to the company, who tip them with cemented carbides at the wear points on the ends of anvil and spindle. The micrometer is then accurately adjusted and returned to the owner. It is stated that the micrometers will hold to a closer degree of accuracy during a longer life with the hardened tip. One standard price for tipping all micrometers, regardless of size, has been established.

Speed Show Dramatizes Developments in Machine Tool Drives and Controls

BASED upon the same idea as that of putting a successful theatrical production "on the road" for the purpose of bringing it to a number of metropolitan centers, a dramatic presentation of developments in electrical drive and control and in cemented tungsten carbide cutting tools has been brought direct to important centers of the machine tool industry.

Conceived by General Electric Co., Schenectady, N. Y., and produced in collaboration with the Carboloy Co. Inc., Detroit, this traveling "Machine Tool Speed Show" opened at Hotel Bancroft, Worcester, Mass., May 17, was presented at Hotel Gibson, Cincinnati, May 24, and completed its scheduled itinerary with a closing performance at Hotel Faust, Rockford, Ill., May 28. Featuring a large cast of engineers and application specialists from its sponsoring companies, assisted in each case by well known machine tool men, the show on all three occasions drew attendance of well over 100. Tying in with the main performance, which was in the nature of an unusually interesting engineering meeting, there were extensive displays of motors, controls and related equipment and material. There also was a group luncheon, and a dinner with speakers and entertainment.

Each presentation was — with

minor variations to suit it to its locality—the same as the other two. This report covers particularly that at Cincinnati, inasmuch as that city is the most important of the machine tool centers.

The prologue was a sound motion picture which dramatized the economic importance of machine tools in this age of speed. This emphasized the fact that only through modern machine tools have such things as high-speed trains, low-cost quality motor cars, mechanical refrigeration, etc., been made possible.

Speaks on Tungsten Carbide

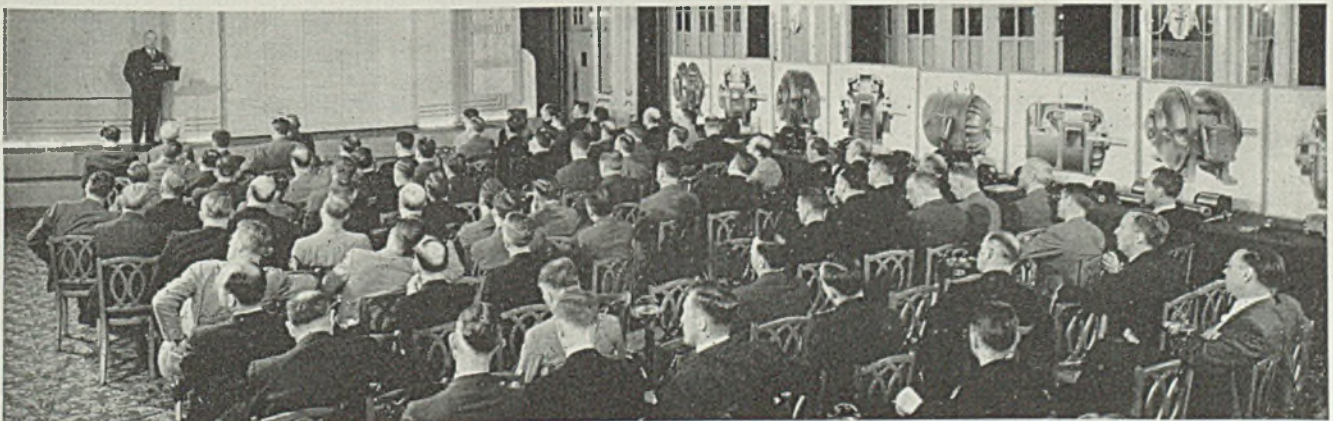
Following this came a paper by A. A. Merry, special representative in charge of activities, Carboloy Co., Detroit, on "High Production Performance With Carboloy Tools." Mr. Merry urged machine tool builders to concentrate attention upon three problems: First, the mechanical removal of chips from their machines; second, the mounting of cutting tools by some means permitting of quick removal and replacement; and third, increasing production by speeding up and mak-

ing automatic the so-called "idle movements" such as the return of slides and indexing of tool or work heads.

Sol Einstein, vice president and chief engineer, Cincinnati Milling Machine Co., Cincinnati, covered the subject of "Requirements of Electrical Equipment for High-Production Machine Tool Performance." As an index of the rising tide of electrification, Mr. Einstein mentioned that today less than 1 per cent of the machines built by his company are equipped for other than individual motor drive. Speaking particularly of conditions met with in the automobile industry, Mr. Einstein said, "Individual motor drive for machine tools permits the location and relocation of the tools to the best advantage with respect to their efficiency and the routing of work through the shops. It makes possible the utilization of efficient systems of illumination, and the unobstructed use of cranes, hoists, conveyors and other material handling equipment."

The third paper of the morning session was entitled "Meeting Your Requirements for Motors." This

ABOUT 125 engineers from machine tool building establishments in Ohio attended the "Machine Tool Speed Show" when it was put on in Cincinnati, May 24. Similar groups were guests at "performances" in Worcester, Mass., and Rockford, Ill. Oversize photographs, sound motion pictures, technical papers and dramatics were utilized to present latest developments in electrical drive and control and cemented tungsten carbide cutting tools



plify it with the idea of covering the fundamental features rather than to include too many details.

It is proposed, he continued, to establish one set of rules for the qualification of welding processes and a second set for the testing of welding operators, based on those prepared by the American Welding society. This latter, he added, will result in a great simplification in the qualifications of welding operators.

A new standard set of radiographic films has been adopted by the committee, which limits the porosity of the weld metal to a greater degree than previously. The stamping provisions in the code have been revised to provide that in addition to boilers the code's symbol shall be applied to superheaters, water walls, and steam economizers. A new basis, he also pointed out, has been agreed on for determining the minimum safety valve capacity to be installed.

New rules have been declared to cover the fusion welding of piping used in connection with boilers and other features of welding not previously covered, Dr. Jacobus said. A careful investigation has been made of the use of the higher tensile strength steel covered by specification S-26 for U-69 vessels, with an agreement reached with all those representing the industry.

Active work, he reported, is now being done on subjects such as the following: Revision of unfired pressure vessel code; allowable stresses for ferrous materials at different operating temperature; allowable stresses for nonferrous materials; revision of two tables; special designs to meet increasing steam pressures in large boiler drum construction; and rules to cover clad vessels.

Handbook Being Prepared

A welding handbook, now being prepared by a special committee of the American Welding society, will be available before the end of the year, Dr. Jacobus announced. It will have more than 600 pages and will cover more than 70 subjects which are being prepared by different authorities. So that the information shall be as authentic as possible, each chapter will be reviewed by at least five experts in the line and afterwards carefully edited.

As a result of this work, he stated, the American Welding society will soon be able to offer additional valuable data concerning matters the boiler code committee needs to know, such as further information on stress relieving and nondestructive testing of welds.

The first all-welded locomotive boiler is now being installed on a chassis of a Delaware & Hudson en-

gine, supplanting the original boiler of conventional construction, according to J. Partington, manager, engineering department, American Locomotive Co., New York. The installation, he said, is purely experimental, with the interstate commerce commission granting permission solely on this basis.

He described the dimensions of the boiler as being unusual and said that the boiler is double butt welded for the most part. The boiler is first to be given careful stationary tests for a period of six weeks, before being further tested under practical operating conditions.

Mr. Partington discussed various problems of design and welding to have come up in his department over the past year on which further clarification of safety code regulations were desirable. He said that some of the problems involved a simple construction yet required considerable thought in the setting up of a satisfactory standard.

Stresses X-Ray Inspection

Importance of X-ray tests was stressed by A. C. Weigel, assistant to the president, Combustion Engineering Co., New York. He cited various instances where careful inspection of this character would have precluded difficulties later—some leading to disastrous results. And where X-raying has not been done for one reason or another, special care in the operation of the equipment and its periodic inspection should be taken, he added.

The human element is still all-important in welding, he said, and even though there is good supervision while the work is progressing, metallurgical tests should be applied as much as possible. Speaking of welding rods, he said, they are usually of good standard, but nevertheless the exception should be looked for. He also warned that there is danger in mixing rods, especially where special steels are involved.

Control of carbon is an important factor in hardenability in the welding of high tensile strength, low alloy steels, according to Dr. J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, O. Silicon plays a small part in hardness while vanadium and chromium have pronounced effect on carbides. Manganese contributes to higher tensile strength in the ratio of the ability to confine carbon to a minimum, under 0.204 per cent in general. For a given increase in tensile strength by an increase in carbon there is a decrease in ductility and wearing qualities are reduced. In welding also a high rate of cooling also tends to hardness. Steels now in use give satisfactory service for pressure parts, and, while considerable progress is possible, certain

results can now be reduced to fundamentals for specific uses.

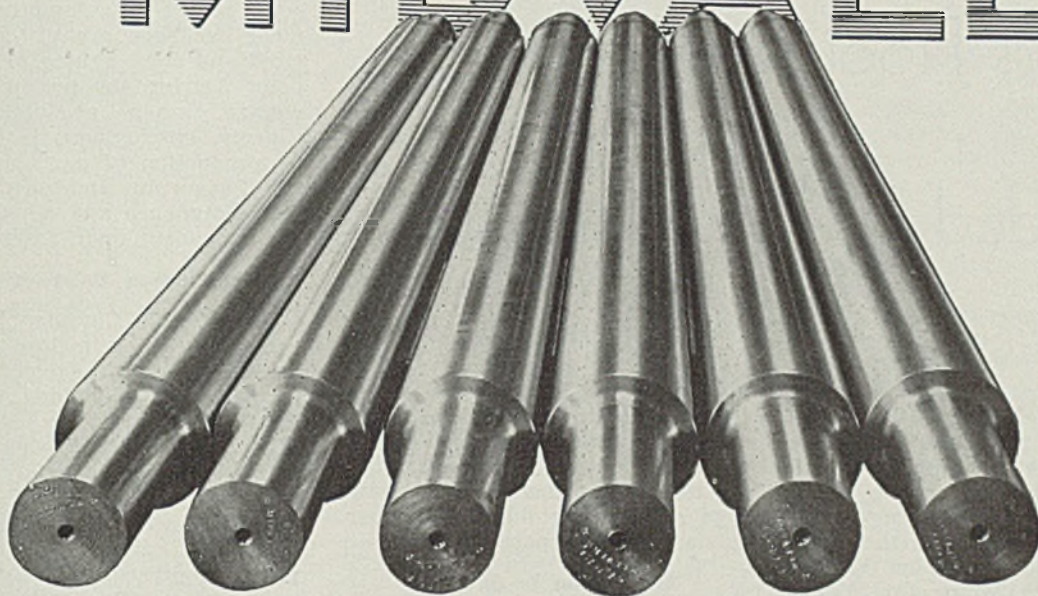
W. R. Grunow, sales engineer, Allegheny Steel Co., Brackenridge, Pa., discussed chromium steel alloys in the use of ferrous alloys in the construction of pressure vessels, citing the increase also in the utilization of nickel-clad steels. Tracing the use of alloys in steel for high pressure needs at various temperatures and under many conditions, Mr. Grunow predicted greater progress would be made during the next few years.

J. J. Vreeland, research engineer, Chase Brass & Copper Co., Waterbury, Conn., reviewed the use of silicon bronze with several methods of welding in pressure vessels. In the application of this metal it is generally sought to meet specifications as to welding by which the weld is near 100 per cent to the base metal. A filler rod of 97 per cent copper and three per cent silicon with the 1 per cent zinc eliminated is recommended. Use of a flux of approximately 90 per cent borax with the welder working with a medium arc, 25 to 40 is favored. The average steel welder is likely to operate with too little heat. Speed of welding and heat should be coordinated with density an important factor. Stops and starts should be minimized. Cold working of the weld structure by several methods described by Mr. Vreeland results in an increase of 5000 to 8000 pounds per square inch in tensile strength with a free bend improvement up to 60 per cent in some instances of silicon bronze welding. Silicon bronze will bond with steel satisfactorily, but the steel should be clean, with no flux used. Care should be taken that steel base does not melt in the operation.

Discusses Effects of Alloys

Citing wide adaptation of chromium-nickel steels for chemical and other industrial uses, W. B. Miller, engineer, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y., covered molybdenum, vanadium, columbium and titanium as alloying elements in connection with requirements of welding codes. For the compensation of the loss of some desirable features, employment of a higher alloy in the rod is required. Chromium-molybdenum steels enhance creep strength. Low alloys have been especially successful in numerous uses in the oil industry. Mr. Miller included these alloys under three general groups, chromium, nickel and manganese, outlining tensile strengths of each as to carbon ratio. For elevated temperature requirements, weld metal should approximate the base metal in analysis.

A LONG LIFE, AND A TRUE ONE, WITH MIDVALE



WHEN shop orders for hardened and ground rolls start to fill our floors, we know the basic industries are busy. That condition exists today. And those industries expect that business to continue, or they would not be buying new equipment and spending the money for the long life they get from Midvale rolls. For only by long life can they realize the full economy of these rolls. The only reason we can give for this long life is that at Midvale we have carried on intense research without cessation, developing better rolls to meet the increased duties imposed on them.

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Mechanical Engineers Told Mass Production Industries Headed for Decentralization

DECENTRALIZATION of industry, with its consequent improvement in both living and working conditions for the wage earner, was seen as the next forward step to be made in the mass production industries by W. J. Cameron, Ford Motor Co., Dearborn, Mich., speaking before the semiannual meeting of the American Society of Mechanical Engineers in Detroit, May 18-21. He observed that the present trend toward branch plants which several of the larger automobile companies have started does not represent decentralization, in his opinion, but rather simply an expansion or moving. Decentralization involves removal of some unit of the central organization to a different location, good examples being the 25 so-called village industries which Ford has developed with a 50-mile radius of Detroit.

Plan Proves Successful

These small plants, nine of which are not yet completed, were started with three motives in mind—interest in water-power development, in economical operation and in the human element. They have all proved highly successful and profitable, bringing labor turnover among the 4000 employed in the plants to practically nil. The plants produce light parts only, such as valves, switches and other electrical accessories. Raw material is trucked to them and then trucked back to the main assembly plant.

Decentralization has been made possible, Mr. Cameron, said, by what has been learned in mass production. In congregating to a cen-

ter there is the advantage of coordinating many parts into a cooperative whole, and in disseminating them again there is the advantage of bringing them to further refinements as separate units.

Congestion Is Avoided

He maintained that decentralization, just as is the case with any other forward step in industry, represents an advancement taken by industry on its own initiative and not under the pressure from any outside political or reform agency. It came as a result of industry thinking on its own problems. Mr. Cameron urged all industry to consider carefully the merits of decentralization, now that so much has been learned about mass production methods. It offers one method of eliminating large areas of congested masses which are breeding places for unrest and blots on the map of society.

Steps which the automobile industry has taken to meet its three-fold responsibility—to the consuming public, to its employes and to its stockholders—were reviewed by John W. Scoville, chief statistician, Chrysler Corp., introduced by K. T. Keller, president of the corporation. He defended the price policy of the industry and showed charts to illustrate that automobile prices over a period of years have not advanced nearly to the extent of other commodities and have year after year represented more value per dollar.

He explained car prices are determined by the competitive situation and by a careful appraisal of what the public is able to pay. After the price is set, it is up to engineers

to design and specify within the limits of cost and still produce a car which will attract buyers. He decried the attacks of politico-economists who have charged the industry with "administrated" prices.

Mr. Scoville outlined the industry's efforts toward stabilization of production by changing the date of introduction of new models, but figures show the change has not been entirely successful and has originated new problems which were not anticipated. He maintained the seasonal nature of automotive employment has been greatly overemphasized and cited figures to prove his point. During the period of model change, when production drops sharply, employment is bulwarked by production of parts, by production for surplus and by employment in maintenance and other divisions not dependent upon assembly lines.

Production Balances Sales

Plan which Chrysler has developed for keeping in close touch with dealer sales was sketched by Mr. Scoville who explained this information was used to gage future production, so that when a model change comes dealers are not faced with the necessity of selling old models at a loss. In fact, at present every car going through Chrysler plants represents an order from some dealer. This calls for considerable ingenuity and speed on the part of planning and routing departments. As an interesting sidelight, Mr. Scoville mentioned that on Plymouth cars alone it is possible to put together 54,000,000 combinations of model, finish, upholstery, etc., no two alike, sufficient to provide a different design for every family in the United States.

ALLEX DOW, past president of the A.S.M.E. and president of the Detroit Edison Co., was given an honorary membership in the society at a dinner meeting which climaxed the week's activities, with approximately 1000 in attendance. Mr. Dow presented the society's Holley medal to Henry Ford "for revolutionary influences through invention and practices in transportation and mass production methods in manufacture." Preceding an informal reception and dance, Col. Willard T. Chevalier, vice president, McGraw-Hill Publishing Co., New York, spoke on matters of production and exchange. He observed that the luxuries of today become the necessities of tomorrow, chiefly because engineers have learned how to multiply productivity so rapidly.

A technical session devoted to research in cutting metals was featured by a paper detailing correct

grinding procedure on cemented carbide milling cutters, by Hans Ernst and Max Kronenberg, engineers in the research department of Cincinnati Milling Machine Co., Cincinnati. Radical difference in the nature of cemented carbide cutters from high-speed steel cutters calls for different grinding technique, different wheels and a rigid tool-grinding machine if clean, sharp cutting edges are to be obtained without cracking the carbide tip.

Grinding must be done by removing a little material at each pass, pressure between tool and grinding wheel must be light and a constant motion in the direction of the feed must be maintained to prevent localized heating of the tip. Wheel speeds in the range of 3500-5000 surface feet per minute are recommended. Dry grinding appears to be favored. Diamond wheels should be operated at a speed 50 per cent higher than abrasive wheels.

Results of a study of the relation between income and expense of a wide range of business enterprises including General Electric Co., General Motors Corp. and United States Steel Corp. were presented by Prof. Walter Raustenstrauch, industrial engineering, Columbia university, New York. By the use of a new method of graphic analysis, he found that (1) in general the expenses of any business tend to maintain a straight-line relation to income; (2) changes in business policy usually are evidenced by a series of nearly parallel straight-line trends; and (3) current reports of operations are in many cases surprisingly close to the results predicted two or three years ago. Thus it was concluded business enterprises have definite and determinately economic characteristics just as power machinery operates to specific functional characteristics.

Requirements for Engineers

Survey of the requirements of the automotive industry as regard technically trained men was summarized by C. J. Freund, dean, college of engineering, University of Detroit. College trained men constitute only 58 per cent of the automotive engineering group, compared with 85 per cent of engineers in other fields. Discussion with prominent automotive engineers disclosed to Dean Freund that they depend much more upon experiment and less upon analysis and calculation than do engineers in other industries, but nevertheless they stress the need for competence in mathematics, science and mechanics.

Extension of data on high-velocity tension impact tests presented by H. C. Mann of Watertown arsenal in the past two years was given in a paper by Col. Glen F. Jenks, ord-

nance department, Watertown arsenal, Watertown, Mass. The work has been extended especially for short notches about 0.1-inch long and for longer gage lengths of 1 inch and for metal in various conditions of heat treatment. Col. Jenks showed that annealed metals have comparatively low transition velocities compared with quenched and drawn materials.

In this work the behavior of metal under impact is studied with relation to the structure of the metal, rather than from the point of view of stress concentration. It appears essential to have a clear understanding of the physical structure of the metal in order to understand the phenomena occurring at low temperature and under high velocities.

Dr. Northrup Writes of Trip Round the Moon

Zero to Eighty, by Akkad Pseudoman, published by Scientific Publishing Co., Princeton, N. J., 292 pages, cloth. Copies available from publisher of STEEL, Cleveland, at \$3; in Europe at \$3.50 from Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Writing under a penname denoting "pretended man", Dr. E. F. Northrup, former vice president of the Leeds & Northrup Co., Philadelphia, inventor of the Ajax-Northrup high frequency induction furnace, now vice president and tech-

nical advisor, Ajax Electrothermic Corp., Trenton, N. J., and a world famous authority on electrothermics, has written an imaginative story of the life, inventions and reflections of a scientist living from 1920 to the year 2000, A. D.

Experiments With Guns

The book reveals for the first time many important applications of the "electric guns" with which Dr. Northrup, at great expense, has been experimenting at the plant of the Ajax Electrothermic Corp., at a government arsenal and in the research laboratory of General Electric Co. at Schenectady, N. Y. Containing 29 illustrations, the book is an interesting and delightful fictional narrative of the first human beings to circumnavigate the moon.

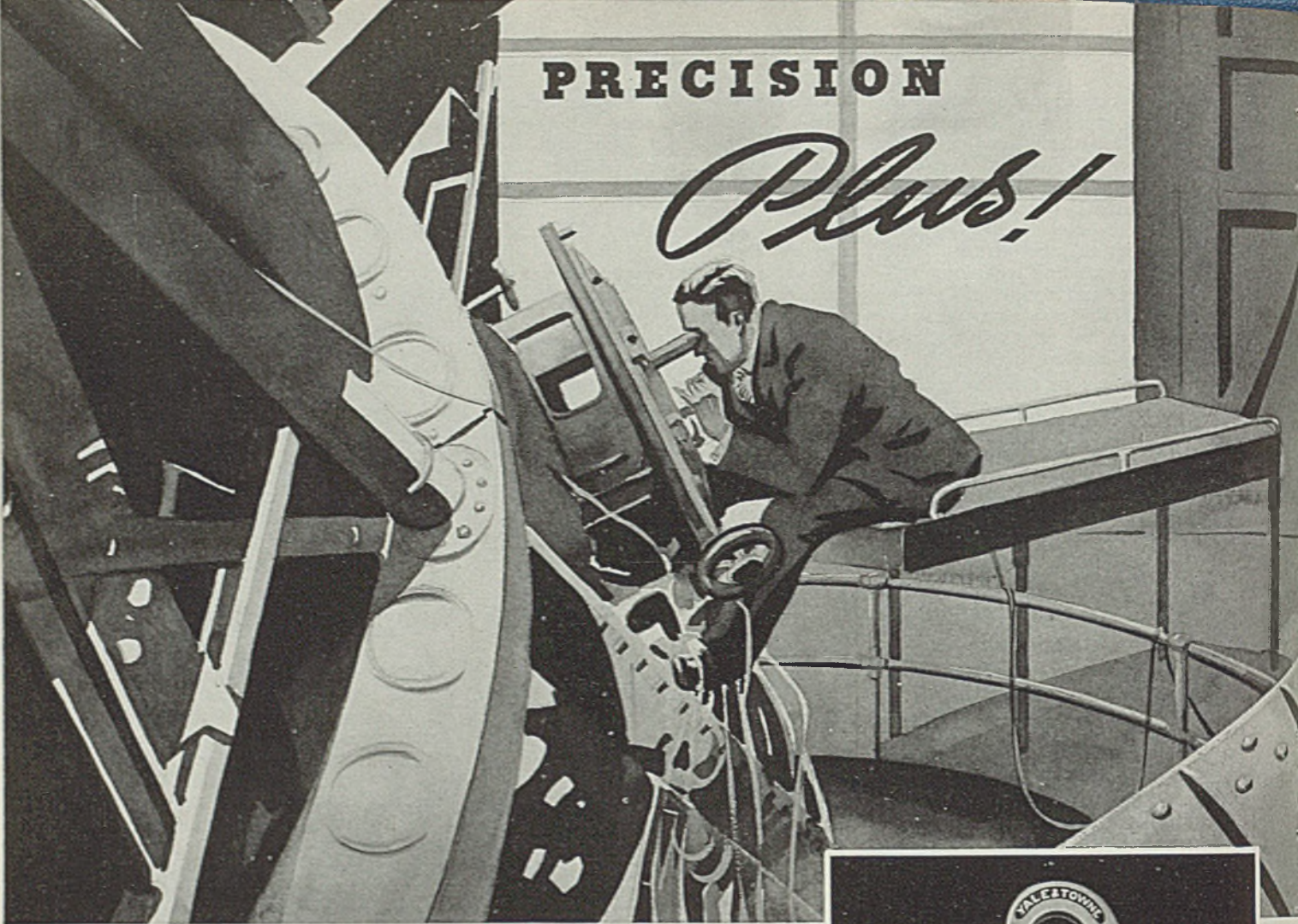
Dedicated to Dr. Guillian Henry Clamer, the book contains a technical supplement setting forth data which Dr. Northrup regards as pointing the way to the solution of the problems of launching projectile ships away from the earth's gravitational attraction and navigating them in outer space. This sets forth formulas on the laws of motion, the work required to overcome the earth's attraction, parabolic velocity, the thrust given a projectile by an electric gun, linear propulsion by traveling magnetic waves, the use of electric condensers, relative advantages of series and parallel resonance and related factors.



OTTO FRANKE (left), master mechanic at Plymouth Motor Corp., shows A.S.M.E. visitors to the Plymouth plant in Detroit how interruption of a light beam to a photoelectric cell stops one of the parts conveyors feeding the main assembly line. In operation, the part on the conveyor cuts off the light beam until it is removed to be placed on the chassis, thus preventing piling up of parts

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A huge lens intended to carry the eye of man to the very heights of the heavens . . . to make the secrets of the stars part and parcel of human knowledge.

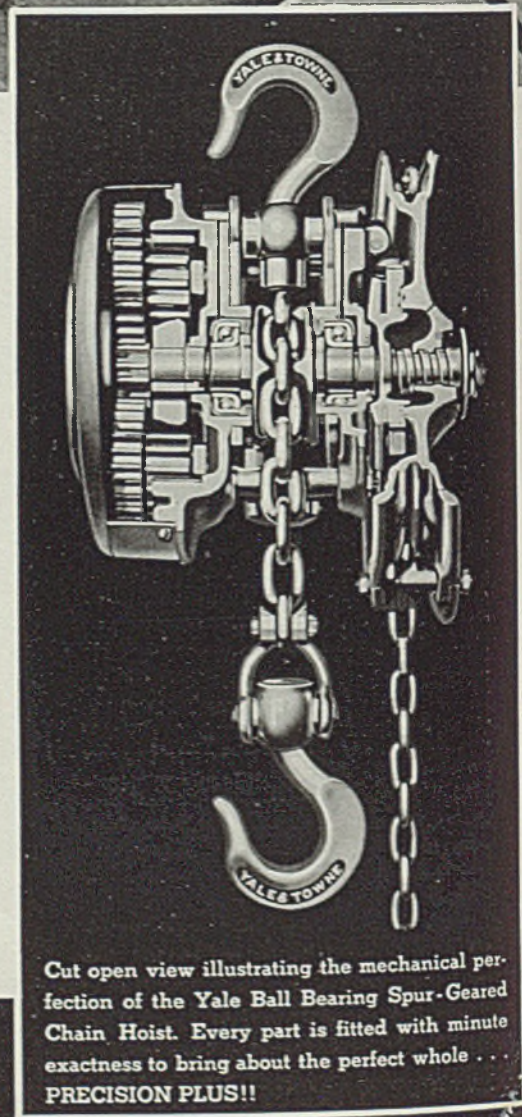
Only the most exacting care in the manufacture of this giant mechanical eye could assure the success of this stupendous adventure in the stratosphere. Measurements, precise to the ten thousandth of an inch . . . Cooling, by a process that measures heat to a fraction of a degree . . . Precision Plus!! The same factor that makes YALE Chain Hoists the first choice of industry!

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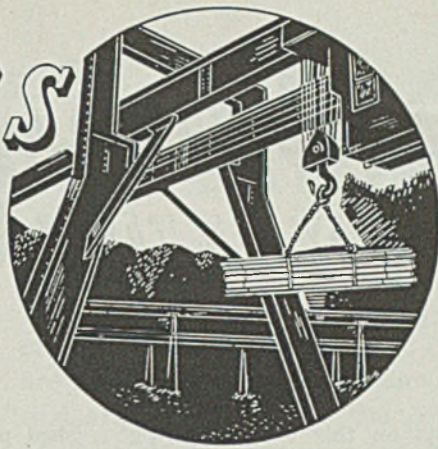
Cut open view illustrating the mechanical perfection of the Yale Ball Bearing Spur-Gear Chain Hoist. Every part is fitted with minute exactness to bring about the perfect whole . . . PRECISION PLUS!!

SPEED TRADE **YALE** MARK **SAFETY**
ECONOMY **EFFICIENCY**

IN MATERIALS HANDLING

THE YALE & TOWNE MANUFACTURING COMPANY, PHILADELPHIA DIVISION, PHILADELPHIA, PA.

MATERIALS HANDLING



Few Statistics Available on Costs Of Materials Handling in Industry

WHAT does it cost to handle materials in the average American industrial plant? How many executives can answer this question? Those who have been identified closely for many years with the materials handling industry have been aware that comparatively few business men know the correct answer in relation to their own establishments. Yet, all of them agree that the problems involved in materials handling are of sufficient importance to warrant a segregation of costs in the accounting system.

A few weeks ago, a materials handling sales engineer, who has sold equipment to hundreds of plants in the past decade, told a representative of **STEEL** that he knew only a couple of companies which could tell him exactly what it costs for their entire handling operations. An earnest effort to determine whether his estimate of conditions is correct indicates that he had not exaggerated.

Some Costs Are Known

Probably the best segregation of materials handling costs is found in the automobile industry. In the Chrysler chassis plant, for example, according to a statement of George Miller, budget supervisor, (**STEEL**, Jan. 25) materials handling cost is \$1.056 per ton of materials handled. Stated another way, the cost was \$6.104 per \$100 of direct labor cost throughout the plant. These figures cover receipt, transportation and actual physical handling of the mate-

rials. They do not include some other factors, such as purchasing, planning and planning follow-up.

These figures on the Chrysler operations are closely in line with those of some of the other manufacturers in the same industry for the particular class of handling operations. They offer, therefore, for certain other industries at least a cost target at which to shoot.

Is there any similar basis for comparison of costs in other industries? Here's one which may furnish food for thought on the importance of the problem of handling:

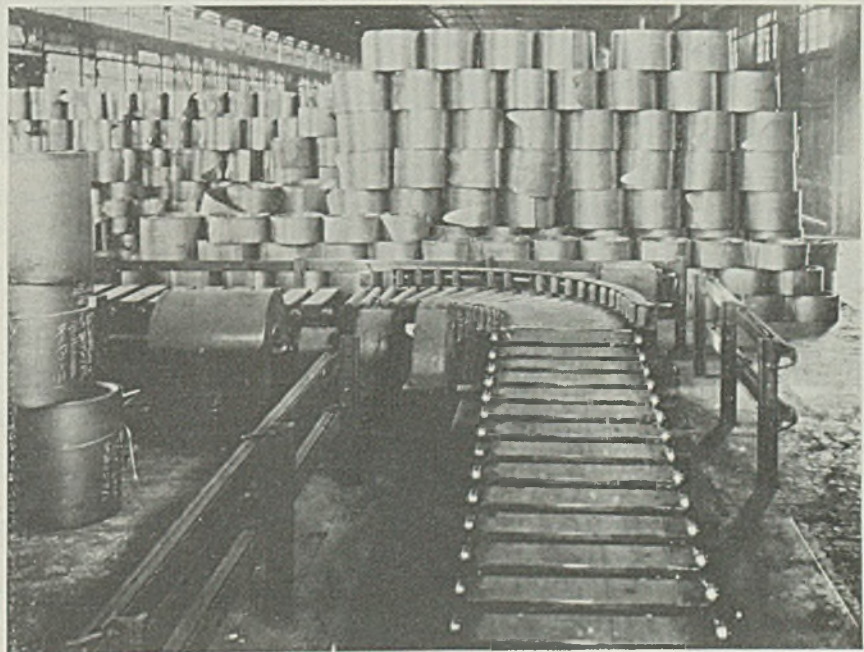
At a meeting of iron and steel engineers recently, one speaker stated that the normal cost of handling the product through various processes amounts to 25 cents per ton in the

hot mill and 95 cents per ton in the cold mill. In the course of discussion on the subject, this same man is reported as having remarked: "I have heard it said that it cost 10 cents every time a lift is picked up and set down."

Various Estimates Made

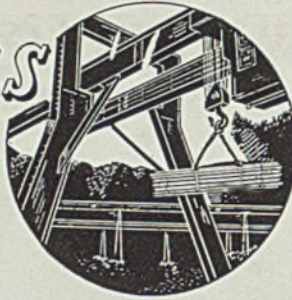
Previous to the depression, most statements about cost of handling were based on relatively meager data. The one given most prominence was that of a nationally recognized industrial engineer, who estimated that "materials handling labor cost to American industry is about 22 per cent of the total annual payroll of American manufacturing industries." In a book on "Modern Materials Handling," published in 1932, the foregoing estimate was reprinted in the opening chapter, which includes also the following: "Another estimate places the cost of moving materials *within the plant*, at 80 per cent of the freight, express and parcel post expenses."

One of the most widely quoted



VIEW of motors and control units used to drive heavy conveying unit which connects two crane bays in a large steel plant. Heavy loads call for much larger motors than are used in most conveying applications. Photo courtesy Mathews Conveyer Co.

MATERIALS HANDLING



statements on this subject during the pre-depression era was that "approximately 80 per cent of the labor contents in unit costs is traceable to handling. Of this 80 per cent, 50 per cent is taken care of through operations on the floor, 12 per cent has to do with receiving, transferring to plant, transportation to the first operation, and packing and shipping." These percentages were not guesses. They represented the judgment of a man who had charge of plant planning and layout for the Westinghouse Electric & Mfg. Co., and whose experience included intimate knowledge of handling in a wide variety of plants.

Interest Is Now Revived

During the years of the depression, interest in the subject of materials handling costs waned. Some of the larger manufacturing companies found the slack period useful for studies of operations, and as a result they have been devoting greater attention to the subject of handling during the past year.

Even the labor disturbances had their effect on materials handling. They brought into focus the interdependence of industry upon industry, the need of a free flow of raw materials and semifinished and fin-

ished products between sources of supply and point of final assembly. More and more, as time goes on, materials handling will become of greater importance. There is a distinct need at the moment, however, for some additional cost targets at which industrial executives may shoot in their search for improvement of methods.

* * *

New Type Bucket Operates In Skull Cracker Pits

SUCCESSFUL operation of a new type of clam shell bucket at the Pittsburgh works of the Jones & Laughlin Steel Corp. is reported. This is another illustration of the oft-repeated assertion that materials handling developments of today are characterized in large degree by advancement in design rather than in adoption of entirely new classes of equipment. This particular bucket, shown in the accompanying illustration, is a 4-yard, hook-on, two-line unit, and was designed specially by the Blaw-Knox Co., Pittsburgh, to meet unusual crane conditions at skull cracker pits.

An ordinary installation for han-

dling ladles and magnets, as well as clam shell buckets, at open-hearth cinder pits, is a traveling crane with two hooks arranged in a plane at right angles to the tracks carrying the cars. This arrangement of hooks makes the use of regular type two-line clam shell buckets unsuitable since the buckets would have their jaws working in the wrong position for dumping broken slag into cars. Most plants use a single line hook on buckets. In handling large skulls which do not permit complete closing of the bucket, there is danger of damage from sudden closing.

Both main and auxiliary crane hooks are used to pick up this new type bucket. One hook picks up a chain sling which is attached to the bucket head, and the other picks up the operating line. With the two cable drums spaced at 3 or 4 feet, there is no fouling of lines, and the bucket jaws are in proper position in relation to the cars. The bucket is provided with an open top 5 feet square so that the hook operating the dumping mechanism can have a short purchase on the cable reeved directly to the bucket. This makes it possible to operate the bucket with a head room of 24 feet.

Unaffected by Hot Slag

Of extremely sturdy construction, the bucket weighs 22,000 pounds. Jaws and trays are made of chrome-nickel-molybdenum steel, heat treated to retain its properties in the presence of hot slag. This steel has a tensile strength of 100,000 pounds per square inch and a brinell hardness at the cutting edges of 350. Scoop side plates are made of alloy steel of a tensile strength of 80,000 to 90,000 pounds per square inch.

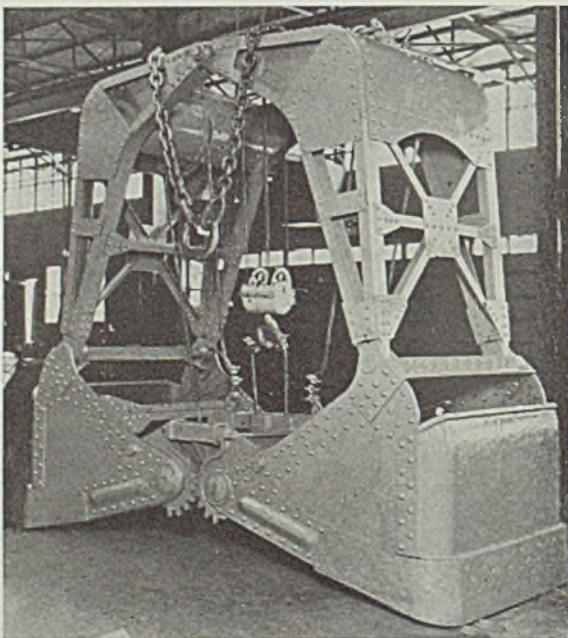
Hinge and corner castings are of nickel-vanadium steel with main hinge pins of chrome-nickel heat treated SAE 3140 steel. Sealed anti-friction bearings are provided for all sheaves, and high-tensile bronze bearings of 250 brinell hardness are used for the hinges. It is said that even a difference in ratio of 5 to 1 in the speed of the two lines does not interfere with successful operation.

* * *

Lists Requirements of an Adequate Handling System

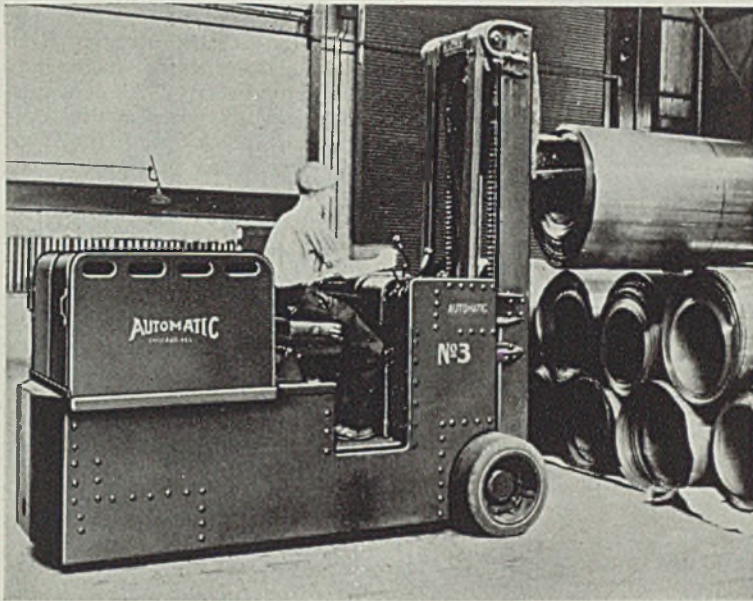
TWO fundamental requirements of a successful materials handling system, according to a recent analysis issued by the Cleveland Tramrail division, Cleveland Crane & Engineering Co., Wickliffe, O., are: First, a system which will pick up a load and take it to its destination without rehandling; and second, one in which the size of the unit load is planned

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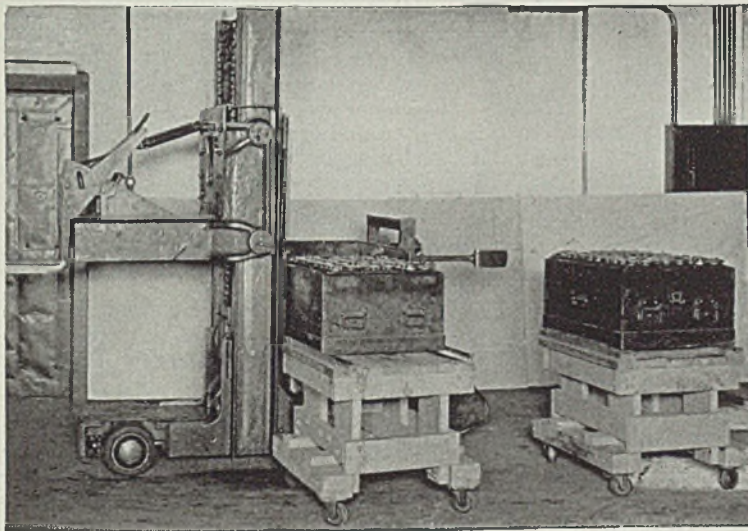


◆
THIS 4-yard clam shell bucket was designed specially for operation with two-hook traveling cranes found at skull cracker pits. Both hooks of the crane are used when the bucket is picked up. Weight of the unit is 22,000 pounds
◆

You can handle materials 24 hours a day ... using EXIDE-IRONCLAD BATTERIES



Truck illustrated made by Automatic Transportation Co., Inc.



Showing the use of transfer tables for battery changing. The discharged battery is pushed from the truck to the table and wheeled to the charging panel, while a freshly charged battery is slid into its place on the truck.

BECAUSE of their electrical characteristics and extremely rugged construction, Exide-Ironclad Batteries are ideally suited for continuous cycles of charge and discharge. Using two sets of Exide-Ironclads, you can keep an electric industrial truck in unbroken, productive operation 24 hours a day.

Changing batteries presents no problem, for it's done in less than five minutes. Many operators use transfer tables the same height as the bottom of the battery compartment of the truck, simply sliding the battery from the truck to the table, and vice versa. The battery is charged right on the table.

Overhead hoists are also commonly used. In an actual test, two Exide-Ironclad Batteries, Type 18 TLM 21, were recently changed with an overhead chain hoist in 1 minute, 39 seconds.

With their high power ability and high "afternoon" voltage, Exide-Ironclads handle the toughest assignments with ease. And with quick battery changes so readily made, you can use these batteries to give you speedy, dependable service 24 hours a day. Write for free booklet, "Battery Handling Systems and Equipment."

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*The World's Largest Manufacturers
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WELDING, ETC.

BY ROBERT E. KINKEAD

Welding Statistics

SURVEY made as of the spring of 1935 showed 21,017 arc welders in the country, 6009 gas welders and 10,308 resistance welders. The method of making the survey was such as to give a conservative figure in the case of the arc welders. Arc welding equipment used for maintenance work would be disregarded by this method. To arrive at an estimate of the number of arc welders in service in May, 1937, a considerable amount of statistical gymnastics is required. Taking the motor-generator set production of 1935, 1936 and five months of 1937 at 18,000 units and the transformer arc welding units at 12,000 for all sizes, the total is approximately 51,000 as of the present time. That this figure is very conservative is indicated by current estimates of welding rod consumption of about 170 million pounds for the year 1937.

The capital investment and consumption balance of this kind of welding equipment indicates a sound reason for prosperity in this field. Thus, 25 million dollars worth of arc welding equipment requires 13 million dollars worth of welding rod per year. This compares with an automobile which costs about \$600 and consumers about \$200 worth of gasoline per year. An arc welder which costs \$500 will consume nearly \$300 worth of welding rod on

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

production work. The manufacturer who sells the welding machine and can continue to supply the welding rod has a regular rat and cat farm so far as possibilities of profit are concerned.

In the field of gas welding equipment the ratio of capital investment to consumption of gases is still more striking. Thus, a blow pipe which costs \$75 may easily consume \$600 worth of gas per year. In the resistance welding machine business, no consumption items are involved except electric power which the machinery manufacturer does not sell.

Peace and Tranquillity

IN THE welding industry, as in others, there are individuals who long for orderliness in which each welding process serves its particular field, salesmen always remain salesmen, engineers always are engineers, executives always function along precisely predetermined lines.

Steel Home for Tools



INTERIOR view of a new all-steel tool house built by Bridgeport Machine Co. shows a compact arrangement of shelves and bins, as well as a bunk and a desk for the record keeper. Shelves, walls, floor and roof are of plate, while the frame is built from angle irons. The entire structure is fabricated by arc welding, and is attached to a base made from 6-inch pipe. Exterior is coated with rustproof tool enamel, while the interior is finished in aluminum paint.

The vision of complete orderliness, co-operation, harmony is extrapolated to a picture of Utopia. The difficulty is that human beings never behave that way. An arrangement which yields one man \$50,000 a year for his efforts may not be at all satisfactory to another man subject to the same arrangement but which pays him only \$2500 per year. Progress, improvement, constructive actions come from individuals trying to satisfy their wants, —not from people whose wants have been satisfied. A man improves flash welding and promptly goes over into the arc welding man's territory and takes his customers away from him. And unless he could do that thing and every other analogous thing, progress would stop and the seeds of revolution would be sown.

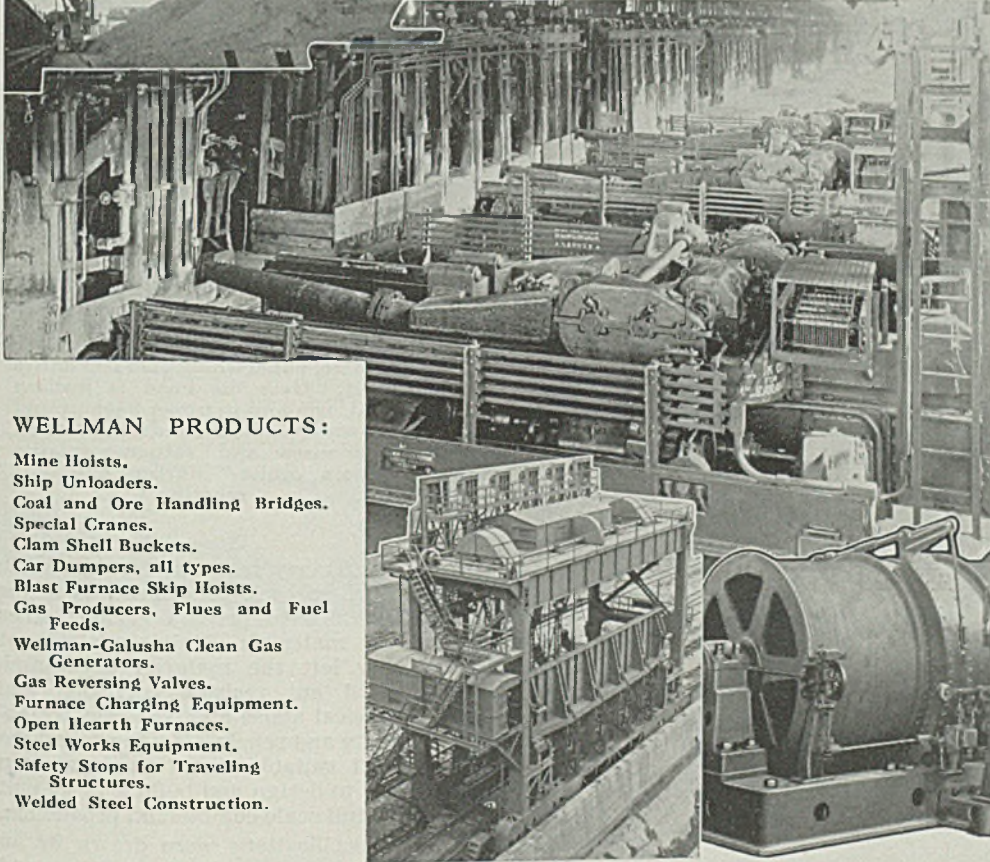
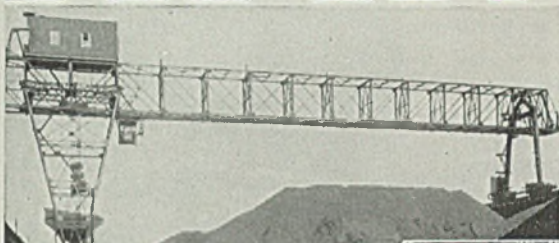
We have been accused of improper complacency by our correspondents about the vagaries of the new deal. Our defense is as above. The administration's leader is the world's champion compromiser and politician,—and that is what the country needs. That is what has saved England in her many crises, to say nothing of the Steel Corporation and General Motors. It is the boys like Stalin, Hitler and Mussolini who know all the answers and who do not compromise when expedient who can lead the nation into crazy schemes. The normal healthy condition of this country involves strong competition between companies and individuals, strikes with a certain amount of hand to hand fighting, lawsuits, quarrels and confusion. Those who ask for peace and tranquillity can find it in the nearest cemetery.

Dynamic Braking for Alternating Current Motor

Designed to minimize braking time on machines powered by alternating current motors is a new set-up in use by Reliance Electric & Engineering Co., Cleveland. Dynamic braking utilizes the driving motor itself as a brake and, in this instance, employs the sudden introduction of direct current.

At present the method is used on a polyphase, squirrel cage, induction motor controlled by a three-pole magnetic reversing controller whose contact positions are governed by two solenoids. The one which throws the motor on the alternating current line is operated by a starting button, while the other, which throws two terminals of the motor across a source of direct current, is connected to a brake pedal. When the motor must be stopped, the pedal is depressed and the direct current introduced, bringing the motor to a quick but smooth stop.

MATERIAL HANDLING Equipment



WELLMAN PRODUCTS:

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Coal and Ore Handling Bridges.
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Blast Furnace Skip Hoists.
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SERVING THE STEEL INDUSTRY from ore mine to finished product.

Machinery for huge and unusual handling jobs has been our specialty for more than three score years.

When *your* material handling problems seem insurmountable, remember that Wellman has the experience and ability to create the equipment needed.

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ENGINEERS

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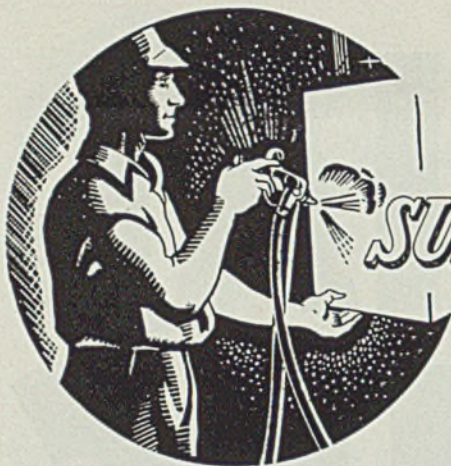
CLEVELAND, OHIO

BIRMINGHAM

NEW YORK

MEXICO CITY





SURFACE TREATMENT AND FINISHING OF METALS

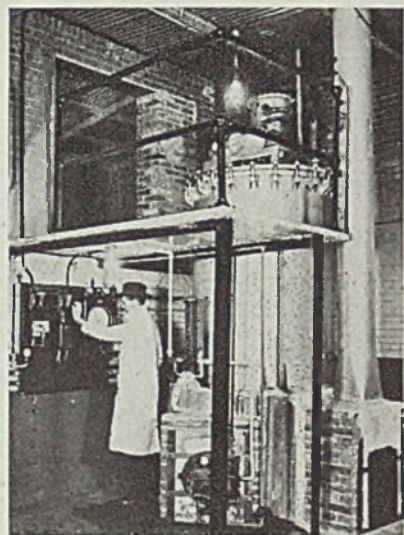
Use of Stainless Steel Equipment Insures Purity of Modern Finishes

DEMANDS placed upon modern industrial and domestic finishes have set quality standards in paint and varnish manufacture hitherto considered unattainable. Discoloration and metallic impurities formerly disregarded in resins and varnishes were found to have definite deleterious effects upon color, flexibility, adherence and other desirable properties. It was definitely known that these faults were, in many cases, directly traceable to metals used in the processing equipment and progressive paint and varnish manufacturers set about to find a metal which would not contaminate their product.

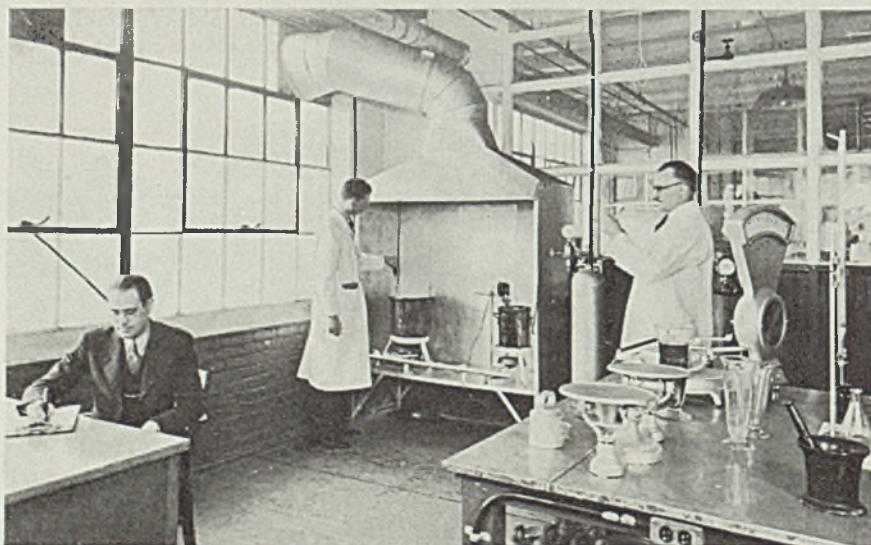
One of the manufacturers faced

with this problem was Nu-Enamel Corp., Cleveland. This company having completed its organization for the manufacture and sale of domestic paints and enamels recently decided to enter the industrial finish field. Their experience in the production of the popular pastel shades of domestic enamels requiring resins and varnishes free from discoloration caused by metallic impurities and oxidation products pointed the way to successful production of the specially formulated synthetic resins required for various industrial finishes.

This company, after experimenting with various metals and alloys, found stainless steel to be the most



SHOWN here is the direct fired stainless steel synthetic resin kettle as it appears in operation. Operator is standing at automatic control panel which operates entire unit. Over his head is loading platform and in upper background is water-cooled condenser which condenses and returns volatile vapors evolved during chemical reaction



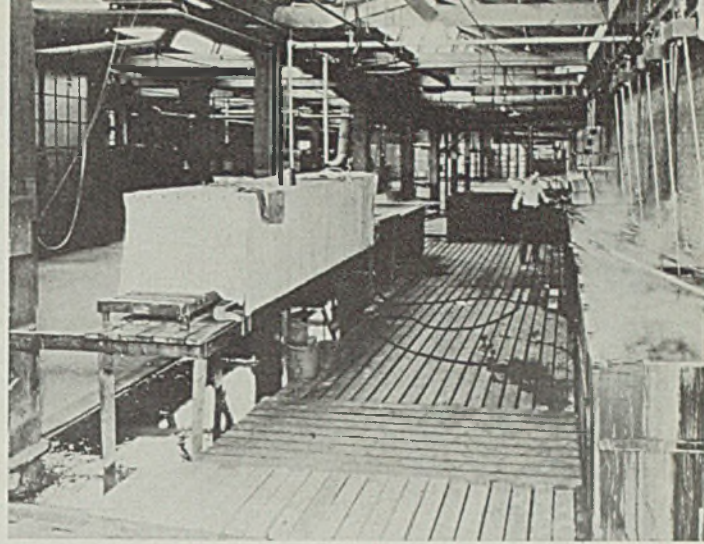
HAVING completed its organization for manufacture and sale of paints and enamels for the domestic market, Nu-Enamel Corp., Cleveland, is now preparing to serve industrial consumers. Shown here is a section of their modern laboratory and part of the staff of chemists ready to formulate finishes "tailor made" to meet customers' requirements

satisfactory material for kettles in which to cook varnishes and resins and also to process various other raw materials. Stainless steel not only left the material uncontaminated but resisted corrosion and physical abuse and was easy to fabricate and repair. Having found the most suitable metal the next step was to design and build a large unit for full scale commercial production.

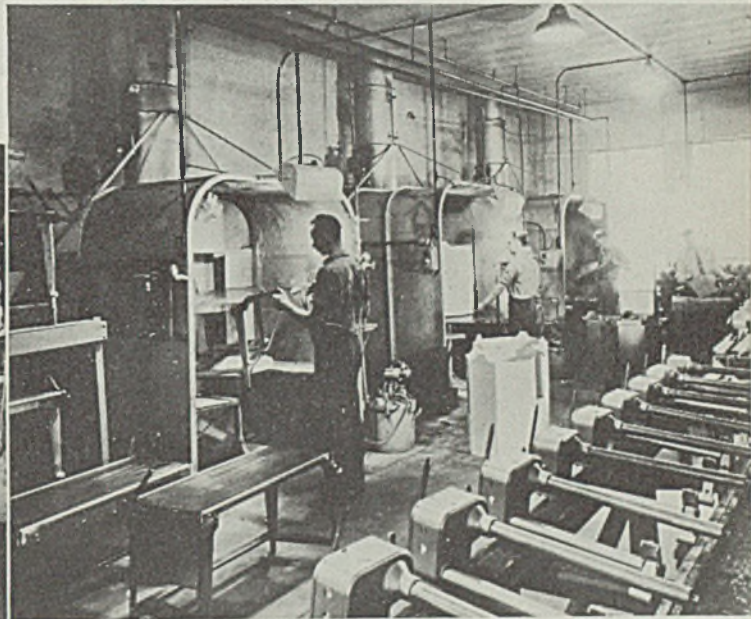
Specifications were drawn by an experienced resin formulator and sent to an outside fabricator. The kettle proper is a welded assembly of 1/4-inch stainless steel plate as is the condenser shown in the upper background of the illustration. Stirring shaft and blades, feed tubes, condenser tubes and all connecting pipe are also stainless steel so that
(Please turn to Page 82)

Washing Machine Tubs Finished with Porcelain Enamel

USE OF PORCELAIN ENAMEL on steel tubs of washing machines manufactured by Horton Mfg. Co., Fort Wayne, Ind. has proved attractive to housewives because of their attractive appearance, long life and ease with which they can be cleaned. These views show methods used in a modern porcelain enameling plant

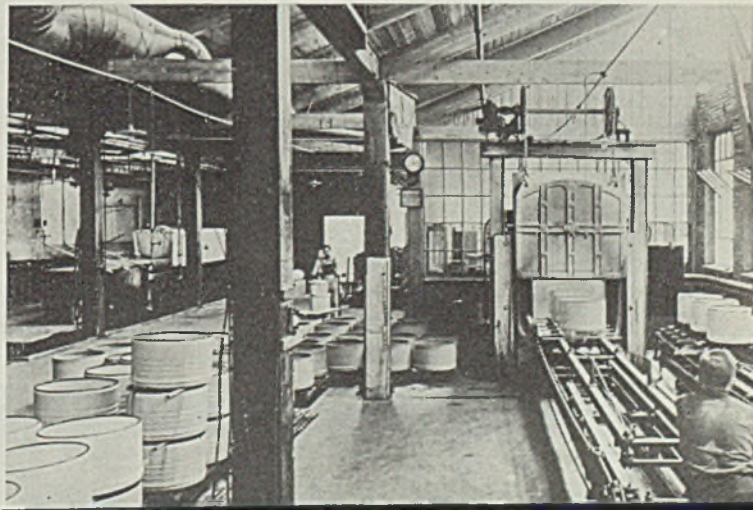


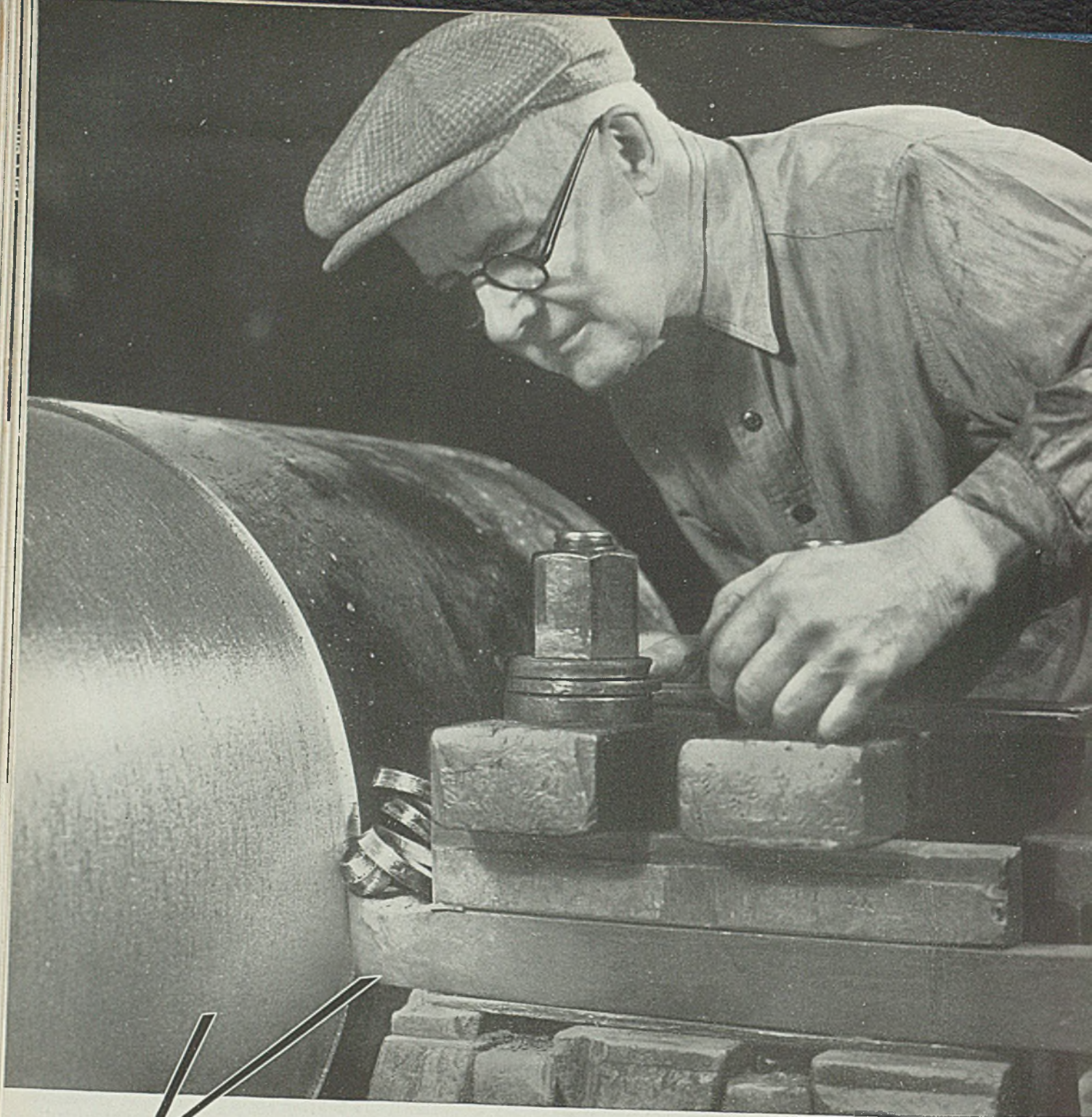
THOROUGH CLEANING METHODS are necessary to insure firm adhesion of porcelain enamel. Cleaning cycle for steel tubs is hot alkali solution, hot water rinse, hot sulphuric acid solution and cold water rinse, followed by dip in borax and soda ash solution. Tubs are dried in dust proof drier shown left above



FINISHES ARE APPLIED BY spray. Porcelain enamel slip is being applied by the wet process at left. Tubs in foreground have been sprayed with finish coat, dried and are ready for firing. Other washing machine parts are finished with synthetic enamels (above) and baked at 165 degrees Fahr.

ELECTRIC OVENS maintained at 1520 degrees Fahr. fuse the enamel frit to a smooth coat of adherent glass. Operator loads and unloads furnace from a distance. Furnace door is electrically operated by switch above operator's head





Key TO HIGH PRODUCTION

HERE'S a cutting steel that you can depend on to see you through when conditions bear down hard on tools. Bethlehem Special High Speed Tool Steel is worthy material for the teeth of modern machine tools. It takes the toughest materials in its stride—stands up under the combinations of high speeds, heavy feeds and deep cuts that get the work out on schedule.

Bethlehem Special is being widely used for every type of roughing tool, for twist drills, gear cutters, inserted saw teeth, special dies, woodworking tools, punches and similar

tools. In every application, experienced shopmen praise its uniformly high cutting qualities—the result of Bethlehem's long experience in making fine tool steels.

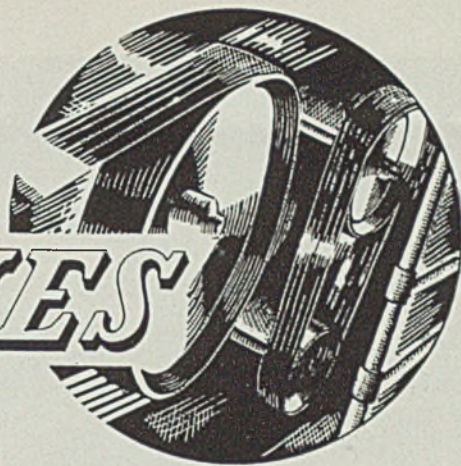
If high-test iron castings, special steels and similar hard-to-machine materials have been taxing the capacity of your tools and slowing down production, it's more than likely you will find Bethlehem Special an excellent solution to your problem.

Other Bethlehem Tool Steels handle tough tasks in their own fields of application with equal efficiency.



BETHLEHEM STEEL COMPANY

POWER DRIVES



Well Planned Group Drives Simplify Quantity Production of Small Parts

TOTAL production of this plant being measurable in hundreds of miles of chain per month, for industrial power transmission, motorcycles, trucks, bicycles and for conveyor and miscellaneous services of a great variety, it is evident that a great volume of light punch press parts and small screw machine work is produced, in addition to a substantial volume of heavier parts. A large portion of the output of this plant is roller chains from $\frac{3}{8}$ to 2 $\frac{1}{2}$ -inch pitch, 1500 to 300,000 pounds tensile strength for some multiple assemblies, sprockets and flexible couplings.

Much of this work is performed on small machines with individual power requirement of 1 horsepower or less. If each machine were driven individually, thousands of motors would be required, but careful grouping has permitted limiting the number to about 550, varying from fractional to 40 horsepower rating, with about 400 on group drives.

Although group driving is not established as an arbitrary rule, wherever machines can be grouped advantageously, considering both production and transmission economies, this is done. In no case is grouping permitted to interfere with straight line production.

Planning of Groups

Groups are laid out in units of 6 to 10 machines, the number varying of course with different types of work and machines. Groups are planned to be driven by 3, 5 and 7 $\frac{1}{2}$ -horsepower motors as a rule. If the machines are individually driven, such groups would require motors of a total rating of approximately 10, 15 and 25 horsepower re-

An Interview with
JAMES W. DOEPPERS

Assistant Superintendent,
Diamond Chain & Mfg. Co.,
Indianapolis

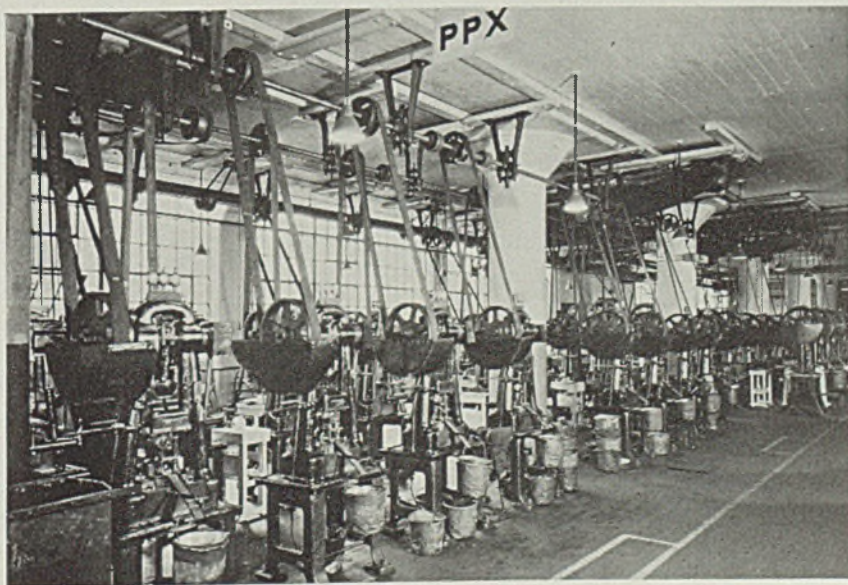
spectively, plus the extra wiring and starting units, implying considerably greater installation expense and a much larger amount of electrical equipment to maintain. Punch presses, screw machines, assembly

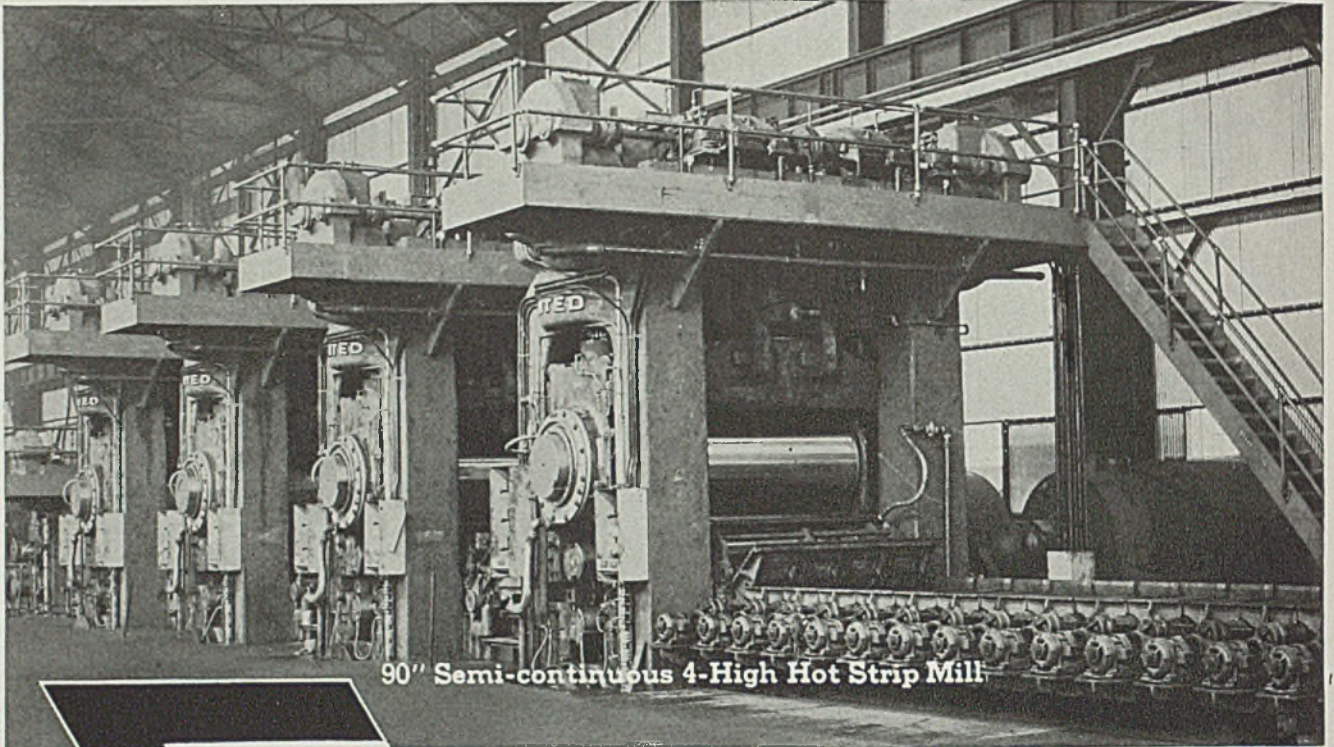
CEILING inserts for mounting lineshafts paid for themselves in lower installation and moving expense on punch press and other group drives

and riveting machines for the work produced in large quantities on automatic or semiautomatic machines, are all group driven.

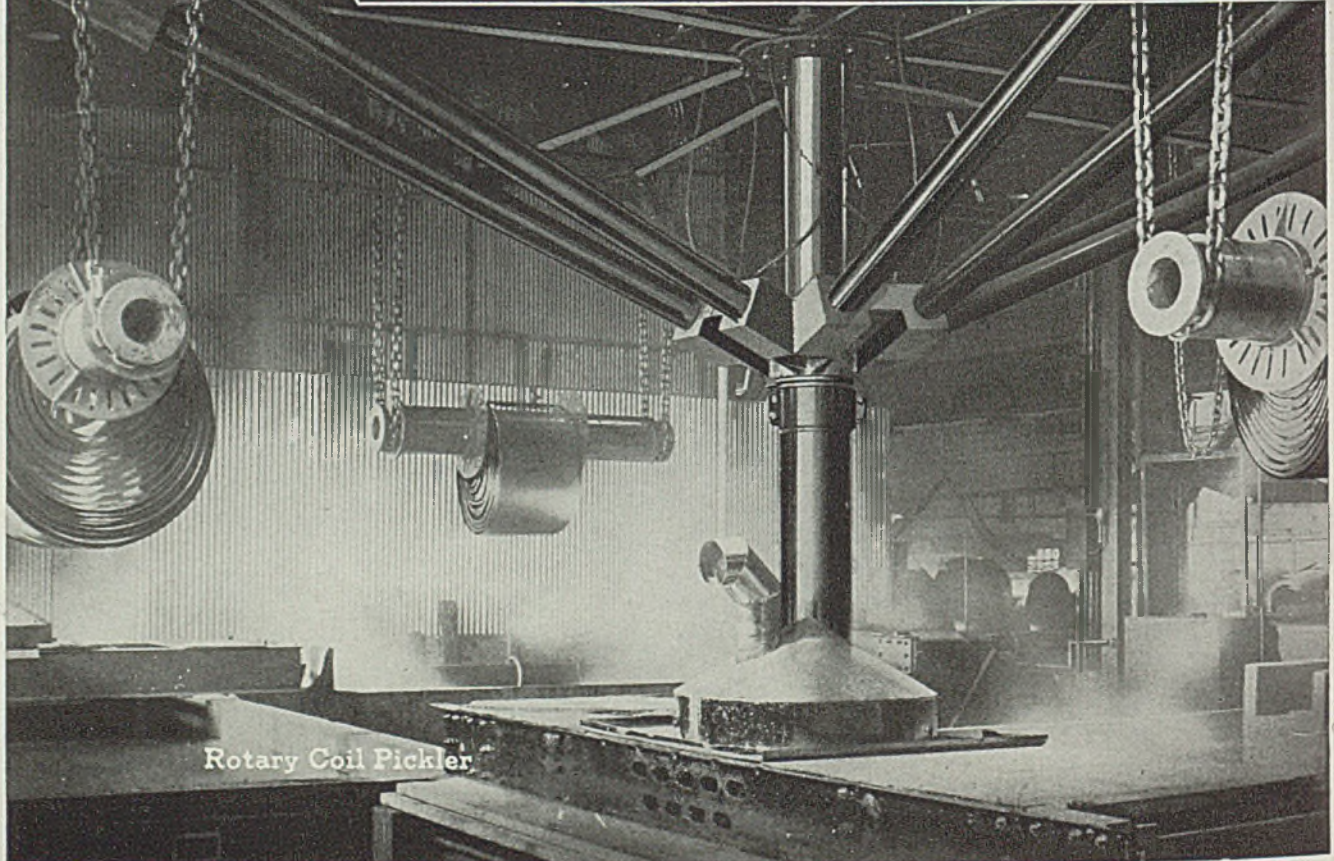
All groups are driven from ceiling-mounted lineshafts. When the reinforced-concrete building was constructed, inserts were spaced on 39-inch centers in all ceilings, including the office sections so even that space can be turned over to manufacturing at any time. These inserts have more than paid for themselves in the ease in erection and changes. In addition to supporting lineshafts, the inserts are also used for mounting monorails and trolleys for serving larger equipment and trolley conveyors for handling materials and parts.

To mount lineshafting, parallel 4 x 6-inch stringers are bolted to

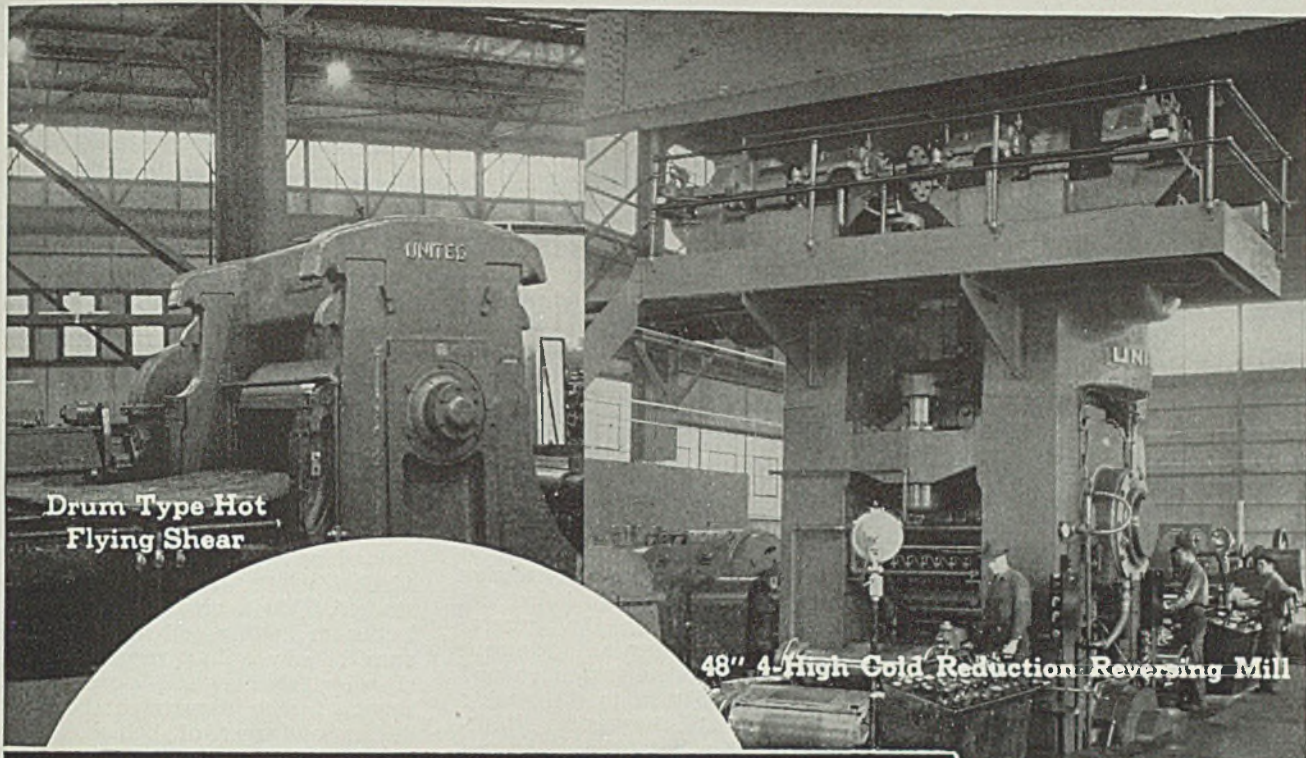




90" Semi-continuous 4-High Hot Strip Mill



Rotary Coil Pickler



Drum Type Hot Flying Shear

48" 4-High Cold Reduction Reversing Mill

STEEL COMPANY MILLS

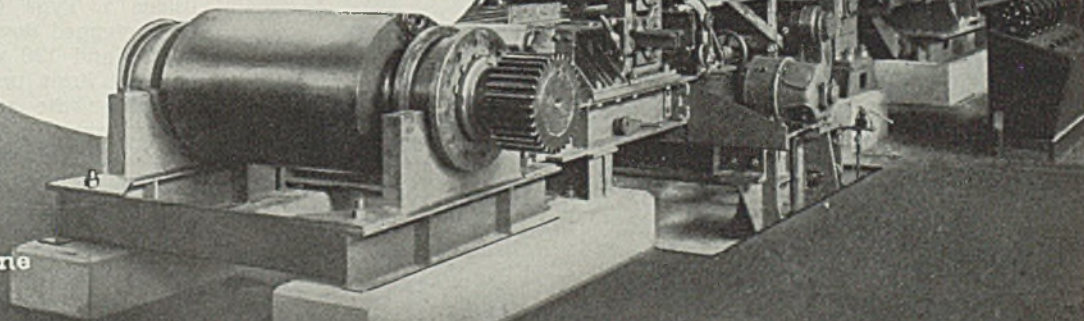
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ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

All Rolling Mill, Pickling and Shearing equipment designed and built complete by United.

Tin Plate Shearing Line



Associated Companies: DAVY and UNITED ENGINEERING CO., LTD. London, England; DOMINION ENGINEERING WORKS, LTD., Montreal, P.Q.

the ceiling with 3 x 6-inch or 3 x 8-inch cross pieces lag-screwed to the stringers for mounting hangers and motors. Shafts are standardized in three sizes, 1-7/16, 1-15/16 and 2-3/16-inch diameters, carried in roller bearings set in cast iron, four-point adjustable drop-hangers, spaced to fit the load. Two hangers support the motor pull. Roll chain is used for power transmission from all motors, either to the line-shaft or the individual machine. Split steel pulleys facilitate easy and quick installation from line-shaft to machines. The rigid ceiling and rigid mounting prevent misalignment trouble. Lineshaft bearings are checked quarterly but in some cases have operated 1½ years without requiring additional lubricant.

Use Own Chains

Lineshaft and most individual motors are 220-volt, 3-phase, 60-cycle induction type, operating at 1200 revolutions per minute. Lineshaft motors are ceiling mounted, inverted, and are connected to the shafts by Diamond roller strand chain drives, single or multiple width, enclosed in welded oil-tight casings. The lower slack side of the chain usually dips into the oil for lubrication although some drives are lubricated by slingers fastened to sprockets. Excepting a few recently installed motors with ball bearings, the majority are ring-oiled.

Motor bearing failures are experienced possibly 6 or 8 times a year, almost invariably on individually driven punch presses where the jar of the cutting stroke is transmitted to the bearing. Oil levels are checked monthly. Visible auto-

matic oilers are installed on some motors and on a number of machine bearings instead of sight-feed oil cups, these oilers being especially serviceable where there has been a tendency to oil pumping or overflow. When all motors have been equipped with these oilers as is contemplated, oiling can be completed in one day instead of two days as at present.

Motors are blown out and checked over monthly. Original starting equipment is of the hand-operated, low-voltage start type but this is being changed over to push-button control.

Inspect Units Regularly

Each week, compressors and pumps, forced circulating oiling systems, autocal signal and alarm system, cranes and elevators receive a thorough mechanical and electrical inspection. During the general spring housecleaning, all equipment receives a complete inspection and cleaning in addition to the weekly wiping off and inspection. Lineshafts are wiped, the adjusting setscrews in bearings tightened and everything else looked over that might loosen in service. Once in 2 years the overload releases are checked.

No special time is set for check-ups on load, but whenever a motor shows signs of impending trouble, readings are taken of current, voltage, power and power factor. A single spare has been ample for each rating and type of motor. Special types are used only on special

machines or equipment. Careful standardization of the others permits safe operation with a very low stock of spare units. Any desired speed change is readily accomplished with one of 15 combinations of sprockets, carried in stock.

Long lines of machines are avoided in some cases by parallel grouping, two relatively short shafts being employed, one being chain driven from the motor and the second being chain driven from the first. Both drives are enclosed and automatically lubricated, and both shafts operating at identical speed. Some of these parallel shaft groups are on 66-inch centers, providing ample aisle space between the lines, machines being small.

Belt purchases have been standardized on two sizes of one make, 4-inch width being maximum stocked. Much greater care in selection of belting and in the avoidance of abuse has resulted from charging the general expense account of each department both in dollars and feet of belt.

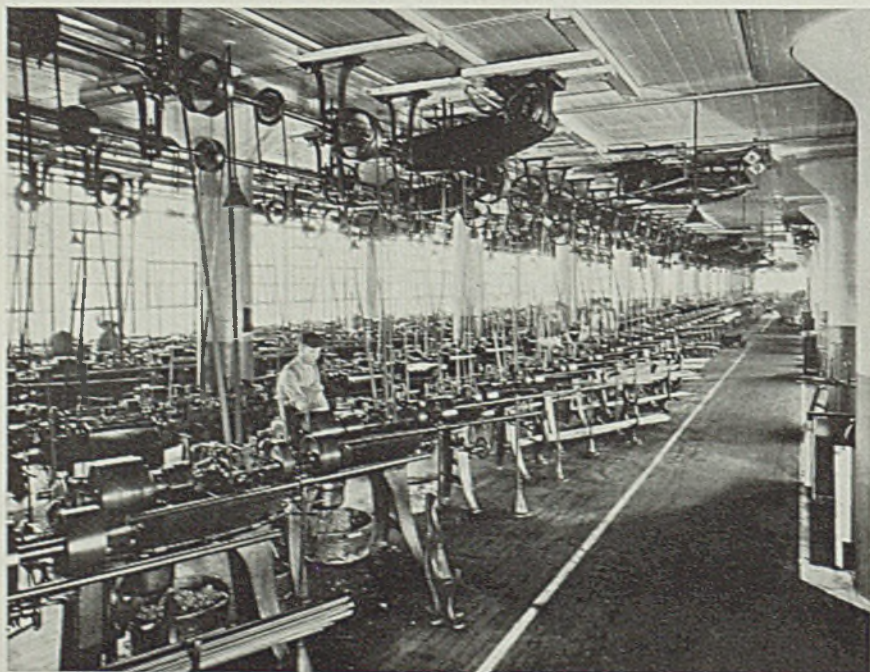
On all but individual machines, the maintenance department handles oiling and belt servicing. This has been found to provide more satisfactory operation and longer life of metallic belt joints as a result of the more experienced handling of maintenance men, who have been trained in this work.

Many Individually Driven

About 150 machines of different types, some of which are special, and others which do not fit into production lines are driven by individual fractional horsepower motors. Machines that require more than 10 horsepower are also individually driven; in some cases because there are not sufficient numbers to group. The majority of these larger units operate independently, not entering into line production, and providing no particular reason for grouping. Much of this class of individually driven equipment consists of the larger punch presses and screw machines, special grinders, and other special machines.

Power is purchased at 2200 volts under a Type C limited demand rate, stepped down to 220 volts for power and 120 volts for light. A demand limit unit tell-tale signals whenever the power consumption approaches the limit and certain specified machines using considerable power are shut down. To further decrease the maximum demand, certain grinding operations and electric heat-treating furnaces are operated at night. Although power factor penalties are not imposed by the public utility, the power factor in operation is approximately 70 per cent.

SCREW machine department and other groups are driven by enclosed roller chains; parallel shafts are similarly cross connected



Leadership

in TESTING
methods and equipment

It is noteworthy that progressive automotive and accessory manufacturers who have modernized their research laboratories have purchased Southwark-Emery Hydraulic Testing Machines . . . and, in most cases, Southwark Stress-Strain Recorders and other accessory equipment. There is an almost universal preference in all industries for Southwark Testing Machines and Instruments.



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Universal
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Weight Motor

EXTENSOMETERS, STRAIN GAGES

Kenyon
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Huggenberger
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Inductor (Telemeter)
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VIBROGRAPHS

TORSIOGRAPHS

BALDWIN-SOUTHWARK CORPORATION
SOUTHWARK DIVISION, PHILADELPHIA
BELTON WATER WHEEL CO. San Francisco



PROGRESS IN STEELMAKING

Diesel Shovel Cleans Pits

At a large open-hearth plant in Ohio a diesel-operated shovel recently was installed for cleaning open-hearth pits. One shovel does the whole job for 14 pits. The new method of cleaning eliminates all delays and is economical.

Magnet Steel Is Developed

Four new types of magnet steel have been developed by a Japanese metallurgist. The first group contains 3.50 per cent nickel, 1.50 titanium, 1.60 cobalt and less than 5.0 per cent manganese or tungsten or both,

the remainder being iron. Ferrotitanium may be substituted for titanium. Some specimens falling within this chemical composition have a magnetic induction ranging from 6100 to 8100 gauss and a coercive force ranging from 650 to 750 oersteds. The second group, which has similar properties, contains 3.50 per cent nickel, 1.50 titanium, 1.60 cobalt and less than 1 per cent aluminum or copper or silver, or two of them in combination. The third group, known as nickel-titanium steel, consists of an iron alloy containing one or more of the elements manganese, vanadium, molybdenum and tungsten, the total content not exceeding 20 per cent.

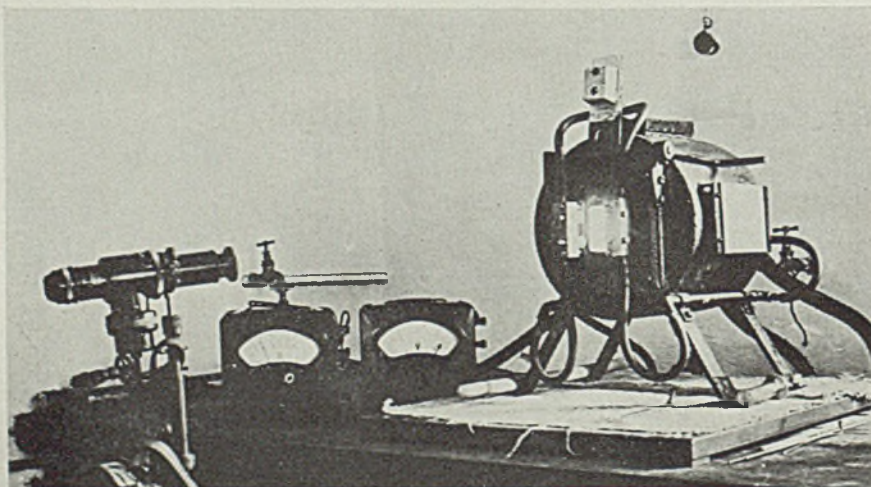
The fourth group contains one or more of the elements silver, copper, aluminum and arsenic not exceeding a limit of 20 per cent.

Resists Caustics and Acids

Two new points, which are resistant to caustics and acids, have been introduced for use in tanks, pipes, vats and other containers carrying liquids of high alkali or normal acid concentration. It is claimed that the caustic resisting paint showed no effects after a 100-hour test in an 80 per cent caustic solution at 160 degrees Fahr. These paints make it possible to provide corrosion-proof surface on metals or machinery exposed to cleaning compounds, caustics, alkalis, etc. The coating can be applied over old paints, enamels and rust particles if adhering solidly to the wall. Colors in black and white are available.

Elements Withstand Temperatures Above 3000 Degrees Fahr.

NEW developments are being brought to this country by Dr. Ing. Paul Schwarzkopf, Reutte, Austria, metallurgist, including a new element for electric furnaces which is said to have maintained satisfactorily temperatures exceeding 3000 degrees Fahr. An experimental furnace using several elements already has exceeded more than 900 hours at temperatures above this figure. The element maintains a constant resistance with age and an increased resistance with temperature. This, it is stated, will reduce the control equipment necessary. One of the experimental furnaces equipped with the new element is shown in the accompanying illustration. Dr. Schwarzkopf recently was elected president, American Cutting Alloys Inc., 500 Fifth avenue, New York



Simplifies Control Problem

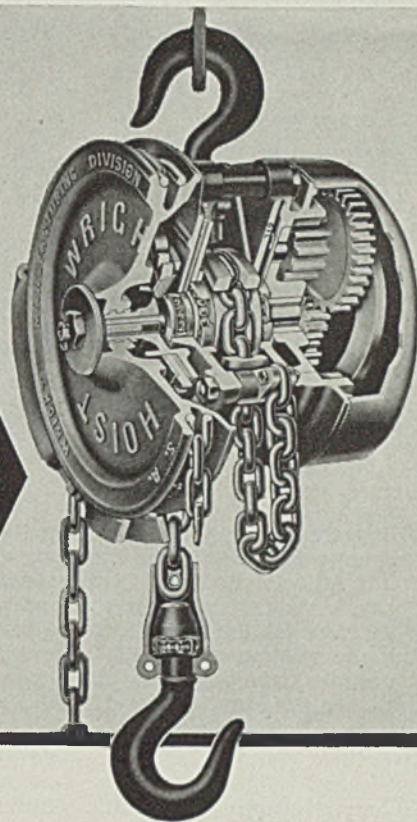
A newly developed instrument reads and records continuously the amount of carbon monoxide or hydrogen in the atmosphere of a heating furnace. It is very sensitive and accurate and its use simplifies the problem of controlling furnace atmospheres.

May Galvanize Cold Strip

Operators of continuous 4-high tandem mills appear to be on the verge of making galvanized sheets from cold reduced strip. Current belief is that such product will be good for certain uses such as roofing and siding. It is thought that this product will not immediately displace hot rolled galvanized sheets for uses where such fabricating operations as forming and double seaming are necessary.

4 OF WRIGHT'S 21 POINTS OF SUPERIORITY

- * 1. ZINC COATED FINISH
- 2. PRECISION LOAD WHEEL BEARINGS
- 3. SAFETY LOAD CHAIN GUARD
- 4. BALL BEARING DRIVING SPINDLE BEARING



BUY ACCO QUALITY

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Weed Tire Chains • Welded and Weldless
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* THE ONLY ZINC-COATED "ALL-WEATHER" HOIST

Overcoated with a heavy finish of corrosion-resisting zinc, Wright Hoists are prepared for any atmospheric conditions. They remain unaffected by corrosion under conditions that would quickly impair the efficiency of unprotected material handling equipment.

This feature is exclusive with Wright—one of the four tabulated above—and one of the 21 points of superiority that tell the story of Wright quality. They form the evidence which permits us to say no other hoist you can buy offers so much for the money you invest. They form a combination of quality and value that makes the Wright Hoist the right hoist to buy.

And you can get a Wright Improved High Speed Hoist of just the right capacity from 300 pounds to 40 tons. Ask your jobber's salesman—he will give you the facts.

WRIGHT MANUFACTURING DIVISION
AMERICAN CHAIN & CABLE COMPANY, INC.
YORK, PENNSYLVANIA

In Business for Your Safety

WRIGHT *Improved High Speed* HOISTS

A. F. A. Sessions Review Progress In Gray Cast Iron Industry

FOUR technical sessions and a roundtable luncheon at the forty-first annual convention of the American Foundrymen's association in Milwaukee, May 3-7, were devoted to the subject of gray cast iron. The first of these sessions was reported in STEEL for May 10, page 76; the remainder are reviewed here, thereby completing the resume of the 1937 convention. For reports of the steel castings, malleable cast iron, nonferrous and management sessions, see the May 10, May 17 and May 24 issues of STEEL.

Gray Iron

ALUNCHEON meeting of the gray iron division was attended by approximately 300. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., chairman of the division, presided and spoke of activities of the division. He called attention to the recently formed committee for co-ordination with engineering school instructors. Hyman Bornstein, past chairman of the division, and new president of the A.F.A., urged efforts to build up membership in the division.

Exchange Paper Presented

Following the luncheon, the second technical session on gray iron was held with Mr. MacKenzie, and Garnet Phillips, International Harvester Co., Chicago, as chairman and vice chairman, respectively. A paper on cast iron for nitriding by J. E. Hurst, Staffordshire, England, was presented by Mr. Bornstein. It discussed in detail analyses, hardening and stabilizing treatments, nitriding procedure, etc.

R. F. Harrington, Hunt-Spiller Mfg. Co., South Boston, Mass., stated his firm made iron for nitriding, and that the castings must be poured with minimum disturbance in the mold. Also, care must be taken to see that the mold is clean. Hot spots at the gate must be avoided to prevent shrinkage or porosity. Mr. Phillips called attention to Mr. Hurst's results with hardened and tempered cylinder liners, and said that they did not agree with those

obtained here. Mr. Hurst had stated that there was little difference in wear results between plain cast iron, alloy cast iron in the "as cast," and in the hardened and tempered condition.

Hardenability Is Studied

D. W. Murphy and W. P. Wood, University of Michigan, Ann Arbor, Mich., prepared a paper on "The Hardenability of Cast Iron," giving data on five heats of iron to illustrate the use of aluminum additions to confer shallow hardening properties. The most pronounced decrease in hardenability in the base mixture studied appears to be from 0.02 to 0.03 per cent.

R. S. MacPherran, Allis-Chalmers Mfg. Co., West Allis, Wis., presented a paper on cupola high test cast iron in which he described the procedure employed in his plant. The cupola charge is composed of 80 per cent steel scrap, 8 to 10 per cent return scrap, 8 per cent silvery pig, 1 to 2 per cent pig iron (2 to 3 per cent silicon), and 2 per cent ferrosilicon. In the spout 3 pounds of ferromanganese-silicon is added for each 1000 pounds of metal in the ladle.

He pointed out that to obtain low carbon content, the metal must not be permitted to remain long in the cupola. Due to greater shrinkage the risers used are larger than usual, and short gates must be used because the metal has a short freezing range. Also, the iron must be poured hot to obtain the greatest physical properties.

In a written discussion, Max

Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., stated that test bars in which the surface had been ground show a considerable improvement in strength. Mr. MacKenzie referred to the impact investigation of the A.S.T.M., and said that machined bars gave better results than those in the as-cast condition. E. F. Green, Axelson Mfg. Co., asked about the bed height employed, and inoculation in the ladle. Mr. MacPherran said that the bed was approximately 35 to 38 inches above the tops of the tuyeres, and recently had been reduced from 2300 pounds in weight to 2100 pounds. He also said that graphitization of the iron was performed both in the cupola and in the ladle through the addition of the ferro manganese-silicon.

H. H. Judson, Goulds Pumps Inc., Seneca Falls, N. Y., asked about tapping, and the reply was that short taps were employed to keep the cupola well as dry as possible to prevent carbon pick-up.

A METHOD for making transverse-strength test bars in green-sand molds was detailed by C. M. Saeger Jr., national bureau of standards, Washington, at a gray iron session. He emphasized the importance of providing freedom from burned-on sand and other surface defects in preparing test bars. Sand mixture employed consisted of eight parts molding sand to one part of seacoal, with 7 per cent moisture. Four methods of molding were employed: Bottom poured vertical mold, top-poured vertical mold, horizontal mold and horizontally inclined mold. Transverse breaking strength of the irons investigated increased with an increase of the maximum heating temperature, regardless of the casting method employed.

No essential differences in the primary structure or in the microstructure of test bars of the same compo-

sition and size, but cast by different methods, were revealed. A finer primary structure, and finer graphite and pearlite constituents, were found to be associated with higher transverse strength.

Considerable interest was shown in a discussion of wear testing by Paul S. Lane, American Hammered Piston Ring Co., Baltimore. The procedure followed in these tests consisted of the application of specimens, ½-inch square, to drums affixed to a motor shaft, wear being determined by weight loss of the specimen. Results indicated that in actual service, finish is an important factor. Coarse, or moderate-grained irons seemed more resistant to wear than those of fine-grained structure. Phosphorus appeared to aid in resisting wear, while high sulphur also seemed advantageous. Best wear was found to result with carbon contents of 3.40 per cent and under.

Improving Wear Resistance

Coarse pearlite usually indicates improved wear resistance over the sorbitic type. Alloy additions improve wear, often to a marked degree, but if grain refinement is carried too far, the opposite result may obtain. High pouring temperatures, resulting in very fine grain, may result in impaired wearing qualities.

A comprehensive paper dealing with the influence of composition and section size on the strength-hardness ratio in cast iron was presented by A. L. Boegehold, General Motors Corp., Detroit. The author pointed out that the relationship between strength and hardness in cast iron is determined by the amount and distribution of the various microstructural constituents. These latter factors in turn are governed by the chemical composition of the iron and the rate and nature of solidification. The latter are affected by the rate of heat dissipation and presence of modifying materials which act as nuclei to begin solidification.

The nature of these nuclei determine their frequency, therefore the number of centers from which freezing is initiated, and thus the overall time for solidification.

Microstructure and physical properties of alloy cast irons was discussed by V. A. Crosby, Climax Molybdenum Co., Detroit. Alloys were discussed from the standpoint of their effects on cast iron, being divided into the group which increases combined carbon and free cementite and those alloys which tend to reduce the amount of the common hardening constituents, cementite and pearlite. Carbide forming elements touched on included vanadium, chromium, molybdenum and manganese. The second group included graphitic carbon, silicon, titanium, nickel and copper.

Three papers on various phases

of cast iron were presented at the final session on gray iron. In one of these, by E. R. Starkweather, Titanium Alloy Mfg. Co., Niagara Falls, N. Y., discussed the effect of titanium additions. Following a brief historical reference and an enumeration of the physical properties of the metal, the speaker quoted from the published works of Moldenke, Piwowarski and Stoughton to show that titanium has a remarkably beneficial effect on the physical properties. He stated that the metal is a powerful deoxidizer and also promotes graphitization. In cupola practice the required amount of titanium is added to the stream as it flows into the ladle. In another form the metal is available and recommended for use in the electric furnace.

"Some Steel Works Castings" was the title of the annual exchange paper of the Institute of British Foundrymen, prepared by J. Roxburgh, Davy Bros. Ltd., Sheffield, England, and presented in abstract by J. W. Clyer, Allis-Chalmers Mfg. Co., Milwaukee. The author commented on certain points of difference between British and American foundry practice. The paper carried detailed explanation of the various problems encountered in the production of large castings, ingot molds, anvil blocks and cylinders, ect., used in steel works operation.

Measures Ingot Mold Life

In discussing ingot molds, Mr. Roxburgh stressed the point that the quality of these castings is measured by the life or in other words the number of castings produced in them before they are scrapped. He described the molding of a 60-ton ingot mold, the mold and core being made in loam with skeleton patterns and sweeps. The metal mixture for large molds is made up of 25 per cent hematite scrap, 30 per cent pig iron of 2.50 to 2.75 silicon and 0.50 manganese, and 45 per cent pig iron of 1.00 to 1.25 silicon and 1.00 per cent manganese. Analysis of the casting shows 3.60 total carbon, 1.60 to 1.80 silicon, 0.50 to 0.70 manganese, 0.07 sulphur maximum, and 0.07 per cent phosphorus maximum.

Summarizing an extensive paper of 68 pages on graphitization and inclusions in gray iron, John W. Bolton, Lunkenheimer Co., Cincinnati, stated that one who has studied the literature of this subject would be rash indeed to come to any sweeping conclusions about the underlying reasons for the effects produced by superheating, the matter of heredity in cast irons and other apparent anomalies. For convenience, cast iron may be described as a eutectiferous series of alloys of iron, carbon and silicon, containing as cast combined carbon not in excess of the eutectoid percentage, the matrix

containing many graphite flakes. However, it is a series of alloys. Other constituents beside carbon and silicon must be considered. Manganese, phosphorus and sulphur, also alloys like nickel, are determined in routine analyses. The chemistry of minor constituents is important.

Various Hypotheses Studied

Useful mechanical properties depend mostly upon the nature and continuity of the matrix. Continuity of the matrix depends upon the amount, size and distribution of graphite flakes. Foundrymen are fairly familiar with some aspects of graphitization, but much remains to be firmly established. As an example, Mr. Bolton mentioned the graphite nuclei hypothesis of Piwowarski, Hanemann and co-workers. Some hypotheses are of doubtful validity for decidedly hypoeutectic irons and in their original form for cast irons in general. Silicate slime hypothesis of Van Kiel and associates is attractive in many respects, but not proved directly. Formation of fluid inclusions or inclusions with fluid peripheries, making the inclusions ineffective as nuclei is postulated by Norbury and associates.

Under certain conditions some of the premises of these hypotheses may be valid. The author appreciates the value of the work on inclusions proper, and recognizes the difficulties which confront investigators in that field. Nuclei action or inclusions probably is not the sole explanation for the phenomenon of variation in graphitization characteristics.

Mathematics of Metal Plate Work Explained

Metal Plate Work, by C. T. Millis; two volumes, 539 pages, 5 x 7 inches; sixth edition; Chemical Publishing Co. of New York Inc., American agents; supplied by STEEL, Cleveland, for \$4.80 for two volumes; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Since its first edition in 1887 this work has been reprinted with corrections to keep up with progress. In the present edition it has been divided into a first part serving as an elementary course and a second as an advanced course. The change has been made by rearrangement of sections without alterations in text or diagrams, continuity of subject matter being preserved.

In Part II a large addition of mensuration problems has been made, with geometrical and arithmetical solutions. Full explanatory notes are provided to make clear the principles upon which the solutions are based.

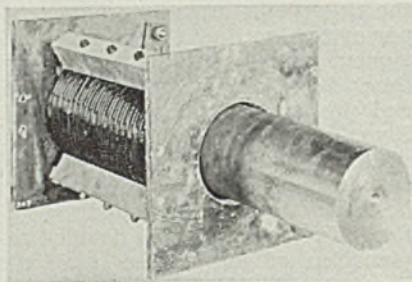
New Applications Are Developed for Electric Induction Heating Process

HAVING demonstrated the application of induction heating to hardening processes, Ajax Electrothermic Corp., Trenton, N. J., is now introducing its use in heating metal prior to forming and forging operations. Using the Ajax-Northrup high frequency induction furnace, setups for heating the ends of tubes prior to a series of forging operations and for heating an end section of a large steel tube were devised.

In preparing the tubes for forging, high frequency power at 2000 cycles is used. In less than one minute after insertion 6-inch sections of the tubes are heated to a temperature of 2200 degrees Fahr., ready for forging. In a subsequent operation, a focus inductor coil is used. This coil consists of one turn of heavy conductor and is of the same fundamental type as the focus inductor coil used in the recently introduced induction hardening process for crankshafts. The two operations differ in that in surface hardening a large amount of power is used and is concentrated on the work for a short time, followed by a rapid quench, in order to produce a hard exterior in combination with a tough core, while in the tube-end heating operation of a lower power is used and the time is extended in order to induce a temperature of 2200 de-

grees Fahr. throughout the end of the tube.

Uniform heating of ends of bars or billets is also possible with this setup. In tests it has been shown possible to heat to a uniform temperature of 2200 degrees Fahr. billets of 3-inch diameter in two minutes. Using thermocouples at center and on the surface to check temperatures, it was shown that a 7-inch billet required 15 minutes to reach the same uniform tempera-



ARRANGEMENT used in induction heating of a 5-inch tube with one end closed. The coils are set in such a way that the temperature is graded from 2200 to 1800 degrees Fahr. in the heated section to provide ideal forging conditions

ture. To heat steel from a room temperature to a forging temperature requires approximately 400 kilowatt-hours overall per ton.

In heating metal prior to forging, it is often desirable to provide a graded temperature in the piece. In order to accomplish this, the coil turns per inch are altered or the location of the load in the coil is varied. In this manner it is possible to vary the temperature in any combination desired.

High Carbon Steels Machine Freely

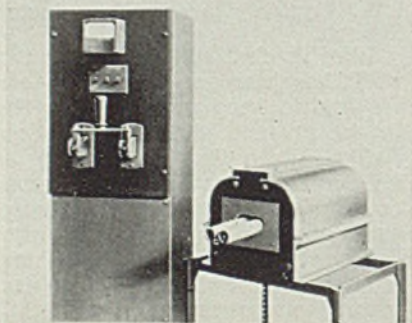
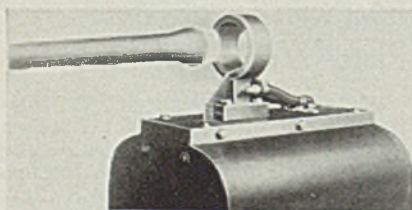
MONARCH STEEL CO., Indianapolis, whose new high carbon, cold drawn, free machining, carburizing steels were announced in STEEL of March 1, Page 69, reports that high machinability ratings have been achieved by these steels. The first of these to be brought out, known as Speed Treat X-1535, containing 0.30 to 0.40 carbon, is an open hearth steel. Although it has tensile strength of 95,000 pounds

per square inch, it machines at a speed of more than 150 surface feet per minute, its machinability rating being 100 per cent. This steel has good tool life and has high ductility.

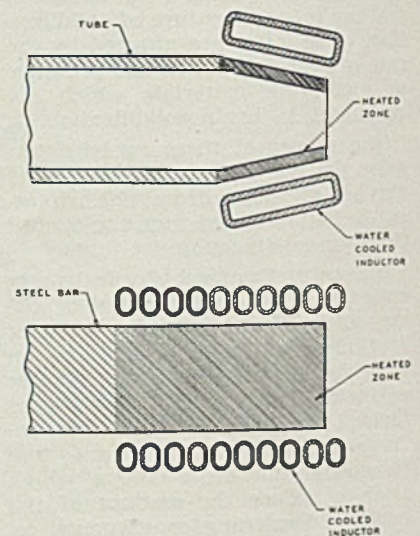
The second of these new steels, Speed Treat X-1545, also is an open hearth product containing 0.45 to 0.50 carbon and having tensile strength of 110,000 pounds per square inch. It is said to approach S. A. E. 1112 bessemer in free machining, carrying a rating of 90 per cent. The company's original Speed Case X-1515, an open hearth product containing 0.15 to 0.20 carbon, is said to machine at more than 200 surface feet per minute or faster than S. A. E. 1112 bessemer, yet is sufficiently ductile so that a 1-inch round, cold drawn bar may be bent flat on itself without fracture. High case hardening ability is claimed for all these steels.

New Refrigerator Hardware

Kason Hardware Corp., 127-137 Wallabout street, Brooklyn, N. Y., has developed an ingenious forged brass latch for refrigerator cabinets. Of streamline design, the latch is provided with an adjustable handle which may be pointed outward, downward or upward. The latch is furnished with polished brass finish, nickel plated, or chromium plated in bright or satin finish. This company also has developed a line of forged brass hinges made in streamline design, for use particularly on refrigerator cabinets. They may be used on right or left doors and may be equipped with stops opening to any desired angle.



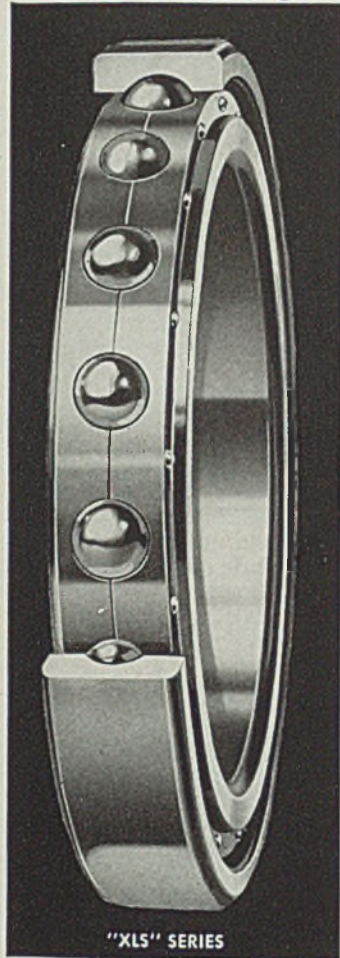
TOP photo shows a special focus inductor coil and a narrow band at the end of the coil which is heated to 2200 degrees Fahr. Lower photo is a view of the individual heater control panel and the coil with two steel tubes inserted



TOP drawing is a cross section of the single-turn focus inductor coil, the end of the tube and the heated section. Diagram below shows uniform heating of a bar or billet using a straight coil energized with high frequency current

When You're Cramped for Space

USE THESE VERY LIGHT INCH SERIES BEARINGS

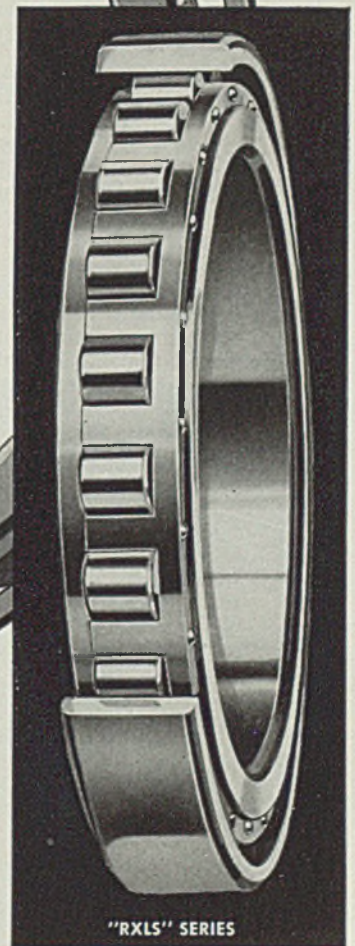


"XLS" SERIES

HAVING bores abnormally large, as compared with the outside diameter, they offer definite advantages under certain conditions found in machine design. You may have them in several different types, *affording compactness, light weight, and greater latitude in your design.*

There are several lines of very light type ball bearings, which include the "S" starting at $\frac{1}{8}$ " bore, and the "XLS" starting at $1\frac{3}{8}$ " bore, running up to a maximum of 21" bore and 28" outside diameter. And in very light type roller bearings, there is the "RXLS" Series, paralleling the "XLS" in size range.

Why not let our engineers tell you more about these Very Light Precision Bearings? Write for the Catalog.



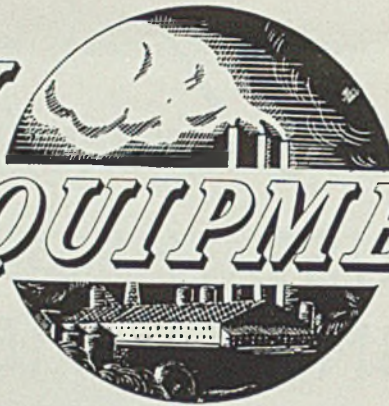
"RXLS" SERIES

NORMA-HOFFMANN

PRECISION BALL, ROLLER AND THRUST BEARINGS

NORMA - HOFFMANN BEARINGS CORP'N. — STAMFORD, CONN., U. S. A.

NEW EQUIPMENT

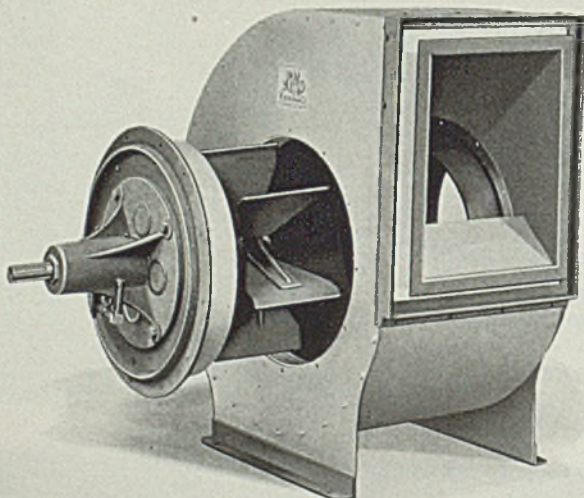


Hydraulic Lift Truck—

Revolvator Co., North Bergen, N. J., has announced its new "Red Giant Hydraulic Lifttruck," a unit capable of elevating 3 inches and of lifting 2500 to 10,000 pounds and more. Loads may be elevated by long or short strokes at the will of the operator, with equal effort from any angle and with an automatic shut-off when full height is reached. The truck has no pawls, ratchets or links to wear out, while frames are collapsible to save under clearance. Although the 3 inch lift is standard, the unit is also made with lift of 4, 5 and 6 inches and greater.

High Temperature Exhausters—

Industrial Gas Engineering Co., 201 East Ohio street, Chicago, has a new improved line of high temperature exhausters in addition to its regular line of thermo exhausters. The new exhausters are available in double housing construction, insulated and air cooled; also in a single housing uninsulated construction. All parts subject to high temperatures are of heat resisting alloys best suited to the particular temperature. Double row, self-align-



One of new exhausters available in classes for operating temperatures up to 1250 degrees Fahr.

ing ball bearings are used and kept cool by an air cooling method which prevents transmission of heat to the shaft and bearings, thus keeping the shaft cool and rigid and eliminating water cooling. Convenient access to exhauster wheel is provided, the complete assembly wheel, shaft and bearing being readily removable by the removal of the cap screws fastening the assembly to the exhauster housing. Exhausters are made in classes for operating temperatures from 800 to 1250 degrees Fahr. with special units being available for temperatures up to 1800 degrees Fahr.

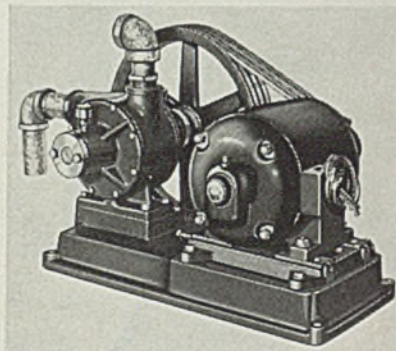
Recording Meter Chart—

Permochart Co., Koppers building, Pittsburgh, has announced "Permocharts", for recording meters in all cases where the paper chart is thrown away after having been used but once. The Permochart product, a smooth, hard-surfaced chart, can be cleaned for reuse by a damp cloth, and is made from a recently developed wrinkle proof, water proof and noninflammable material. These charts can be made to fit all types of recording instruments for flow, temperature, pressure and vacuum, humidity, electricity, mo-

tion or speed. No change in the meter or of pens or ink is necessary.

Rotary-Vane Pumps—

Pine-Thrig Machine Co., Oshkosh, Wis., has developed a new unit known as the Amazon rotary-vane pump, made in all sizes from 5 gallons per minute up to any size required. The rotor of the pump operates eccentric to the bore of the pump housing, while the impellers



Amazon rotary-vane pump is not harmed by cast iron, steel or metal chips

operate concentric to the bore, both rotor and impellers operating as one unit when in motion. There is a running clearance between the rotor impellers and the bore of the pump housing, eliminating all wear on the bore as well as on the outside diameter of the impellers. The unit has no springs or valves and is self cleaning. Cast iron, steel or metal chips, it is claimed, will not harm the pump, but go on through, provided they are not larger than the clearance between the inlet port and the rotor.

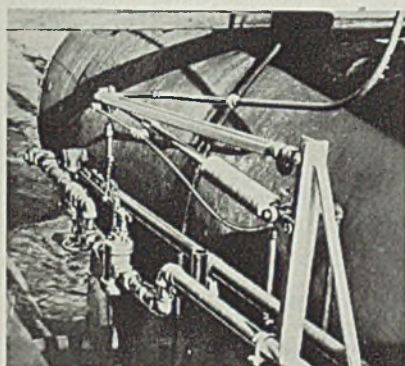
Pipe Cutoff—

Beaver Pipe Tools Inc., Warren, O., announces as optional equipment on its Model-A pipe machine an au-

omatic, spring-fed knife cutoff especially recommended for cutting electrical conduit, or, with special knives, for scarfing pipe preparatory to welding or grooving pipe for Victaulic joints. The Model-A machine features rack-and-pinion feed; quick-opening, fully adjustable die-heads; full 1/8 to 2-inch pipe range, right hand operation and, when having wheel-and-roller cutoff as standard equipment, capability of cutting and threading either pipe or solid round bars.

Water Level Control—

J. A. Campbell Co., Box 851, Long Beach, Calif., has recently introduced a new feed-water level control for boilers with extreme sensitivity to maintain levels within 1/2-inch. The unit is made in one size to meet all boiler needs and will operate any valve up to 12 inches. Overall length is 48 inches. Various mountings are provided for fire box, return tubular and water tube boilers. The controller is installed on the side of the boiler, with the frame set so that the water level mark is at the same level as the desired



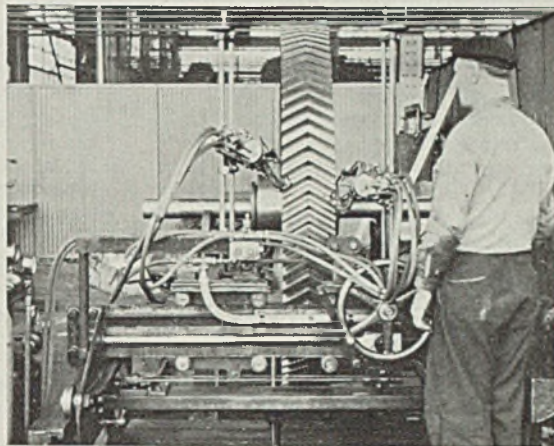
Feed-water level control for boilers which is extremely sensitive, maintaining levels within 1/2-inch

water level in the column. When the water level drops in the gage glass, water runs down an inclined tube exposing same to the high temperature of the steam at boiler pressure. This causes expansion which moves the end casting upward through a multiplying action. The same principle operates to close valves by the contraction due to cool water rising in the tube.

Gear Hardening Machine—

Farrel-Birmingham Co., Buffalo, N. Y., has recently perfected a new torch gear-hardening machine. While specially designed to harden double helical or herringbone gear teeth, this new machine is equally efficient for hardening single helical or

Farrel-Birmingham torch gear hardening machine for all gear hardening applications



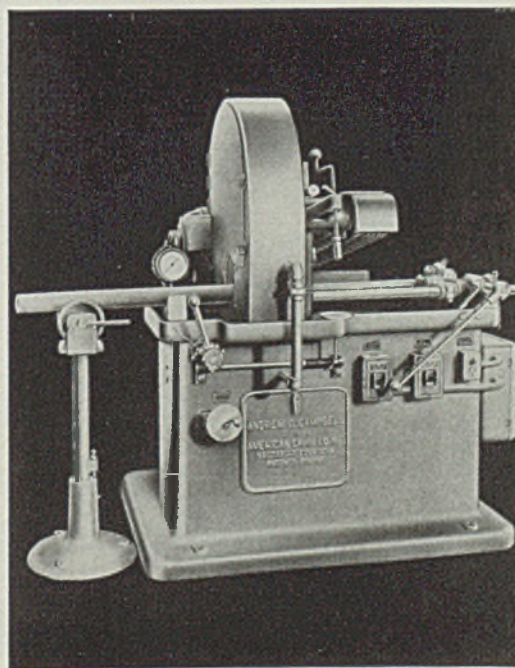
straight-tooth gears, splines of rolling mill wabblers, sprocket wheels and similar parts. The unit has two separate torch heads, each head carrying two sets of tips. This feature enables the machine to harden simultaneously both sides of the gear tooth and both helices of double helical gear. Traveling speed of the torches and attached water jets is regulated by a variable speed gear. A lever controls the pilot lights for igniting the torches and their gas supply. Water pressure from a 250-gallon tank is kept constant by a centrifugal motor-driven pump equipped with a relief valve and other fittings. Adjustable burners of seven different sizes are supplied to enable the machine to handle various ranges of work.

Abrasive Cutter—

Andrew C. Campbell division, American Chain & Cable Co., Bridgeport, Conn., has recently an-

nounced a new abrasive cutting machine known as the Cutamatic. In the new machine, the arc of contact remains constant in cutting any thickness of stock. This is accomplished by the combination of oscillating and rotating increments of the hydraulically fed abrasive cutting wheel. Through this combination of oscillating and rotating movements, the new machine produces smooth cuts on bars up to 6 inches in diameter. Abrasives wheels used on this machine are 10, 12, 14, 16, 18 and 20 inches in diameter and are all 3/32-inch thick except the 20-inch wheel which is 1/4-inch thick. The machine is designed to be used on materials which are hard or soft, alloyed or low carbon. Unannealed materials are cut equally as well as annealed materials. Through an equal distribution of coolant on both sides of the abrasive wheel, an equal temperature is maintained which contributes to length of wheel's life. This machine has primarily been designed for cutting

Cutamatic abrasive cutting machine recently introduced by American Chain Co.



solid bar stock, but it will also work well on tubes, flat or slab materials as well as formed sheet. Through the use of coolant on both sides of the wheel, dust and grit is eliminated, making it possible to use standard squirrel cage, open type motors.

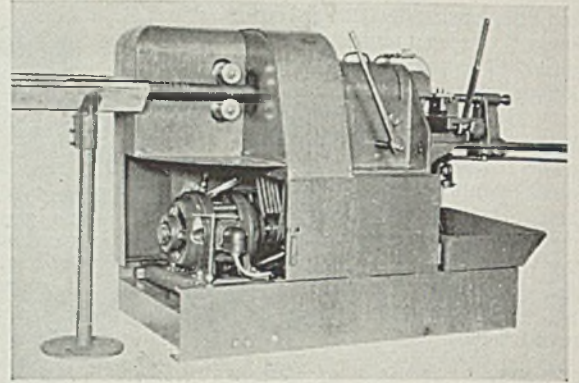
Cutting Off Machine—

Modern Machine Tool Co., Jackson, Mich., has recently introduced a new machine designed for cutting off tubing, pipe and solid stock rapidly and economically. Base of the machine is made of steel shapes electrically welded together, while the main casting is bolted solidly to the base. The spindle is driven from the motor through standard V-belts, the motor being mounted on a swinging bracket to give belt adjustment. An automatic stock stop is provided to insure all pieces being cut off accurately and of identical length. Collets are of push type, operated by cam action through dogs and cones located between the bearings, and arranged so that light pressure will operate the collet. Stock feed is of the roller type, the rolls running continuously being adjustable for any size stock. On ordinary tubing, best results are obtained with a surface cutting speed of from 150 to 250 feet per minute, and 0.002 to 0.004-inch feed per revolution. Machines are built so the tubing can be cut off and chamfered at the same time.

Insulating Refractories—

Quigley Co. Inc., New York, has developed a group of eleven insulating refractories made from "Insuline," a new calcined fire clay base material of minute cellular structure. The products have high insulating qualities, possess the properties of light weight and low heat storage capacity and are available in block, brick, plastic and castable materials. Of the group, "Insulbrix

Cut-off machine for tubing, pipe and solid stock, recently introduced by Modern Machine Tool Co.



2600" are insulating fire brick suitable for service temperatures up to 2600 degrees Fahr. and were developed for heat treating, annealing and other types of fuel fired and electrically heated furnaces. This refractory, it is claimed, has 1/17 the heat storage capacity of heavy refractories for the same heat flow, while one inch has the insulating value of five inches of fire brick.

Valve Grinder—

Aldon Products Co., Duncannon, Pa., announced a pneumatic valve grinder designed primarily for grinding the valves in internal combustion engines. The device also may be used for grinding industrial valves of the poppet or plug type. The grinder has valve speeds adjustable from 600 to 6000 strokes per minute and operates in a dual action, both oscillating and rotating the valve.

Disk Sanders—

Skilsaw Inc., Chicago, has added to its line of portable electric tools two 7-inch disk sanders, one for heavy duty and one for constant production. Both models have aluminum alloy bodies, die cast in streamline design, and embody comfortable grip handles, air filter to protect

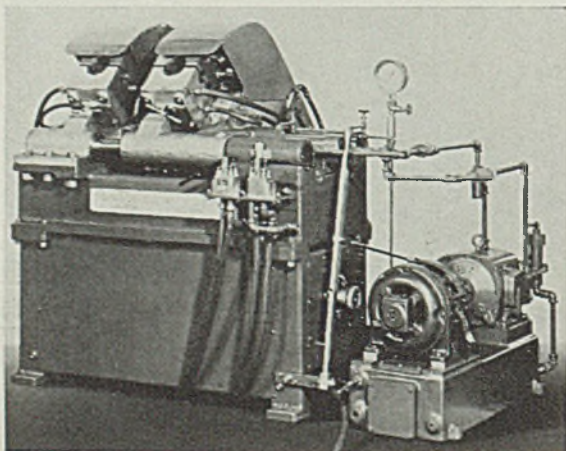
commutator and motor from abrasive dust or dirt, and straight line ventilation to assure cool running. Ventilating ports are located to blow the dust away from the operator and to prevent clogging. Ball bearings in all positions are fully sealed as a protection against dust and grease leakage.

Drawing Stand—

Westbrook Equipment Co., 10016 Greenview avenue, Cleveland, is manufacturing a drawing stand designed for attachment to any size or shape of table. Stand has formed metal base and steel rod with end clamps which hold the stand onto the table by tension. Height and angle of the board are obtained by two arms and brackets. Light and compact, yet rigid, the stand has sponge rubber at all contacting points and can be made portable by folding.

Welding Machine—

Thomson-Gibb Electric Welding Co., Lynn, Mass., has recently announced a new 150 kilovolt-ampere flue welder. The transformer is offset in the frame to provide a direct path for the flash dirt to drop to the floor, while the slide bearings are set well away from the line of the flash and piston rods and linkage are shielded by a flash-proof hood. Pressure is supplied by a hydraulic pressure cylinder and an oil pressure pump. A long lever is provided on the pilot valve to enable the operator to govern the speed of the platen more exactly. Dies are water cooled and are adjustable for vertical alignment by hand wheels on the front of the machine. Heat control is provided through 10 points of regulation. Five points are obtained through a switch on the machine, while the other five are obtained by a change of connection on a terminal board. Capacity of the machine is 1 1/4 to 6-inch outside diameter boiler tubing at a rate of 25 to 150 per hour, depending on the size of the pipe used.



New Thomson-Gibb flash welder designed for welding flue pipes and similar uses

Technological Advances in Iron and Steel Production

(Concluded from Page 47)

which appear so commonly that man-hour units have been established for measuring the efficiency of carrying them out.

The usual special requirements steel orders carries only one or two of these special tests. Many orders with three or four special requirement restrictions, however, have been accepted and delivered without proper compensation in order to hold desirable business.

The cost of each special requirement order should be examined since very expensive tests may be required, and at times the tonnage absorbing this cost is very small.

One such case required a guaranteed heat treating test from each size rolled. The test required about three hours of laboratory time, or more than \$5 per test. During the depths of the depression the size of some special orders dropped to approximately one ton per rolling. In these cases the entire extra compensation was absorbed by the laboratory charges.

The laboratory man-hours to make each test vary with the size of the piece involved. They can, however, be calculated, and time units have been allotted for each test and are included regularly in cost estimates in many companies.

Standard times allotted per test in one laboratory are as follows:

	Time unit hour
Tensile test, bar not over 1 in. thick	0.15
Flat products test, where made infrequently	0.6
Tensile test, stand. test bar..	1.0
Elevated temperature test...	3.0
Brinell or Rockwell sampling and testing	0.2
Etch tests per square inch etched	0.02
Sampling for microscopic examination per sq. in. tested.	0.03
McQuaid-Ehn, each sample .	0.7
Microscopic examination with photographic record.....	1.0
Hardened steel fracture test	3.0
Hardening test, 1 1/4 in. square	3.0
Hardening test, forged 1 in. round	3.0
Hardening test, rolled bars 1/2-in. round	0.3
Fiber test on steel bars	0.3
Timber test	1.0
Bend test on bars	1.0
Stepdown standard	2.0
Torsion test	2.0
Impact test	3.0

Cost per laboratory hour in this plant in 1936 was \$1.77 total.

To the extra metallurgical costs should be added the cost of claims. These run ordinarily about 0.5 per cent of the sales value of the commodity for special steels, and below

0.2 per cent of value on simpler products.

The cost of special requirement steel in small tonnage delivery should be calculated on each order rather than on a blanket charge per ton.

Between 1926 and 1936 many tons of product were delivered in which the cost of testing per ton exceeded the cost per ton of any of the major operations such as melting, rolling, chipping, or shipping.

The future of our industry cannot be surveyed without giving some consideration to the effect which sociological and so-called labor movements may have on it.

Since steel is a basic material necessary to every type of industrial operation, to our systems of transportation and to the maintenance of modern standards of living, assuring continuity of operations in the steel industry is a matter of national concern.

Steel Base of Living Standard

Any serious curtailment in the production of steel or restriction upon improvements of productive facilities not only would be reflected in all other manufacturing industries, but would hinder the orderly development of still higher standards of living throughout this country.

In this connection we should view with concern the results of completely unionized industry, examples of which are railroad and building industries.

The history of these industries has shown that unionization has tended to straight jacket an industry and seriously retard the development of new and better methods of production.

Similarly in the building industry high costs, due largely to shortsighted union conditions, and to union opposition to the uses of new methods and materials, are holding down building activities and keeping hundreds of thousands of men idle, in spite of a tremendous housing shortage.

Contrast these conditions with those in such industries as steel and automobiles which have been free to take every advantage of new methods and improvements in productive facilities, thereby giving consumers the benefit of an improved product at fair prices, and at the same time pay higher than average wages to an increasing number of workers. Today both wage rates and employment in the steel industry are substantially higher than they were in 1929.

How far the modernization program proceeds in our industry and what technical advances are recorded in the next decade are too

closely associated with this situation to be dismissed.

The best basic open hearths in the country probably melt steel for \$3 per ton less than the marginal furnaces which operate either in boom time or as accessory melting units producing steel for special manufacturing work.

Earlier we recorded the cost of one furnace in a seven furnace unit as approximately \$1,000,000. At 70 per cent capacity operation which has been usual, it will take more than five years to save enough to pay for changing to a more efficient unit.

Wages in the steel industry usually depend on tons, and if we are to pay present wages the special requirement steels must command prices in line with the man hours involved.

Investment alone cannot provide for sufficient decrease in man power to permit special requirement steels to be made by machinery.

Whether we record advances in the next decade depends upon many factors. If no invention appears to alter our producing methods radically the most important factor is whether we secure a proper profit on each item of steel which we produce.

Should Sell on Costs

If we are to be fair to our owners, our men, and our customers we should sell our products on the basis of actual cost and recognize clearly that special steels are now such a large factor in our production that we cannot sell them on an average cost basis.

The progress of metallurgy in our industry, the mechanical improvement in our equipment, the better selection and use of our raw materials, the welfare of our men and of the towns in which we manufacture, should not be retarded or hampered.

If we know what our progress costs and earn a proper return on the investment made in progress, our business can continue. Failure to know the proper costs of our various products and to reflect these additional costs in selling prices, encourages the building of plants and factories to take advantage of improper pricing situations. These improper prices can only lead to chaotic conditions which will lend encouragement to governmental restrictions.

This paper could not have been produced without the active and wholehearted assistance not only of a great many of my immediate associates, but also of many friends throughout the industry. To all of them I extend my hearty thanks for their fine co-operation.

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 TO ZINC & ALUMINUM
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IF you are now using synthetic finishes, **INVESTIGATE** the many *plus* factors of ROXYN-C in all colors and clear. This super-synthetic produces a striking likeness to porcelain for brilliance and depth of finish. The impermeable film (perspiration-resistant, too) is tough without brittleness, yet it blanks and forms. . . . stands considerable abuse without chipping, flaking or peeling. It has the same degree of permanent Flexibility and Adhesion that characterizes all ROXALIN FLEXIBLE FINISHES.

Study the angles: (1) Quality of Result; (2) Production Advantages of Shorter Bake and Greater Toughness; (3) Longer Finish-Life because of Impermeability of Film. . . . and you, too, will want to join the quickly growing list of converts to this *new* synthetic.

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Please send the Shaker Top finished in ROXYN-C and all data pertaining to this new Short-Bake Synthetic.

We are now using } synthetic finishes
 We do not use }

(signed)
 Attach this coupon to your company letterhead, please.

Stainless Steel Equipment Insures Purity of Finishes

(Concluded from Page 64)

at no time during the process will the material come in contact with any other metal.

The kettle is heated by direct firing from a thermostatically controlled oil burner. Operating temperatures usually vary between 300 and 650 degrees Fahr. All controls are located on the panel shown at left of the accompanying illustration. Control is fully automatic and shuts off immediately if pressure or electric power should fail.

The kettle is used for compounding synthetic resins, bodying linseed and chinawood oils and for manufacture of ester gums. Kettle capacity varies according to the type of reaction taking place. Reactions which cause foaming or which build up pressure, naturally, reduce the size of the batch which may be processed. Batches up to approximately 300 gallons may be processed. At the end of each reaction the finished batch, which is liquid at elevated temperatures, is blown from the kettle with compressed air.

The entire unit has been designed for ease of operation and uniform production. It can be dismantled easily for repairs or alterations and provision has been made for feeding raw materials by direct pipeline when production warrants it.

According to Nu-Enamel technicians this equipment enables them to produce synthetic resins of their own formulation which give them a product with greater adhesion, paler color and longer life than any they have been able to manufacture heretofore. The success of this unit is causing them to consider the use of stainless steel in other equipment.

New Ceramic Material for Laboratory Table Tops

Development of a new laboratory table top material called "Kemite" has been announced by Stuart M. Phelps and Edward E. Marbaker, Mellon Institute, Pittsburgh. Its properties are said to be such that it fulfills the exacting requirements of scientific laboratory service and does not have any of the disadvantages of the materials commonly used for this purpose.

Kemite consists essentially of an easily molded ceramic body into which has been incorporated carbonaceous substances to increase porosity after firing. It also contains artificially prepared cordierite, a mineral having low thermal expansion. This body, after molding, drying and firing, is completely im-

pregnated under pressure with liquid bitumens, and then subjected to a heat treatment during which the volatile matter is expelled. A residue of carbon in the form of coke fills the pores rendering density to the body and imparting to it an attractive black color.

The material is said to be smooth, hard, strong and practically impervious to liquids and very resistant to the action of acids and alkalis.

While developed primarily as a table top material, the characteristics of Kemite suggest its use in other kinds of laboratory and chemical plant equipment. In another form called Karcite, in which cordierite is not present, it is being used for sinks, tanks, drain pipe fittings and window sills. In building construction it can be employed in such forms as sanitary ware, partitions, roofing, flooring, wainscoting, stair treads and shelves.

Hard Surfacing Material is Put Up in Collapsible Tubes

An entirely new process and material for producing a welded-on wear-resistant, heat-resistant, corrosion-resistant overlay or hard facing is announced by Colmonoy, Inc., Los Nietos, Cal.

The new material consists of a paste contained in collapsible tin tubes. This paste may be squeezed out and spread over the surface to be processed and then sweat into the surface of the parent metal with the flame of the oxy-acetylene torch, the atomic hydrogen torch, the carbon electric arc or furnace heat, to form an overlay which actually becomes a part of the metal processed.

In reality, this is a new method of handling Colmonoy Sweat-on crystals, which is a metallic boride combination, part of which alloys with the parent metal to form a suitable matrix for holding the diamond hard, indestructible metallic boride crystals. The chief advantage of this sort of overlay, aside from its resistance to wear, corrosion and heat, is that it actually becomes a part of the metal processed and is claimed not to chip off, interfere with hot or cold forging, forming or heat treatment of the parent metal.

The overlay may be formed on vertical as well as horizontal planes or it may be applied overhead. It can also be used so that an overlay of equal thickness will follow contours or irregular surfaces.

The collapsible tubes contain sufficient material for processing from one to two and one half square feet of surface, depending upon the thickness of the overlay formed.

Lists Requirements of an Adequate Handling System

(Concluded from Page 60)

to meet the requirements of the problem.

These two fundamentals are broken down into 11 more specific subdivisions as follows: 1—Make original lift and carry operation complete; 2—eliminate rehandling; 3—plan to size of the load to meet requirements of the problem; 4—increase the size of unit loads in production; 5—lessen nonproductive time of machine runs; 6—elimination of waste materials and damage to product; 7—handled-through processes make materials handling equipment a production tool; 8—increased production per man is often a result of a well-planned system; 9—release men for more productive labor; 10— increase speed of handling and conserve human effort; and 11—set a pace of production.

* * *

Conveyor Belt Is Kept in Line by Center Guide

DIFFICULTY frequently is encountered in keeping long conveyor belts properly lined up on their rollers. This is true particularly for conveyors which must of necessity be set up on uneven floor surfaces such as may be found in coal mines, sand and gravel plants, power plants, chemical plants and certain production plants.

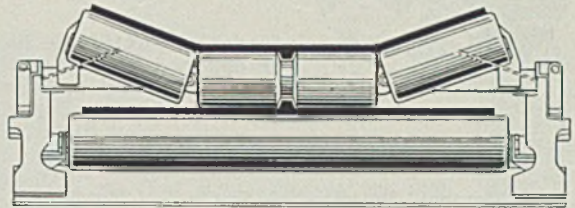
This difficulty has been completely overcome, it is claimed, in a new type of center-guide belt conveyor just announced by the Link-Belt Co., Chicago. The conveyor utilizes a belt molded with a continuous central guide strip on the underside and antifriction idlers having a central roll with a deep groove within which the guide strip is confined in both runs. The accompanying illustration shows a cross section of one of the self-guiding belt idlers with a belt in position.

Actual operation is said to have shown that the belt maintains its central carrying position at all times, even when the conveyor is tilted sidewise at a considerable angle, thus making it unnecessary to use side guard idlers. The manufacturer states that with this positive and easy central guiding of the

belt the life of the belt is certain to be materially longer than that of belts which are subjected to destructive edge wear in the process of trying to keep them in line by conventional methods, or of letting them ride from side to side, as is common

practice. Center-guide conveyors can be furnished for any width of belt and with double guides for the wider belts. The belt is known as the Phillips brand, being named after the company's engineer who invented the idea.

CRoss section of center-guide conveyor belt and idler. The molded guide strip keeps the belt positively aligned under all conditions



Air Handling
also saves time!



3 Ton MonoRail System installed in San Diego Plant, Consolidated Aircraft Corp.

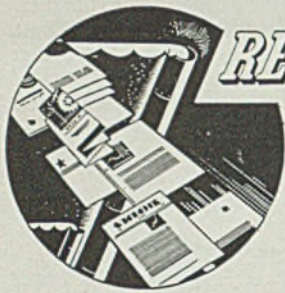
Like traveling by plane, American MonoRail saves time by providing permanently smooth air-lines for quick passage of loads over operating area.

With newly developed equipment, three ton capacities are easily handled through switches on precision ball bearing trolleys. Motor driven cranes and hoist carriers offer safe transportation of 5 ton loads at 200 feet per minute.

Specialized engineering experience is available, without obligation, to help solve your handling problems. A copy of the 192 page book "Overhead Material Handling Equipment" will be mailed on request.

AMERICAN MONORAIL CO.

13102 Athens Ave., Cleveland, O.



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

Dust Control—W. W. Sly Mfg. Co., 4700 Train avenue, Cleveland. Bulletin No. S-85, describing its dust control installations.

Recording Gauges — Bristol Co., Waterbury, Conn. Bulletins Nos. 483-4-5-6, describing its recording and controlling gauges.

Round Edge Flat Wire — American Nickeloid Co., Peru, Ill. Folder describing its nickel and chrome steel edge flat wire.

Plant Maintenance — Skybryte Co., Cleveland. Catalog devoted to better maintenance of metal, concrete, wood, glass and composition surfaces.

Brick Mortar Shrinkage — Truscon Laboratories, Detroit. Folder describing its waterproof non-shrinking mortar, known as Truscon Mortite.

Pattern Plates — Freeman Supply Co., 1152 East Broadway, Toledo, O. Folder describing its Dowmetal pattern plates, claimed to be one-third lighter than aluminum.

Colloidal Graphite—Acheson Colloids Corp., Port Huron, Mich. Bulletin No. 270.1, pertaining to application of colloidal graphite to industry.

Tubular Chairs—Bunting Glider Co., Eighteenth street and Allegheny avenue, Philadelphia. Folder describing its various tubular and all-steel furniture.

Dust Collectors—C. O. Bartlett & Snow Co., Cleveland. Bulletin No. 79, describing design and operation of dust collecting equipment; includes engineering data relating to air flow through pipes, etc.

Materials Handling System — Cleveland Tramrail division of Cleveland Crane & Engineering Co., Wickliffe, O. Folder No. G-237, on how to plan a materials handling system.

Rust Arrestor — Truscon Laboratories, Detroit. Bulletin No. 441, describing its Bar-OX formula "97", claimed to have given some good results in protecting iron and steel, and steel paint.

Squirrel-Cage Motors — Westinghouse Electric & Mfg. Co., East

Pittsburgh, Pa. Folder No. 3105, describing its new line of type CS squirrel-cage motors; employing a new heat exchanger principle of cooling, self-cleaning ball bearings and tested insulation; bulletin No. 26-150, describing its single operator flexarc engine driven welders.

Timers — Automatic Temperature Control Co. Inc., 34 East Logan street, Philadelphia. Bulletin No. G-15, describing its new series 2700 timers for controlling the time of firing and functioning the valves and dampers of reversing furnaces.

Motor-Pumps — Ingersoll-Rand Co., Phillipsburg, N. J. Catalog describing its motorpumps; compact machines combining electric motor and centrifugal pumps; capacities range from 5 to 1000 gallons per minute for heads to 500 feet.

Abrasive Metal Cleaning—American Foundry Equipment Co., 555 South Byrkit street, Mishawaka, Ind. Booklet No. 211, describing its wheelabrator tum-blast, containing information on airless abrasive metal cleaning.

Creep Testing of Metals — Walworth Co., 60 East Forty-second street, New York. Bi-monthly magazine covering outstanding developments in valves, fittings, pipe and tools; features article on creep testing of metals.

High Temperature Exhausters — Industrial Gas Engineering Co. Inc., 201 East Ohio street, Chicago. Catalog describing its complete line of high temperature exhausters and recirculative air heaters for application to ovens and furnaces.

Temperature Controllers — Foxboro Co., 40 Neponset avenue, Foxboro, Mass. Folder describing its "Open and Shut" simple recorder-controller, which it is claimed can handle 65 per cent of all temperature control applications.

Welding Stainless Steel—Republic Steel Corp., Cleveland. Booklet No. 180, describing proper methods for welding stainless steel by electric arc, gas, seam, spot, projection and atomic hydrogen methods; includes information on brazing and silver soldering; booklet No. 179, setting

forth properties and fabrication of stainless steel, describing in detail types best suited in connection with textile equipment.

Welder Connections—Tweco Products Co., Wichita, Kans. Folder form 500-G, showing and describing ground clamps, cable lugs, ground connectors and electrode holder for welders.

Transformers — Pennsylvania Transformer Co., 1701 Island avenue, Pittsburgh. Bulletin No. 340, dealing with power and distribution transformers, containing photographs of various single and three phase transformers for industrial uses.

Crane Truck—Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland. Bulletin No. A-7992 describing its four types of portable crane trucks, from 1000 to 10,000 pounds capacity; each has two-wheel drive and a four-wheel steering by means of a wheel.

Door Hardware — Kason Hardware Corp., 127 Wallabout street, Brooklyn, N. Y. Catalog describing offset latches and hinges suitable for heavy door of walk-in coolers and cold storage plants; includes general information for refrigerator and air-conditioning industry.

Combustible Gas Indicator — Mine Safety Appliances Co., Braddock, Thomas and Meade avenues, Pittsburgh. Bulletin describing its combustible gas indicator; a self-contained, portable instrument used for testing explosive gas hazards and locating leaking gas.

Mouldings — Pyramid Metals Co., 455 North Oakley boulevard, Chicago. Folder showing a variety of stainless steel snap-on mouldings for use in industrial design; includes suggestive uses as decorative treatment on trucks, refrigerators, air-conditioned units, vending machines, furniture and other items.

Carload Stowage—Gerard Co. Inc., 2915 West Forty-seventh street, Chicago. Pictorial presentation of freight carloading stowage braced by galvanized round wire strapping, or metal ties, to prevent damage to carloads of machinery, mixed merchandise, pipe, mixed carloads of oil drums and grease pails and other commodities.

Centrifugal Pumps — Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago. Bulletin No. 5814F, describing its ball bearing centrifugal fire pumps; bulletin 6150, self-oiling power pumps; bulletin 5870, centrifugal pumps, built for operating against heads up to 245 feet, with capacities of from 90 to 225 gallons per minute; bulletin describing its model 42-E, heavy duty continuous-service stationary diesel engine, for the small power user.

Strikes Interrupt Progress of Steel Market

Production Is Cut;

Autos Hold Rate;

Sheet Demand Heavy

CLOSING of several steel plants by strikes in the Youngstown, Cleveland and Chicago districts has thrown the market into confusion, production and deliveries being stopped to a sufficient degree to cause apprehension among consumers supplied from affected mills.

Should the interruption be of long duration steel users dependent on the idle plants for supplies will exert pressure on other suppliers in the effort to obtain materials. With deliveries still considerably delayed by their normal customer demands these steel-makers probably are not in a position to give much help.

Strikes closing some plants at Cleveland, Youngstown and Chicago brought a sharp recession of operations in these centers and carried the national operating rate down $16\frac{1}{2}$ points to 75 per cent. Youngstown dropped 50 points to 30 per cent, Chicago 10 to 75 per cent, Cleveland 17 points to 65 per cent. Other declines in rate included Pittsburgh, two points down to 94 per cent; Eastern Pennsylvania, off one point to $72\frac{1}{2}$; Detroit off five points to 95, and New England off 45 points to 55 per cent. Wheeling gained two points to 96 per cent and Buffalo three points to 91 per cent. No change was made at St. Louis, 94, Cincinnati, 90, and Birmingham, 83.

A moderate resumption of buying by wire and strip users is noted in eastern territory, which may be an advance sign of further covering for third quarter requirements. It tends to support the belief that consumer stocks are not large and that current shipments are going into production promptly.

A close estimate indicates that buying during May was close to 75 per cent of the April volume, which is sufficient to keep mills busy for some time when added to the extensive backlogs already on books. Some lessening of demand, due to impending model changes in automobiles, is felt as partsmakers reach the end of their orders for 1937 models. In spite of the gradual decline in buying the situation is said to be better than for the corresponding season since 1929.

In sheets delivery shows little improvement in spite of the best efforts of producers. Bookings in the Pittsburgh district recently have been about equal to capacity, preventing gain on backlogs.

Automobile production continues at a high rate, only slightly under the record established a few weeks

MARKET IN TABLOID

DEMAND *Slower but exceeding seasonal rate since 1929.*

PRICES *Strong; no change expected on pig iron.*

PRODUCTION . . *Operations drop $16\frac{1}{2}$ points to 75 per cent because of strikes.*

SHIPMENTS *At high rate by mills not strike bound.*

ago. Last week 134,940 units were made, compared with 134,500 the preceding week. General Motors raised its figure nearly 500, while Ford and Chrysler fell off somewhat. The smaller carbuilders increased their output considerably.

In scrap the situation is clouded by effects of suspensions due to strikes. Dealers in many cases were caught unawares with cars in transit and are faced with the problem of diverting them. Indications are that the market has come close to the low of the current decline and is scraping bottom. Renewal of buying may cause a further dip before the rise. At the moment so many uncertainties face the market that the situation is largely nominal. Last week, for the first time in several weeks, steelmaking grades held their own at Chicago and Pittsburgh, an indication that the decline is losing momentum.

While no announcement has been made by pig iron producers of prices for third quarter delivery it is believed present prices will be reaffirmed for that delivery. Books are expected to be opened within a few days. Export inquiry continues but in smaller tonnages, most being for foundry grades.

Railroad buying has entered a quiet period after the heavy placing of cars, locomotives and rails in earlier months. Steelmakers have large tonnages on books for equipment now on order from car builders. Inquiries for freight cars are appearing and further buying is expected within a few weeks.

A decline of 29 cents is registered in the steel and iron scrap composite, bringing it to \$17.60, practically the level of the last week in December and the first week in January. This was brought about largely by weakness in the East. The iron and steel composite lost 8 cents to \$39.89 through scrap reductions. The finished steel composite is unchanged at \$61.70.

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	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	23.00	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	24.50
Jackson, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	22.00	21.50	22.50
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	25.00	24.50	25.50
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	25.58	24.46	25.46
Boston from Birmingham	26.37	26.37	25.87	26.87
Boston from Everett, Mass.	26.25	26.25	25.75	26.75
Boston from Buffalo	26.25	26.25	25.75	26.75
Brooklyn, N. Y., from Bethlehem	27.27	27.27	26.77	27.77
Brooklyn, N. Y., from Bmghm.	27.05	27.05	26.55	27.55
Canton, O., from Cleveland	25.26	25.26	24.76	25.76
Chicago from Birmingham	24.22	24.22	23.72	24.72
Cincinnati from Hamilton, O.	24.07	24.07	23.57	24.57
Cincinnati from Birmingham	23.69	23.69	23.19	24.19
Cleveland from Birmingham	24.12	24.12	23.62	24.62
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	26.26
Milwaukee from Chicago	25.00	25.00	24.50	25.50
Muskegon, Mich., from Chicago	26.90	26.90	26.40	27.40
Toledo or Detroit	26.01	26.01	25.51	26.51
Newark, N. J., from Birmingham	26.39	26.39	25.89	26.89
Newark, N. J., from Bethlehem	25.38	25.38	24.88	25.88
Philadelphia from Birmingham	25.76	25.76	25.26	26.26
Philadelphia from Swedeland, Pa.	25.76	25.76	25.26	26.26
Pittsburgh district from Neville Island	26.25	26.25	25.75	26.75
Saginaw, Mich., from Detroit	26.25	26.25	25.75	26.75
St. Louis, northern	24.50	24.50	24.00	25.00

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Straits Tin		Lead		Alumi- num	Antimony Chinese	Nickel Cath- odes	
Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	Futures	Lead N. Y.	East St. L.				
May 15 14.00	14.12½	13.75	55.00	54.62½	6.00	5.85	6.75	20.00	16.00	35.00
May 17 14.00	14.12½	13.75	55.00	54.62½	6.00	5.85	6.75	20.00	16.00	35.00
May 18 14.00	14.12½	13.75	55.37½	54.87½	6.00	5.85	6.75	20.00	15.00	35.00
May 19 14.00	14.12½	13.75	56.12½	55.75	6.00	5.85	6.75	20.00	15.00	35.00
May 20 14.00	14.12½	13.75	56.37½	56.00	6.00	5.85	6.75	20.00	14.50	35.00
May 21 14.00	14.12½	13.75	56.37½	56.00	6.00	5.85	6.75	20.00	14.50	35.00

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)	19.75
*Copper, hot rolled	21.87½
Lead, cut to jobbers	9.50
Zinc, 100-lb. base	12.50-13.00
Tubes	
*High yellow brass	22.50
*Seamless copper	22.62½
Rods	
*High yellow brass	16.25
*Copper, hot rolled	18.62½
Anodes	
*Copper, untrimmed	19.12½
Wire	
*Yellow brass (high)	20.00

OLD METALS

Nom. Deal. buying prices

No. 1 Composition Red Brass	
*New York	8.75-9.00
Cleveland	9.00-9.25
*Chicago	8.50-9.00
*St. Louis	8.25-8.75
Heavy Copper and Wire	
*New York, No. 1	11.00-11.25
Cleveland, No. 1	11.00-11.25
*Chicago, No. 1	10.50-11.00
*St. Louis, No. 1	9.00-9.50
Composition Brass Borings	
*New York	8.25-8.50
Light Copper	
*New York	9.00-9.25
Cleveland	9.00-9.25
*Chicago	8.50-9.00
*St. Louis	8.00-8.50

Light Brass

*Chicago	5.25-5.50
*Cleveland	5.00-5.50
*St. Louis	5.25-5.75
Lead	
*New York	4.75
Cleveland	4.75-5.00
Chicago	4.75-5.00
*St. Louis	4.50-4.75
Zinc	
New York	3.25-3.50
Cleveland	3.00-3.25
*St. Louis	3.00-3.50
Aluminum	
Borings, Cleveland	10.00-10.50
Mixed, cast, Cleve.	13.25-13.50
Clips, soft, Cleve.	15.00-15.50
*Mixed, cast, St. L.	12.50-12.75

SECONDARY METALS
 Brass, ingot 85-5-5, 1cl, 14.00
 Stand. No. 12 alum. 19.00-19.50

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Birmingham	24.12	24.12	23.82	26.44
St. Paul from Duluth	25.94	25.94	25.94	26.44

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			
<i>Super Quality</i>			
Pa., Mo., Ky.	\$64.60	Chester, Pa., and Baltimore bases (bags)	\$45.00
<i>First Quality</i>		Domestic dead-burned grains, net ton f.o.b.	
Pa., Ill., Md., Mo., Ky.	51.30	Chester, Pa., and Baltimore bases (bags)	43.00
Alabama, Georgia	51.30	Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	25.00
<i>Second Quality</i>		Base Brick	
Pa., Ill., Ky., Md., Mo.	46.55	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Georgia, Alabama	41.80	Ohio	
<i>First quality</i>	43.70	First quality	43.70
<i>Intermediate</i>	39.90	Intermediate	39.90
<i>Second quality</i>	35.15	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.			

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.	
Silicomane, 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
Ferrovandium, 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
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage.	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads. Quan. diff. apply	

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	3.93 1/2 c
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	2.97 1/2 c
Seattle, under 1 ton	4.22 1/2 c
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 (l)	4.45c
San Francisco	4.05c
Seattle (l)	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, 1/2-in. and over	3.86c
Detroit	3.95c
Detroit, 3/4-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.	3.93 1/2 c
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	4.68 1/2 c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York† (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	4.35c
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, 3/4-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 12 1/2 c	
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 five 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 20

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	
	£ s d		Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$28.40	5 15 0	\$32.04	3 19 6
Basic bessemer	19.39	3 18 6*	29.01	3 12 0
Hematite, Phos. .03-.05	21.61	4 7 6		
SEMIFINISHED STEEL				
Billets	\$38.90	7 17 6	\$35.27	4 7 6
Wire rods, No. 5 gage	47.55	9 12 6	56.42	7 0 0
FINISHED STEEL				
Standard rails	\$44.46	9 0 0	\$48.36	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, 1 1/2 in. or 5 mm.	2.55c	11 11 3	2.24c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.31c	15 0 0	3.09c	8 10 0††
Sheets, gal., 24 gage, corr.	4.14c	18 15 0	3.87c	10 12 6
Bands and strips	2.21c	10 0 0	2.37c	6 10 0
Plain wire, base	2.43c	11 0 0	2.73c	7 10 0
Galvanized wire, base	3.20c	14 10 0	2.91c	8 0 0
Wire nails, base	3.09c	14 0 0	3.09c	8 10 0
Tin plate, box 108 lbs.	\$ 6.05	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	\$20.50	4 3 0(a)	\$19.04	425
Basic bessemer pig iron	24.70	5 0 0(a)	12.32	275
Furnace coke	8.03	1 12 6	6.60	148
Billets	39.52	8 0 0	29.34	655
Standard rails	2.24c	10 2 6	1.95c	975
Merchant bars	2.53c	11 9 0	1.77c	885
Structural shapes	2.44c	11 0 6	1.72c	860
Plates, 1 1/2-in. or 5 mm.	2.57c	11 13 0	2.21c	1,105
Sheets, black, 15 15 0 3/4	3.48c	15 15 0 3/4	2.80c	1,400*
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.31c	19 10 0	4.30c	2,150
Plain wire	2.60c	11 15 0	2.72c	1,360
Bands and strips	2.70c	12 4 0	2.00c	1,000

*Basic. †British ship-plates. Continental, bridge plates, 24 ga. 1 1/2 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 65.50 per cent over paper sterling.

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.	Malle-able	Basic	Besse-mer
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
Erle, 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	22.00	.....	.....	.....
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	26.37	.....	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
Millwaukee 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	.....	.....	.....	.....
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	.....

	No. 2 Malle-Fdry.	able	Basic	Besse-mer
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			
<i>Super Quality</i>			
Pa., Mo., Ky.	\$64.60		
<i>First Quality</i>			
Pa., Ill., Md., Mo., Ky.	51.30		
Alabama, Georgia	51.30		
<i>Second Quality</i>			
Pa., Ill., Ky., Md., Mo.	46.55		
Georgia, Alabama	41.80		
<i>Ohio</i>			
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. Palmerton, Pa., spot .. 33.00
Do., New Orleans 33.00
Do., 26-28%, Palmer-ton 39.00
Ferrosilicon, 50% freight allowed, c.i. 69.50
Do., less carload 77.00
Do., 75 per cent. ... 126-130.00
Spot, \$5 a ton higher.
Silicomane, 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
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage 58.5

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Straits Tin,		Lead		Zinc	
Electro, del. Conn.	Lake, del. Midwest	Casting, refnery	New York Spot	New York Futures	Lead N. Y.	East St. L.	Alumi-num 99%	Antimony American Spot, N. Y.
May 22 14.00	14.12½	13.75	56.37½	55.87½	6.00	5.85	6.75	14.50
May 24 14.00	14.12½	13.75	56.75	56.37½	6.00	5.85	6.75	14.75
May 25 14.00	14.12½	13.75	56.62½	56.25	6.00	5.85	6.75	14.75
May 26 14.00	14.12½	13.75	55.87½	55.50	6.00	5.85	6.75	15.00
May 27 14.00	14.12½	13.75	55.75	55.37½	6.00	5.85	6.75	15.00
May 28 14.00	14.12½	13.75	55.62½	55.40	6.00	5.85	6.75	15.00

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) 19.75
Copper, hot rolled 21.87½
Lead, cut to jobbers 9.50
Zinc, 100-lb. base 12.50-13.00

Tubes
High yellow brass 22.50
Seamless copper 22.62½

Rods
High yellow brass 16.25
Copper, hot rolled 18.62½

Anodes
Copper, untrimmed 19.12½

Wire
Yellow brass (high) 20.00

OLD METALS

Nom. Deal. buying prices

No. 1 Composition Red Brass

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

Heavy Copper and Wire

New York, No. 1 11.00-11.25
Cleveland, No. 1 11.00-11.25
*Chicago, No. 1 11.00-11.25
*St. Louis, No. 1 11.00-11.25

Composition Brass Borings

New York 8.25-8.50

Light Copper

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

Light Brass
*Chicago 6.00-6.25
*Cleveland 5.25-5.50
*St. Louis 5.00-5.75

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

Zinc
New York 3.25-3.50
Cleveland 3.00-3.25
St. Louis 3.00-3.50

Aluminum
Borings, Cleveland .. 10.00-10.50
Mixed, cast, Cleve. .. 13.25-13.50
Clips, soft, Cleve. .. 15.00-15.50
*Mixed, cast, St. L. .. 12.50-13.00

SECONDARY METALS
Brass, ingot 85-5-5-5, 1cl, 14.00
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*	3.24c
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 (l)	4.45c
San Francisco	4.05c
Seattle (l)	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, ½-in. and over	3.86c
Detroit	3.95c
Detroit, ¾-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*	5.75c
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, ¾-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)

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, fllet 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 27

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	
	£	s d	Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$28.40	5 15 0	\$32.04	3 19 6
Basic bessemer	19.39	3 18 6*	29.01	3 12 0
Hematite, Phos. .03-.05	21.61	4 7 6		
SEMIFINISHED STEEL				
Billets	\$38.90	7 17 6	\$35.27	4 7 6
Wire rods, No. 5 gage	53.48	10 16 6	56.42	7 0 0
FINISHED STEEL				
Standard rails	\$44.46	9 0 0	\$48.36	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, ½ in. or 5 mm.	2.55c	11 11 3	2.24c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.31c	15 0 0	3.09c	8 10 0††
Sheets, gal., 24 gage, corr.	4.14c	18 15 0	4.37c	12 0 0
Bands and strips	2.21c	10 0 0	2.37c	6 10 0
Plain wire, base	2.43c	11 0 0	2.73c	7 10 0
Galvanized wire, base	3.20c	14 10 0	2.91c	8 0 0
Wire nails, base	3.09c	14 0 0	3.09c	8 10 0
Tin plate, box 108 lbs.	\$ 6 05	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	\$20.50	4	3 0(a)	\$19.04	425	\$27.80
Basic bessemer pig iron	24.70	5	0(a)	12.32	275	14.66
Furnace coke	8.03	1	2 6	6.60	148	5.73
Billets	39.52	8	0 0	29.34	655	28.14
Standard rails	2.24c	10	2 6	1.95c	975	1.80c
Merchant bars	2.53c	11	9 0	1.77c	885	1.46c
Structural shapes	2.44c	11	0 6	1.72c	860	1.46c
Plates, ½-in. or 5 mm.	2.57c	11	13 0	2.21c	1,105	1.87c
Sheets, black	3.48c	15	15 0½	2.80c	1,400†	2.19c
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.31c	19	10 0	4.30c	2,150	2.85c
Plain wire	2.60c	11	15 0	2.72c	1,360	2.48c
Bands and strips	2.70c	12	4 0	2.00c	1,000	2.02c

*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 65.30 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		SPRINGS		Buffalo 12.50-13.00		Cincinnati, iron 18.00-18.50	
Birmingham† 11.50-12.50		Buffalo 22.00-22.50		Cincinnati, dealers.. 8.50- 9.00		Eastern Pa., iron 19.00-19.50	
Bos. dock No. 1, exp. 16.00		Chicago, leaf 21.00-21.50		Cleveland 12.50-13.00		Eastern Pa., steel.. 23.00	
N. Eng. del. No. 1 .. 15.50		Chicago, coll 22.00-22.50		Detroit 10.50-11.00		Pittsburgh, iron 20.00-20.50	
Buffalo, No. 1 18.00-19.00		Eastern Pa. 24.00-24.50		Eastern Pa. 12.00		Pittsburgh, steel 25.00-25.50	
Buffalo, No. 2 16.00-17.00		Pittsburgh 25.00-25.50		New York †8.00- 8.50		St. Louis, iron 19.00-19.50	
Chicago, No. 1 16.50-17.00		St. Louis 19.00-19.50		Pittsburgh 14.00-14.50		St. Louis, steel 18.50-19.00	
Cleveland, No. 1 17.50-18.00		ANGLE BARS—STEEL		Toronto, dealers... 8.00- 8.50		NO. 1 CAST SCRAP	
Cleveland, No. 2 16.00-16.50		Chicago 20.00-20.50		CAST IRON BORINGS		Birmingham 12.00-13.00	
Detroit, No. 1 15.00-15.50		St. Louis 17.00-17.50		Birmingham 7.00- 7.50		Boston, No. 1 mach.†14.50-14.75	
Eastern Pa., No. 1. 17.00-17.50		RAILROAD SPECIALTIES		Boston dist. chem.. †10.00-10.25		N. Eng. del. No. 2 .. 17.00	
Eastern Pa., No. 2. 15.50-16.00		Chicago 20.00-20.50		Boston dist. for mills †9.00		N. Eng. del. textile. 18.50	
Federal, Ill. 13.50-14.00		LOW PHOSPHORUS		Buffalo 12.50-13.00		Buffalo, cupola 17.50-18.00	
Granite City, R. R.. 16.00-16.50		Buffalo, billet and bloom crops 22.00-23.00		Chicago 9.50-10.00		Buffalo, mach. 18.50-19.00	
Granite City, No. 2.. 13.50-14.00		Cleveland, billet, bloom crops 24.00-24.50		Cincinnati, dealers.. 8.50- 9.00		Chicago, agri. net. ... 13.00-13.50	
New York, No. 1 13.00		Eastern Pa., crops.. 23.00		Cleveland 12.50-13.00		Chicago, auto 14.00-14.50	
N.Y. dock, No. 1 exp. 14.50-15.00		Pittsburgh, billet, bloom crops 25.50-26.00		Detroit 10.50-11.00		Chicago, mach. net. 15.00-15.50	
Pitts., No. 1 (R. R.) 20.00-20.50		Pittsburgh, sheet bar crops 25.00-25.50		E. Pa., chemical... 14.50-15.00		Chicago, railr'd net. 14.50-15.00	
Pitts., No. 1 (dir.).. 18.50-19.00		FROGS, SWITCHES		New York †8.00- 8.50		Cincin., mach. cup.. 15.00-15.50	
Pittsburgh, No. 2.. 16.50-17.00		Chicago 16.50-17.00		St. Louis 8.00- 8.50		Cleveland, mach... 20.00-20.50	
St. Louis, R. R.... 16.00-16.50		St. Louis, cut 17.00-17.50		Toronto, dealers... 9.00		Eastern Pa., cupola. 19.50-20.00	
St. Louis, No. 2 13.50-14.00		SHOVELING STEEL		PIPE AND FLUES		E. Pa., mixed yard. 17.00-17.50	
Toronto, dtrs. No. 1 11.00-12.00		Chicago 16.50-17.00		Cincinnati, dealers.. 11.50-12.00		Pittsburgh, cupola.. 18.75-19.25	
Toronto, No. 2 10.00-11.00		Federal, Ill. 13.50-14.00		Chicago, net 13.00-13.50		San Francisco, del.. 13.50-14.00	
Valleys, No. 1 19.00-19.50		Granite City, Ill.. 13.50-14.00		RAILROAD GRATE BARS		Seattle 12.00-13.00	
COMPRESSED SHEETS		Toronto, dealers... 9.00- 9.50		Buffalo 14.00-14.50		St. Louis, No. 1.... 14.50-15.00	
Buffalo, dealers ... 16.00-17.00		RAILROAD WROUGHT		Chicago, net 12.50-13.00		St. L., No. 1, mach. 14.00-14.50	
Chicago, factory ... 16.00-16.50		Birmingham 12.00-13.00		Cincinnati 10.50-11.00		Toronto, No. 1, mach., net 16.00-17.00	
Chicago, dealer ... 15.50-16.00		Boston district †10.00-10.25		Eastern Pa. 14.00		HEAVY CAST	
Cleveland 17.00-17.50		Buffalo, No. 1 16.00-17.00		New York †10.00-10.50		Boston dist. break.. †13.00-13.25	
Detroit 15.50-16.00		Buffalo, No. 2 18.00-19.00		St. Louis 11.50-12.00		New England, del... 16.25	
E. Pa., new mat... 17.50-18.00		Chicago, No. 1 net. 15.00-15.50		FORGE FLASHINGS		Buffalo, break. 15.00-15.50	
E. Pa., old mat... 15.00-15.50		Chicago, No. 2 16.50-17.00		Boston district †11.25-11.50		Cleveland, break... 14.00-15.00	
Pittsburgh 18.50-19.00		Cincinnati, No. 2.. 14.75-15.25		Buffalo 16.00-17.00		Detroit, break. 14.00-14.50	
St. Louis 11.50-12.00		Eastern Pa. 18.50		Cleveland 17.00-17.50		Detroit, auto net.. 15.00-15.50	
Valleys 18.50-19.00		St. Louis, No. 1.... 13.50-14.00		Detroit 13.50-14.00		Eastern Pa. 18.00	
BUNDLED SHEETS		St. Louis, No. 2 .. 16.00-16.50		Pittsburgh 17.25-17.75		New York, break... †13.50-14.00	
Buffalo 13.00-13.50		Toronto, No. 1 dir.. 15.00		St. Louis 10.00-10.50		Pittsburgh 15.50-16.00	
Cincinnati, del. ... 13.00-13.50		SPECIFICATION PIPE		Toronto, dealers ... 8.00		MALLEABLE	
Cleveland 13.50-14.00		Eastern Pa. 17.00		SHEET CLIPPINGS, LOOSE		Birmingham, R. R.. 12.50-13.50	
Pittsburgh 17.25-17.75		New York 13.00-13.50		Chicago 11.50-12.00		New England, del... 20.00	
St. Louis 10.00-10.50		BUSHELING		Cincinnati 11.50-12.00		Buffalo 20.00-21.00	
Toronto, dealers ... 8.00		Buffalo, No. 1 16.00-17.00		Detroit 10.50-11.00		Chicago, R. R. 19.50-20.00	
STEEL RAILS, SHORT		Buffalo, No. 2 18.00-19.00		St. Louis 9.50-10.00		Cincin., agri. del.. 15.00-15.50	
Birmingham 15.50-17.50		Chicago, No. 1 15.50-16.00		SHEET CLIPPINGS, LOOSE		Cleveland, rail 20.50-21.00	
Buffalo 23.50-24.00		Cincin., No. 1, deal. 14.50-15.00		Chicago 11.50-12.00		Detroit, auto, net. 15.00-15.50	
Chicago (3 ft.) 20.50-21.00		Cincinnati, No. 2.. 8.50- 9.00		Cincinnati 11.50-12.00		Eastern Pa., R. R.. 19.00-20.00	
Chicago (2 ft.) 21.50-22.00		Cleveland, No. 2.. 12.50-13.00		Detroit 10.50-11.00		Pittsburgh, rail 20.50-21.00	
Cincinnati, del. ... 20.00-20.50		Detroit, No. 1 new. 14.50-15.00		St. Louis 9.50-10.00		St. Louis, R. R. 18.50-19.00	
Detroit 19.00-19.50		Valleys, new, No. 1 17.00-17.50		STEEL RAILS, SCRAP		RAILS FOR ROLLING	
Pitts., 3 ft. and less 25.00-25.50		Toronto, dealers... 9.00		Boston district †14.50-14.75		<i>5 feet and over</i>	
St. Louis, 2 ft. & less 18.50-19.00		MACHINE TURNINGS		Buffalo 19.50-20.00		Birmingham 16.00-18.00	
STEEL RAILS, SCRAP		Birmingham 7.00- 7.50		Chicago 16.50-17.00		Boston †18.00-18.50	
Boston district †14.50-14.75		Buffalo 11.00-11.50		Cleveland 23.00-23.50		Buffalo 19.50-20.00	
Buffalo 19.50-20.00		Chicago 10.00-10.50		Pittsburgh 20.50-21.00		Chicago 20.00-20.50	
Chicago 16.50-17.00		Cincinnati, dealers.. 9.00- 9.50		St. Louis 17.00-17.50		Eastern Pa., R. R.. 21.00-21.50	
Cleveland 23.00-23.50		Cleveland 12.50-13.00		STOVE PLATE		New York †18.00-18.50	
Pittsburgh 20.50-21.00		Detroit 9.50-10.00		Birmingham 9.50-10.50		St. Louis 18.00-18.50	
St. Louis 17.00-17.50		Eastern Pa. 13.00		Boston district †10.50-10.75		LOCOMOTIVE TIRES	
STOVE PLATE		New York †9.00- 9.50		Buffalo 14.50-15.00		Chicago (cut) 21.50-22.00	
Birmingham 9.50-10.50		Pittsburgh 14.50-15.00		Cincinnati, dealers.. 10.00-10.50		St. Louis, No. 1 ... 18.00-18.50	
Boston district †10.50-10.75		St. Louis 8.00- 8.50		Detroit, net 11.25-11.75		LOW PHOS. PUNCHINGS	
Buffalo 14.50-15.00		Toronto, dealers... 8.00- 8.50		Eastern Pa. 14.00		Buffalo 22.00-22.50	
Chicago 16.50-17.00		Valleys 13.00-13.50		New York, fdry... †10.00-10.50		Chicago 20.50-21.00	
Cleveland 23.00-23.50		BORINGS AND TURNINGS		St. Louis 11.50-12.00		Eastern Pa. 24.00-24.50	
Pittsburgh 20.50-21.00		<i>For Blast Furnace Use</i>		St. Louis, steel 22.50-23.00		Pittsburgh (heavy).. 24.00-24.50	
St. Louis 17.00-17.50		Boston district †7.75- 8.25		Chicago, iron 19.50-20.00		Pittsburgh (light).. 23.00-23.50	
STEEL CAR AXLES		IRON ORE		Chicago, rolled steel 20.50-21.00		MANGANESE ORE	
Birmingham 18.00-20.00		Eastern Local Ore		ARCH BARS, TRANSOMS		<i>(Nominal)</i>	
Buffalo 22.00-22.50		Cents, unit, del. E. Pa.		St. Louis 18.00-18.50		Prices not including duty, cents per unit cargo lots.	
Boston district †20.00-21.00		Foundry and basic		AXLE TURNINGS		Caucasian, 50-52% 44.00	
Chicago, net 22.50-23.00		56.63% con. 9.00-10.00		Boston district †11.00-11.50		So. African, 50-52%...Nominal	
Eastern Pa. 25.00-26.00		Cop.-free low phos. 58-60% nominal		Buffalo, elec. fur.. 18.50-19.00		Indian, 50-52% Nominal	
St. Louis 24.00-24.50		Foreign Ore		Eastern Pa. 16.00-16.50			
SHAFTING		Cents per unit, f.a.s. Atlantic ports		St. Louis 24.00-24.50			
Boston district †18.50-19.00		Foreign manganese-ous ore, 45.55%		Toronto 9.50			
New York †20.00-20.50				CAR WHEELS			
Eastern Pa. 24.50				Birmingham 16.50-17.50			
St. Louis 14.00-14.50				Boston dist., iron.. †15.00-15.25			
CAR WHEELS				Buffalo, iron 18.50-19.50			
Birmingham 16.50-17.50				Buffalo, steel 22.50-23.00			
Boston dist., iron.. †15.00-15.25				Chicago, iron 19.50-20.00			
Buffalo, iron 18.50-19.50				Chicago, rolled steel 20.50-21.00			
Buffalo, steel 22.50-23.00				IRON ORE			
Chicago, iron 19.50-20.00				iron, 6-10% man. *17.00			
Chicago, rolled steel 20.50-21.00				No. Afr. low phos.. 17.00			
IRON ORE				Swedish low phos. nominal			
iron, 6-10% man. *17.00				Spanish No. Africa basic, 50 to 60% *15.50			
No. Afr. low phos.. 17.00				Tungsten, spot sh. ton, unit, duty pd. †22.00-22.50			
Swedish low phos. nominal				N. F., fdy., 55% 7.00			
Spanish No. Africa basic, 50 to 60% *15.50				Chrome ore, 48% gross ton, c.i.f. \$24.50-25.00			
Tungsten, spot sh. ton, unit, duty pd. †22.00-22.50				*Nominal asking price for spot.			
N. F., fdy., 55% 7.00				MANGANESE ORE			
Chrome ore, 48% gross ton, c.i.f. \$24.50-25.00				<i>(Nominal)</i>			
*Nominal asking price for spot.				Prices not including duty, cents per unit cargo lots.			
MANGANESE ORE				Caucasian, 50-52% 44.00			
<i>(Nominal)</i>				So. African, 50-52%...Nominal			
Prices not including duty, cents per unit cargo lots.				Indian, 50-52% Nominal			

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 manganese-ous 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	

Sheets

Sheet Prices, Page 86

Pittsburgh—While a slight contraction in demand for sheets has been noted, new business in May was practically equal to capacity here. Delivery promises on hot-rolled and galvanized are hard to obtain under 23 weeks, although cold-reduced sheets can be secured in six or seven weeks. In most quarters not much tonnage of consequence is expected from the automotive industry until late July. Average sheet mill operations on the national scale were off one to two points last week, with galvanizing mills making around 76 per cent; common black about 85; jobbing mills around 58; and full finished around 82.

Cleveland — In plants not affected by strikes, shipments have continued at the high rate reported since the first of the month. Consumers are in need of prompt deliveries and in some instances are anxious to obtain place on mill schedules well into the future. Deliveries on cold-rolled can be made in four to five weeks, due to marked decline in specifications from automotive sources, but in hot-rolled annealed and galvanized some mills are booked into October at prices then prevailing.

Chicago—Sheet deliveries have been crippled by strikes. With those interests not affected by labor troubles busily engaged on old orders, there is little opportunity for diversion of business from those mills now closed. Backlogs in some instances extend far into third quarter, with consumption well sustained among important users.

Boston—Buying of sheets is confined mostly to fill-in lots, with specifications steady. Backlogs are being more rapidly reduced by improvement in deliveries. Current buying is largely by consumers who did not cover heavily, but these are relatively few. Jobber stocks are better balanced on most finishes.

New York—Sheet deliveries average six to 10 weeks, showing steady but spotty improvement. The position of some producers in this respect is giving them a strong competitive advantage, as certain others have little available before October and in fact, on some lines are sold well into fourth quarter. Breeze Corporations Inc., Newark, N. J., is low on a \$1,820,000 contract for furnishing metal stacks and filing equipment for the treasury department, Washington.

Philadelphia — Relative quiet prevails in steel sheets. Buying contin-

ues at a moderately good pace but the trend continues downward. The strike situation in the Middle West is being closely watched but so far has had no apparent influence on the trade here.

Cincinnati—Sheet mills continue capacity operations. Fresh ordering for third quarter delivery has been, for several weeks, below stated capacity. So far there has been no general rush for protection on supplies because of labor troubles in other districts. Automobile specifications, below the year's peak, are well sustained.

St. Louis—Further improvement in the sheet delivery situation is noted, betterment being much more marked than in bars and plates. However, a leading east side producer is still six to eight weeks behind on galvanized deliveries. New business has declined from the high levels of recent weeks, but is still in substantial volume.

Strip

Strip Prices, Page 87

Pittsburgh—Despite a slow slackening from automobile accessory makers and a few other users, backlogs are sufficient to insure high rate of activity in June. No improvement in deliveries was noted last week, promises continuing to range around three to four weeks on hot-rolled and five to six weeks on cold-rolled. Miscellaneous consumers are active. Hot strip is 2.40c, Pittsburgh, and cold strip, 0.25 carbon and under, 3.20c, Pittsburgh or Cleveland.

Cleveland — Specifications from miscellaneous sources, particularly small farm tool, electrical equipment manufacturers and small stamping concerns, have declined only by contrast to the heavy volume placed during March. Mills not affected by strikes continue at close to capacity, with little headway being made against backlogs, which remain extended five to six weeks. Consumers stocks are not too substantial as brought out by the fact that pressure for deliveries continues strong.

Boston—Some cold rollers note spotty improvement in new buying and specifications for narrow widths, notably from automotive and agricultural equipment outlets. Finishing operations continue high. A few manufacturing consumers who bought heavily late last quarter are again showing interest in new needs. Consumption continues high. Prices are firm and unchanged.

New York—Buying of strip has

increased moderately, with specifications steady and operations high. There is more forward buying of narrow cold-rolled strip with added interest in hot-rolled requirements for third quarter. A mixed situation prevails as to deliveries, some mills having reduced backlogs to enable shipments in about four weeks while others who booked heavily can offer no better than five to six weeks.

Philadelphia — Buying of narrow strip is sluggish with deliveries within a week offered by some mills on hot-rolled and two to three weeks on cold-rolled.

Plates

Plate Prices, Page 86

New York—Despite a decline, plate tonnage is exceeding most trade expectations. While mainly diversified, business is coming out particularly well from tank makers and there is an improvement in pipe tonnage, including about 1900 tons of large sized pipe for Ardsley, N. Y. Much railroad work is on mill books, but new work of this character is quiet. The Maritime commission expects once it gets its program under way to approve construction of as many as 60 cargo-passenger boats annually for several years. In some quarters, it is said that full program for such type of boats calls for 500; also that a smaller, although still impressive number of tankers is under contemplation. The Maritime commission is not expected to be in position to go ahead with its program much before fall, as mail contracts are yet to be adjusted and more complete study of the financial position of various shipping companies is said to be necessary.

Pittsburgh—The dearth of barge inquiries continues, but railroad and tank fabricators are taking heavy shipments. Most mills have good backlogs and the volume of new business generally is favorable, insuring a high rate of activity well into the summer. Export inquiry is lighter, but this does not necessarily mean that all requirements have been satisfied. Plates are quoted 2.25c, base, Pittsburgh.

Cleveland — Mills are operating close to capacity with backlogs over twelve weeks in some cases. However, at least one producer is able to make shipments in five to six weeks. Twenty locomotives for the Mexico de Ferras railroad is pending. Good percentage of recent requirements is for structural projects.

Chicago—Plates are meeting best

involving a total of 10,000 to 15,000 tons. Additional plate business for railroad equipment is in prospect though few large inquiries are active. Shipments to railroad shops and car builders continue heavy.

San Francisco—Plate demand continues quiet and only two projects over 100 tons are pending. No action has been taken on 550 tons for two 186-inch outlet pipes for the All American canal project in California nor on 450 tons of 30-inch welded steel pipe for the metropolitan water district, Los Angeles.

Plate Contracts Placed

500 tons, 36 aging tanks for Golden Age Breweries, Spokane, Wash.; general contract to Union Iron Works, Spokane.

190 tons, standpipe, U. S. Treasury department, Cincinnati, to Chicago Bridge & Iron Co., Chicago.

160 tons, 814,000-gallon standpipe, Westchester Joint Water Works, Mamaroneck, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh; bids May 13.

130 tons, softener tank, Council Bluffs, Ia., to Graver Tank & Mfg. Co., East Chicago, Ill.

Unstated, flume and penstock extensions Lehigh Cement Co., Metairie Falls,

Wash.; general contract to Interstate Engineering & Construction Co., Newport, Wash.

Plate Contracts Pending

150 tons, lighthouse tender; GOLDENROD, Dubuque Boat & Boiler Works, Dubuque, Iowa, low.

Bars

Bar Prices, Page 84

Pittsburgh—New bookings continue lighter in bars and shipments are steady. Mill delivery promises vary, with some offering around six weeks. Most sellers are far from being disheartened over the outlook. Buying activity will be well maintained into the summer. Many consumers have large backlogs of orders, including farm implement and bolt and nut manufacturers.

Cleveland—Bar mills continue close to capacity as shipments to auto partsmakers, farm and road-making equipment manufacturers, steel forging concerns and cold bar finishers remains approximately unchanged. However, new business has declined to the point where deliveries on certain grades can be made this quarter. Demand for commercial and cold-drawn alloy steel bars from machine tool builders and auto partsmakers has given much encouragement to sellers here.

Chicago—Bar sales and specifications still are fairly heavy despite absence of pressure for prompt shipment. Deliveries are improved moderately, with shipments now available within 30 days from some producers. Farm implement and tractor manufacturers continue leading steel bar users, with operations at capacity and indications pointing to an uninterrupted run at this level through June. Tractor production this year appears likely to be the largest in history.

Boston—From machinery, small tool, forging and some bolt and nut specialty makers, demand for alloy and forging bars, while smaller, is fairly well sustained. Not much improvement in deliveries of alloy bars is noted. Carbon bars are less active at 2.85c, Boston.

New York—Commercial bar specifications are lighter, although no appreciable change is noted in shipments from a week ago. Most sellers are offering four to five weeks deliveries.

Philadelphia—Little improvement in bar deliveries has been noted, with four and five-week shipments the general average. However, the tendency is easier, what with the

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WYCKOFF

COLD DRAWN SPECIAL SHAPES

Investigate the profitable possibilities of Wyckoff Cold Drawn Special Shapes. They not only enable you to avoid excessive scrap and machining costs but also effect a considerable saving in weight. A blueprint, sketch or sample of your particular requirement is all we need to solve your problem most economically.

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Manufacturers of Carbon and Alloy Steels

Turned and Polished Shafting

Turned and Ground Shafting

Wide Flats up to 12" x 2"

requirements of the automotive interests in the middle west tapering off and with new demand in this district at least, perceptibly less pressing.

Pipe

Pipe Prices, Page 85

Pittsburgh—With a reasonably fair volume of new business, tube mills appear assured of steady operations well into July. Standard pipe continues active and oil country goods are moving well. Specifications and shipments, of course, have declined from the peak preceding the price announcement. Gathering lines are requiring considerable pipe. Prices are steady.

Chicago—Cast pipe shipments reflect the better rate of bookings during the past four to six weeks. New business is only moderately active and consists principally of small lots. Few inquiries have appeared lately from this district but there is scattered buying in adjacent states. A number of pipe lines are being considered but most of these have yet to develop into definite inquiries.

New York—Cast pipe inquiry is heavier with buying in small lots slightly more active. Tonnage being figured is the largest in several months. New York city closes May 25 on third quarter requirements, welded steel and wrought, while a board of water supply upstate dam contract calls for 200 tons of steel pipe. Two contracts for the Tallmans Island sewage treatment plant, New York, closing June 8, take close to 1000 tons of cast. Prices on the latter are notably firmer.

San Francisco—Cast iron pipe sales, with one exception, were confined to small lots. Inquiries are slow. Fillmore, Calif., has taken bids on 25,000 feet of 6 to 10-inch pipe. To date this year 15,651 tons have been booked, compared with 12,001 tons for the same period last year.

Steel Pipe Pending

200 tons, 18-inch and under, two exploratory caissons, Lackawack dam, Wawarsing, Ulster county, New York; bids June 2, board of water supply, New York, contract 338.

Cast Pipe Placed

580 tons, 6 to 24-inch, Minneapolis, to American Cast Iron Pipe Co., Birmingham, Ala.

352 tons, 4 to 8-inch, Fresno, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

265 tons, 6 to 10-inch, Hartford, Conn., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

1000 tons, 54-inch and under, sewage treatment plant, Tallmans Island, New York; bids June 8, department of sanitation, New York.

200 tons, sewage disposal plant, Borough of Middlesex, N. J.

Tin Plate

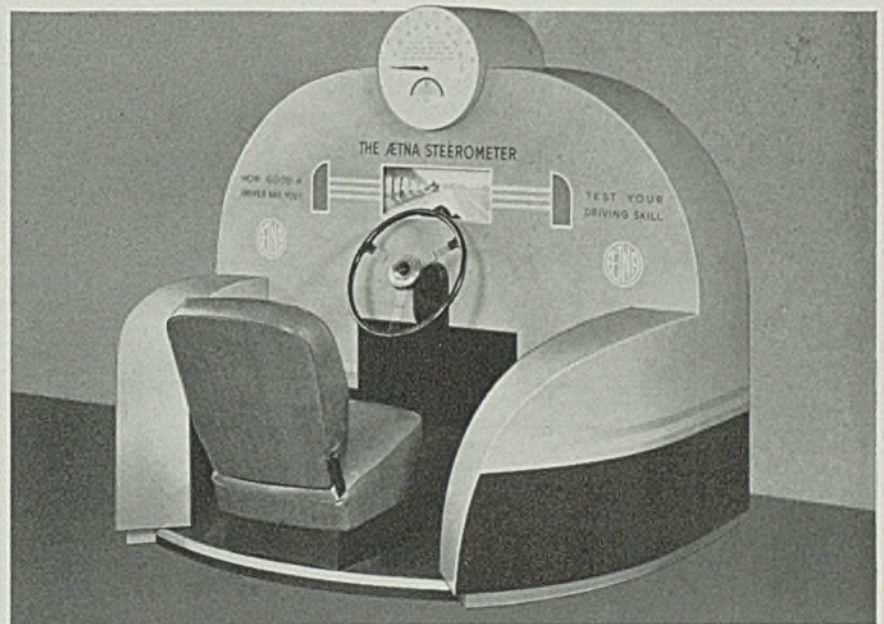
Tin Plate Prices, Page 84

Pittsburgh—With some tin plate mills operating as high as 18 turns

per week, operations continue well above 100 per cent. One producer who was set back several days by the short-lived strike made rapid strides last week toward recovering lost ground. Pressure for shipments is increasing as the packers' busy season draws near. All capacity is sold out until Sept. 30.

New York—Buying of tin plate is more normal following the heavy buying in March to obtain protection on as much tonnage as possible. A leading seller here reports that in

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CLEVELAND OHIO

large sized steel pipe are being figured here for Houston, Tex.

San Francisco—Few cast iron pipe inquiries are current and the most involves less than 100 tons. So far this year 16,117 tons have been booked, compared with 12,286 tons for the corresponding period in 1936.

Cast Pipe Placed

6000 tons, Tampa, Fla., including 80,000 feet 6-inch at \$0.77 per foot, and 19,000 12-inch at \$1.88 per foot, to National Cast Iron Pipe Co., Birmingham, Ala.; 40,000 feet 2-inch at \$0.21 per foot

to Alabama Pipe Co., Anniston, Ala. Cast iron fittings awarded National Cast Iron Pipe Co. and gate valves, valve boxes and sleeves to M. & H. Valve & Fittings Co., Anniston, Ala. 800 tons, 12-inch, Detroit, to James B. Clow & Sons Co., Chicago. 450 tons, 6 to 10-inch, Fillmore, Calif., to United States Pipe & Foundry Co., Burlington, N. J. 150 tons, water extension, Sandusky, O., to J. B. Clow & Sons Co., Cleveland.

Cast Pipe Pending

360 tons, of 6-12-16-inch, water extension project, Akron, O.; J. B. Clow & Sons Co., Cleveland, low.

348 tons, 12 and 16-inch, Los Angeles, specification X103; bids June 3.

Steel Pipe Placed

200 tons, Chicago, to Alco Products Co., Dunkirk, N. Y.

Transportation

Track Material Prices, Page 87

Car and locomotive demand appears at the lowest ebb so far this year. However, steel producers have a substantial backlog of this work. Rail mills still have a good tonnage and frog and switch manufacturers are active. Reading Co. is reported inquiring for 650 underframes for freight cars which it plans to build in its own shops. National Tube Co., Pittsburgh, has ordered from Ralston Steel Car Co. 103 gondola bodies for 70-ton cars. Central of Georgia railway has asked the interstate commerce commission for authority to issue and sell \$1,400,000 in equipment trust certificates, the proceeds to be used to finance the purchase of 600 box cars, five air-conditioned passenger coaches and three express cars. Shipments of bars, plates and shapes to railroad shops and freight car builders are heavy and orders will necessitate active deliveries into next quarter.

Rail Orders Pending

1100 tons, Los Angeles union depot.

Car Orders Placed

National Tube Co., Pittsburgh, 103 gondola bodies for 70-ton cars, to Ralston Steel Car Co.

Car Orders Pending

Reading Co., 650 underframes for freight cars to be built in own shops.

Metallurgical Coke

Coke Prices, Page 87

Coke production in the Connelville, Pa., region has slackened slightly under a letdown in spot demand, but prices continue steady. Estimated United States production of beehive for the calendar year to date is 1,390,400 net tons, compared to 524,900 in the corresponding period of 1936 and 2,381,000 tons in the comparable period of 1929.

Delivery is generally less than in April, as consumers are reducing stocks. By-product ovens are not affected by strikes as union leaders have allowed them to continue to supply gas to utilities in many cases. Prices generally are unchanged.

Behind the Scenes with STEEL

Star Correspondent

SCUTTLING about the streets of the nation's motor capitol, our Detroit editor has unearthed news of the magic prowess of one O. James Crews, self-styled Messenger of Light and on the receiving end of a special forecasting service dubbed the Message of the Stars.

The Messenger, it appears, hangs out at Second avenue and Ledyard and for a small charge is equipped to give you the low down on most anything you want to know. His past achievements include accurate predictions of Schmeling's knock-out of Louis, the Roosevelt landslide, election of Michigan's Gov. Murphy, the Duke's abdication, end of the General Motors strike by day and date, and end of the Chrysler and Hudson strikes by day and date.

Here is no common ordinary swami, our D. E. declaims, but a true master of the infinite, if not the finite. If there is anything that is troubling you, such as who will win the Kentucky Derby, how the Supreme Court will decide on the Wagner Act or whether Dick Merrill will make it, just let us know and we will put you in touch with this postman of the cosmos.

Scientifiction

TODAY'S thriller is a trip to the moon with Akkad Pseudoman. On page 57 of this issue our vice president in charge of book reviews has described Akkad's book,



telling of his journey taken away back in 1961. Of course in the light of Buck Rogers' exploits this seems terrifically elementary, but we are of the old school who enjoy delving into ancient history. Besides, in the back of the book it tells about how it was done, and there is something artistically ter-

rifying about those long curlicues in Doc Pseudoman's mathematical explanation. If this sort of thing keeps up we shall have to open an office there to assure complete coverage and early delivery to our moon-readers.

Blanked

WORDLESS with wonder are amateur cameramen who attempt to take pictures in General Electric's great Schenectady plant. In spite of rules to the contrary, amateurs and foreign industrial spies steal candid camera shots when the guards are giving theory of generators to some sweet young thing or other. Headaches galore and gray hairs in plenty to Gemen are the result. Now, according to STEEL's incompetent slewfoot, all these are things of the past. A super super invisible ray now shines benignly on all who leave the building, sweetly clothing each person in an aura which completely denudes all photographic film. When the dastardly cameramen develop their precious film, a fine and complete blank is the result. We foresee the day when rays will be used for everything from raisin pies to razin' buildings.

Red Faces Dept.

ROSINESS of the week glows forth from the face of STEEL itself. Our able constituent, Capt. Bilgewater, has called our attention to the fact that on page 65 of the May 24 issue our editors defied all laws of physics by stating that a barge goes down when water is pumped out of it. STEEL's editors, mastermen all, now hang their heads in shame when we point a gleeful finger at them.

Barred

WELDING department of STEEL was undoubtedly not the reason why a bonafide resident of the Wisconsin State Prison sent in an order for a subscription. We believe he has great confidence in the articles on metal cutting and forming, since the order was for six months only.

—SHRDLU

Wire

Wire Prices, Page 87

Pittsburgh—Mills are operating at a high rate and heavy backlogs insure steady activity well into July. Bookings are still good. Additional buying may yet materialize from automotive sources for 1937 models. Seasonal influences have curtailed movement in certain lines and some consumers have relaxed pressure for shipments. Prices remain steady.

Cleveland — Wire mills continue at close to capacity, excluding those affected by strikes. Most of recent output is being consumed by the manufacturing trade, although demand for merchant wire products is holding well above normal, particularly from agricultural sources. Most consumer stocks are low as producers report recent shipments going into immediate consumption. Specifications against commitments is well maintained, but new buying continues downward.

Chicago—While wire production and shipments continue active, new business is relatively quiet and producers expect to be searching for orders within 30 to 60 days. Consumption is holding well, but users' stocks are being reduced, now that the threat of high prices next quarter has been removed, and mills no longer are under the pressure for delivery such as prevailed earlier in the year. A decline of somewhat less than seasonal amount in wire consumption is seen for summer. Farm consumption of wire products is slightly spotty but the best in several years. Spring terms are to be announced this week.

Boston—While semi-finished steel production is declining due to furnace repairs, finishing department operations are high and unchanged. New demand and specifications are holding, but are well below shipments and incoming volume of several weeks ago. Buying is well spread and prices steady.

New York—A slight improvement in new buying, well distributed as to products, has brought additional third quarter business to mills. This moderate upturn comes somewhat sooner than expected and is due to steady working off of stocks by consumers and decision of some buyers to get orders on books further in advance, in view of unchanged prices for third quarter. Mill operations continue high, with some curtailment in semifinished production where pressure from finishing departments is slightly relieved, which enables needed repairs to open hearths.

Buffalo—Demand for wire prod-

ucts is near its peak of five or six years, judging from sales reports of the principal producer here. May business has been in keeping with the recent demand.

Tin Plate

Tin Plate Prices, Page 86

Pittsburgh—Tin plate mill operations are holding at better than 100 per cent of capacity, with consumers pressing for all the material they are entitled to before the expiration

of contracts next fall. With this strong domestic situation and heavy export demand, producers anticipate no slackening in their high rate of activity for some time. Extra turns have been the rule in most mills here. Shipments to packers' specifications are slowly gaining. Tin plate is nominally quoted \$5.35 per base box, Pittsburgh.

New York—Continued heavy specifications are taxing tin plate production to the limit, sellers here declare. In fact, schedules generally appear tight until the end of September. Foreign buyers are still inquiring



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briskly, but their allotments are restricted.

Shapes

Structural Shape Prices, Page 86

New York—Awards slightly heavier, although most are in small lots with only a few over 1000 tons. New volume coming out for bids considerably above current awards, with indications of even greater increase shortly in public engineering requirements.

Bookings and shipments of fabricated structural steel during the first four months of 1937, according to tabulations of the American Institute of Steel Construction, were well ahead of last year. Bookings were 27 per cent larger while shipments 20 per cent greater than for the same period in 1936.

Pittsburgh—Shape inquiries are heavy. Projects include 11,000 tons for a hospital at New Orleans, 5000 tons for a United States government building at Philadelphia, and 3500 tons for railway facilities for the San Francisco-Oakland Bay bridge. Prices are steady.

Cleveland — Fabricators report little improvement in deliveries, although most awards are restricted to small lots from private sources. Outside of the 600 tons involved in the Lorain avenue grade crossing elimination, Cleveland, little public work is pending. The 3300 tons for the Industrial Rayon plant at Painesville, O., is expected to come out for bids this week.

Chicago — Fabricated structural steel orders are light and most inquiries are small. Better activity in bridge building is in prospect since programs of various states which were delayed earlier in the year are commencing to materialize. Demand for plain material is aided by good call from railroad and freight car shops.

Philadelphia — Outstanding awards include 925 tons for Keasbey & Mattison plant addition, Ambler, Pa., placed with Bethlehem Steel Co., Bethlehem, Pa. General volume is light but several sizable jobs noted in previous issues are up for figuring in June.

Birmingham, Ala. — Shops are maintaining employment as of months previous and there is little uneasiness as to future prospects.

Fabricating shops are shipping considerable tonnage.

San Francisco—Awards were not large and aggregated only 1666 tons, bringing the total for the year to 96,629 tons, compared with 67,007 tons in 1936. Largest award went to Moore Drydock Co. and involved 511 tons for the Sacramento river bridge, Red Bluff, Calif. Close to 8000 tons are either up for figures or pending.

Seattle—No awards in excess of 100 tons reported, but considerable tonnage is involved in pending jobs. The largest, 1000 tons for Coulee dam trash racks, bids to bureau of reclamation June 3. C. L. Cleelman, Seattle, has the general contract for the Clatsop river bridge, Washington, involving 250 tons shapes.

Shape Contracts Placed

5500 tons, court house, Suffolk county, Massachusetts, to Bethlehem Steel Co., Bethlehem, Pa.; through George A. Fuller Co., Boston.

925 tons, plant addition, Keasbey & Mattison Co., Ambler, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

835 tons, machine shop additions and alterations, Chrysler Corp., Detroit, to Whitehead & Kales Co., Detroit.

720 tons, multiple steel span bridge, Westfield river, Huntington, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Arute Bros. Inc., New Britain, Conn., general contractor.

680 tons, piling, bulkhead, Jacob Rlls Park, Queens, N. Y., to Carnegie-Illinois Steel Co., Pittsburgh; through A. M. Hazel Inc., New York.

550 tons, grade crossing elimination bridge, Central Railroad of New Jersey, Elizabeth, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

511 tons, Sacramento river bridge, Red Bluff, Calif., to Moore Drydock Co., Oakland, Calif.

500 tons, flume supports, North Loup River Public Power and Irrigation district, Ord, Nebr., to St. Joseph Structural Steel Co., St. Joseph, Mo.

500 tons, state highway bridge, route 131, Chadds Ford, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

460 tons, addition, Hyde Park school, Chicago, to Duffin Iron Co., Chicago.

425 tons, building, Scheidt Brewery, Norristown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

385 tons, plant addition, Parish Pressed Steel Co., Reading, Pa., to Belmont Iron Works, Eddystone, Pa.

Shape Awards Compared

	Tons
Week ended May 29	15,660
Week ended May 22	22,610
Week ended May 15	14,946
This week, 1936	13,934
Weekly average, 1936	16,332
Weekly average, 1937	26,047
Weekly average, April	28,197
Total to date, 1936	395,374
Total to date, 1937	573,048

Includes awards of 100 tons or more.

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Thumb lever in handle controls welding flame. Release of thumb reduces flame to pilot size. No re-lighting or re-adjusting of flame necessary between welds. Saves 25% to 50% gas alone. Weight 13 oz. Length 14½ inches. Tip sizes 3 thru 8.



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Has automatic shut-off (gas saving) feature for intermittent welding work or instantly adaptable to continuous welding job by simply sliding thumb lever into retaining or locking slot. Weight 1 lb. 10 oz. Length 18 inches. Tip sizes 2 thru 12.



WELDIT MODEL "E"
GAS AVER

Hanging torch on Gasaver hook, between welds, automatically shuts off intake lines, saves gas. Lifting torch off hook and passing across pilot light instantly produces full welding flame, no re-adjusting necessary.

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380 tons, power plant, Pennsylvania Water & Power Co., Holtwood, Pa., to Blaw-Knox Co., Pittsburgh, and Lehigh Structural Steel Co., Allentown, Pa.

350 tons, Woodhaven boulevard bridge S-61, Glendale, N. Y., for Long Island railroad, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, building, Good Samaritan hospital, Suffern, N. Y., to Joseph T. Ryerson & Son Inc., Chicago.

250 tons, state bridge, over Merrimack river, Boscawen, N. H.

225 tons, coal chute, Decatur, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

220 tons, bridge No. 88, Lafayette county, Wisconsin, to Milwaukee Bridge Co., Milwaukee.

190 tons, trash rack, All American canal, Potholes, Calif., to St. Louis Structural Steel Co., East St. Louis.

180 tons, addition, Buffalo general hospital, Buffalo, to Buffalo Structural Steel Co., Buffalo.

170 tons, junior high school, Lexington, Ky., to International Steel Co., Evansville, Ind.

160 tons, craneway, Crown Cork Co., Baltimore, to Acme Steel Co., Baltimore.

155 tons, piling, bureau of reclamation, invitation A-42,228-A, Calexico, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

145 tons, building addition, Seaboard Steel Co., Maryland, to Dietrich Bros., Baltimore.

135 tons, bridge, Spring Green-Reedsburg road, Wisconsin, to A. C. Woods & Co., Rockford, Ill.

134 tons, bridge, Ware river, Gibbs crossing, Ware, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; H. P. Cummings Construction Co., Ware, general contractor.

130 tons, boiler supports, Combustion Engineering Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, bridge, project 324-G, Major county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

115 tons, crane beams and stops, Great Lakes Steel Corp., Detroit, to American Bridge Co., Pittsburh.

105 tons, bridge, Dutchess county, New York, to Phoenix Bridge Co., Philadelphia; through Standard Engineering Corp., New York.

100 tons, granite shop, state reformatory, Green Bay, Wis., to Milwaukee Bridge Co., Milwaukee.

100 tons, municipal airport hangar, Madison, Wis., to Theo. Kupfer Foundry & Machine Co., Madison, Wis.

Unstated tonnage, shapes and bars, building, Hood Rubber Co., Watertown, Mass., to Eastern Bridge & Structural Co., Worcester, and Concrete Steel Co., New York; Fred Billings Co., Boston, general contractor.

Unstated, miscellaneous dredges, mining equipment, etc., to Washington Iron Works, Seattle.

Shape Contracts Pending

11,000 tons, hospital building, Charity Hospital of New Orleans, New Orleans.

4000 tons, river tunnel and shafts, Queens Mid-Town tunnel, New York City Tunnel authority; Walsh Construction Co., Long Island City, low.

3600 tons, four schools, New York; re-advertised, closing June 7, with separate bids on steel.

3150 tons, viaduct, Dyckman street, New York; P. T. Cox Contracting Co., New York, low.

1500 tons, girders in press shop, unit No. 1, Fisher Body division, General Motors Corp., Flint, Mich.

1200 tons, highway bridge over San Juan river, Shiprock, N. Mex.

1100 tons, building for Harrison Radiator division, General Motors Corp., Lockport, N. Y.

1000 tons, trash rack metalwork, specification No. 739, United States bureau of reclamation, Odair, Wash.

1000 tons, trash racks, Coulee dam; bids to bureau of reclamation, June 3.

800 tons, boiler extension, Rochester Gas & Electric Co., Rochester, N. Y.

800 tons, state bridge, Shepardstown, W. Va.; bids June 8.

700 tons, grade crossing, Delaware & Hudson railroad, Philadelphia.

700 tons, farm show arena, general state authority, Harrisburg, Pa.

650 tons, Parkside and Brewster housing

projects, for United States government, Detroit.

524 tons, bridges, Manderson, Wyo.

500 tons, grade crossing elimination, New York Central railroad, Tonawanda, N. Y.

500 tons, library, Southern Methodist university, Dallas, Tex.

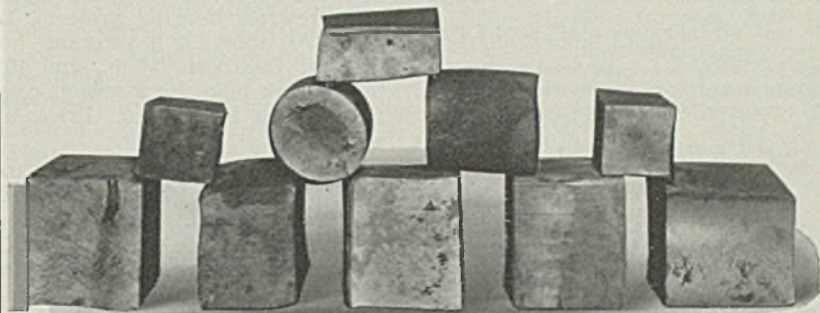
450 tons, service unit, water filtration plant, Milwaukee; Milwaukee Bridge Co., Milwaukee, low bidder.

410 tons, state bridge, Kennebunkport, Me.

400 tons, bridge over Pine creek, Victor, Colo., for United States bureau of public roads.

350 tons, structural steel for Bills brook dam, Barkhamsted, Conn., for Hartford county, Connecticut.

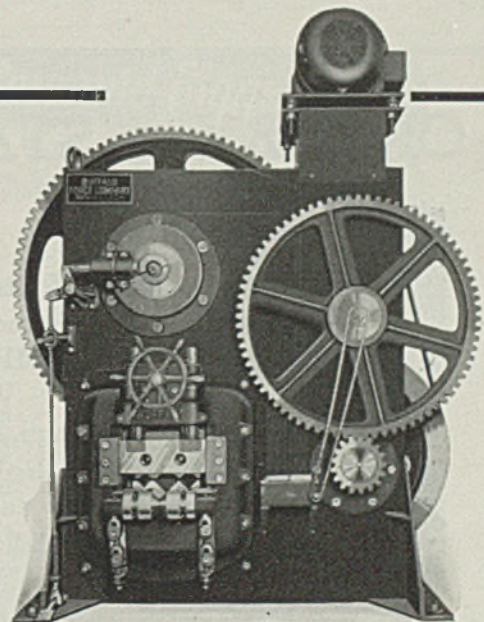
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In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

350 tons, mill building, American Rolling Mill Co., Zanesville, O.
 350 tons, municipal garage building, Flushing, N. Y.
 300 tons, state grade crossing elimination bridge, Albany county, New York.
 360 tons, grade crossing elimination, Passaic county, New Jersey.
 290 tons, Satsop river bridge, Washington; C. L. Creelman, Seattle, general contractor.
 271 tons, piling, bureau of reclamation, Potheles, Calif.; bids opened.
 250 tons, building, for Dennison Mfg. Co., Chicago.
 248 tons, bridge over Middle Fork of Flathead river, Flathead county, Montana; bids opened.
 222 tons, composed of 122 tons fabricated structural and 100 tons plain structural steel, I-beam bridge, Somerset county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 11.
 180 tons, state crossing Snohomish county, Washington; bids at Olympia, June 8.
 150 tons, studio building, 447 West Fifty-third street, New York.
 131 tons, Norton avenue, Everett, Wash., state span; bids at Olympia, June 8.
 120 tons, two Alaska road projects; bids to Alaska road commission, June 10, and bureau of public roads, June 23.

clude unchanged prices on bolts and large rivets and small increases on nuts and small rivets. Despite continued active consumption, demand has slumped rather sharply. The letdown is ascribed to the more cautious attitude of consumers regarding making commitments beyond early needs. Requirements of implement, tractor and freight car builders hold near the recent peak.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh—New projects are well maintained. Last week's inquiries included 1000 tons of rail steel for the Brewster housing projects, Detroit; 700 tons for a veterans' hospital at Dearborn, Mich., and 1075 tons of new billet for a sewage treatment works in Chicago. Prices are steady.

Cleveland—Most recent awards have originated from private sources. Concrete Steel Co., New York, booked 300 tons involved in the Geo. Worthington Co., building, Cleveland. Mills have made considerable headway against backlogs, with deliveries now ranging from

seven days to two weeks. Prices have held firm although no real test has recently been offered. Bids for Industrial Rayon plant at Painesville, O., are expected to come out this week, approximate tonnage 300 tons.

Chicago—New business is quiet and few large inquiries are pending. Production has been crippled by strikes but one mill recently down for a number of weeks is back in production. Backlogs are fairly heavy despite recent curtailment in new buying.

New York—Awards are heavier, including 425 tons for subway. New business mounts steadily with pending volume largest in several years, mostly public works.

Philadelphia—Awards are light. Despite reports to the contrary 700 tons for the Howard street bridge, Baltimore, is still pending. Kaufman Construction Co., Philadelphia, is general contractor.

San Francisco—While awards are not large, close to 9000 tons is expected to be placed within the next week or two. Important inquiries include close to 3500 tons for the San Francisco Terminal facilities of the San Francisco-Oakland bridge and 1800 tons for the Sunset reservoir, same city. Awards totaled 1154 tons, bringing aggregate for year to 35,347 tons, compared with 95,605 tons a year ago.

Seattle—Pending projects call for unimportant tonnages of reinforcing. Mills are working on backlogs and booking considerable new business in lots less than 100 tons. Bids have been opened for a state crossing at Pocatello, Ida., involving 317 tons.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 87

Third quarter contracts for bolts, nuts and rivets are expected to in-

Reinforcing Steel Awards

440 tons, highway project, first section, Merritt parkway, Greenwich, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; through A. I. Savin Construction Co., East Hartford, Conn.

400 tons, warehouse, General Electric Co., Los Angeles, to unnamed interest.

376 tons, housing project, Schonowee Village, Schenectady, N. Y., to Concrete Steel Co., New York, through A. E. Stephens Co., Springfield, Mass.

Concrete Awards Compared

	Tons
Week ended May 29	3,394
Week ended May 22	4,178
Week ended May 15	17,769
This week, 1936	5,029
Weekly average, 1936	6,005
Weekly average, 1937	4,859
Weekly average, April	5,131
Total to date, 1936	152,278
Total to date, 1937	106,906

Includes awards of 100 tons or more.

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- 360 tons, subway, section 6, route 101, Sixth avenue, New York, Capital Steel Co., New York; through Spencer White & Prentiss Inc., New York.
- 300 tons, building, Geo. Worthington Co., Cleveland, to Concrete Steel Co., Cleveland, through H. K. Ferguson Co., Cleveland.
- 300 tons, sewage disposal plant, Cleveland, to Republic Steel Corp., Cleveland.
- 250 tons, shafts, Delaware river aqueduct, contract 333, board of water supply, New York, to Jones & Laughlin Steel Corp., Pittsburgh; through Frazier-Davis Construction Co., New York.
- 165 tons, highway project, Entfeld, Conn., to American Steel & Wire Co., New York; through Lane Construction Co., Meriden, Conn.
- 150 tons, cold storage plant, Arizona Citrus Growers, Phoenix, Ariz., to unnamed interest.
- 150 tons, Farmers Auto Inter-Insurance exchange building, Los Angeles, to unnamed interest.
- 135 tons, bridge, Long Island railroad, Glendale, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh; through Tully & Dinapoli Co., New York.
- 135 tons, high school, Crockett, Calif., to Bethlehem Steel Co., San Francisco.
- 130 tons, bridges, highway 17, Jeff Davis county, Texas, to Concrete Engineering Co., Omaha; H. Page, Austin, Tex., general contractor.
- 103 tons, highway project, Wantage parkway extension, Nassau county, New York, to Jos. T. Ryerson & Son Co. Inc., Chicago; through Johnson Drake & Piper Inc., New York.

Reinforcing Steel Pending

- 1075 tons, southwest sewage treatment works, division CC, Chicago.
- 1000 tons, river tunnel and shafts, Queens Mid-Town tunnel, New York city tunnel authority; Walsh Construction Co., Long Island City, low.
- 1000 tons, rail steel, Brewster housing project, Detroit.
- 841 tons, San Gabriel dam No. 1, Los Angeles; bids soon.
- 700 tons, rail steel, United States veterans' hospital, Dearborn, Mich.
- 582 tons, rail steel, memorial auditorium, Burlington, Iowa.
- 500 tons, building, Montgomery Ward, St. Paul.
- 500 tons, warehouse, for J. L. Hudson Co., Detroit.
- 260 tons, viaduct, Dyckman street, New York; P. T. Cox Contracting Co., New York, low.
- 192 tons, I-beam bridge, Somerset county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 11.
- 175 tons, bulkhead wall and sewer connections, New York.
- 163 tons, wire mesh, Sunset reservoir, San Francisco; bids June 9.
- 156 tons, Washington state Satsop bridge; C. L. Creelman, Seattle, general contractor.
- 150 tons, Egan-Chevrolet building, St. Paul.
- 125 tons, state overcrossing Whitman county, Washington; J. F. Konen, Lewiston, Idaho, general contractor.
- 109 tons, Franciscan Fathers, Oakland, Calif.; bids opened.

Semifinished

Semifinished Prices, Page 87

Last week's deliveries of billets and slabs, sheet bars and rods showed little perceptible change from the

previous week. Skelp and tube round specifications are heavy. Sheet bars, slabs, billets and blooms are quoted \$37 per gross ton, Pittsburgh; forging billets, \$43; wire rods, \$47 and \$52, and skelp, 2.10c.

Pig Iron

Pig Iron Prices, Page 88

Pittsburgh — Announcement on third-quarter pig iron prices is expected momentarily, with the probability current quotations will be reaffirmed. Shipments in May compared favorably with April. The slackening in spot business, largely a reflection of the strong belief that there would be no price advance, continues. Although foundries are active, some have been drawing upon their stocks. Export inquiry also is lighter, foreign interests having made heavy purchases earlier in the year.

Cleveland — Foundry stocks are about average as there is little buying in anticipation of a price advance. May shipments are expected to equal April in spite of delays resulting from brief shutdowns in some foundries, resulting from

strikes. However, most foundries are close to peak operations and many look for a slight recession through June, from seasonal influences. Producers do not anticipate as heavy buying during June as in March, for prices are expected to remain unchanged.

Chicago—While pig iron shipments have been steady, closing of a number of merchant blast furnaces points to a curtailment in deliveries in the event the shut-down is extended. Pig iron consumption is holding in most instances except where labor troubles have forced plants to close. New buying is light but opening of third quarter books, which is expected this week, is expected to see some forward coverage. The market recently has been firm at \$24, furnace, for No. 2 foundry and malleable.

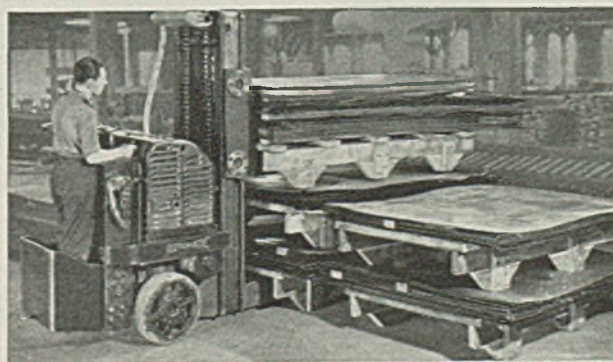
New York — Reaffirmation of prices for third quarter is expected to become general this week. Shipments are still heavy, although new buying is spotty. Sellers report considerable export inquiry for June and July shipment. No particularly large inquiries are reported, but there are a number involving 1000 tons and over. This inquiry is coming from both the Orient and Europe, continental Europe principally

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at present, and while various grades are involved, it appears that most of it falls in the foundry classifications.

Boston—Books for third quarter will be opened this week with no advances in pig iron expected. Lacking incentive to cover against higher prices, consumers, some of which are well stocked with iron, are not expected to buy heavily against third quarter during June. Current buying is generally for small lots. Shipments are steady. Miscellaneous export demand is considerable.

Buffalo—Consumers are awaiting fixing of third quarter prices but have been unable to obtain an official hint as to the trend of quotations. A merchant furnace which has been down for relining is about ready to be blown in. Business is being held up to some extent by fears of labor trouble. Shipments, especially by water, are exceptionally heavy for this season.

Philadelphia—Pig iron consumers are expecting official word momentarily of reaffirmation of prices for third quarter. New buying is spotty but shipments are well sustained. A shipment of 8300 tons left here recently for Japan with a 500-ton lot shortly before for Norway.

Cincinnati — Announcement of third quarter pig iron prices will likely start a flow of new business to mark the end of the present dull market. Some recession in foundry operations has developed, despite which the melt is heavy and stocks of pig iron steadily being depleted.

St. Louis—May shipments will be about equal to April, somewhat below March, approximately one-fourth larger than a year ago and the largest for any May since 1929. New buying continues to lag. Opinion is that third quarter price will be unchanged. Melt is holding at peak and is not likely to decline much before mid-summer.

Birmingham Ala.—With domestic, export and spot pig iron holding steady, active production will be warranted for an indefinite period. Practically every useable furnace will be in blast after June. Base price of southern pig iron will be unchanged for the third quarter.

Toronto, Ont.—Merchant pig iron sales are steady with melters interested only in spot needs. No contracts have been reported recently for forward delivery. Melters covered by contract for second quarter are taking scheduled delivery. Prices are firm and unchanged.

for shipment through June 30, 1938, on contracts for one to five months, advances to \$28.50, June to October; \$29, November to December; \$29.50 January to June, 1938. Prices apply on bulk shipments f.o.b. ovens or ports, whichever is lower. If contracts are made for equal monthly shipments the price is reduced \$1; if contracts made 11 to 13 months for equal monthly shipments price is reduced \$2.

Youngstown Sheet & Tube Co. At once scrap shipments were ordered stopped. The immediate effect has been to weaken the market further, at least sentimentally, so that today quotations on all grades are regarded as merely nominal. In fact, scrap quotations here and at Youngstown are almost meaningless.

Chicago—Closing of independent mills by strikes has created a nominal market for scrap since shipments have been suspended and sellers are refraining from covering old contracts. In the absence of any likelihood of the early placing of new business by mills, consumers' prices are nominal. Dealers are faced with the problem of disposing of cars already in transit to mills since there was not sufficient opportunity to divert such deliveries before plants were closed.

Boston—Dullness continues in domestic demand for scrap, although the Worcester consumer is buying scattered lots at recently lowered prices. Export demand is steady as more cargoes are clearing. Prices for dock delivery are steady for the most part, although weakness prevails on several grades for domestic shipment, including cast borings for

Scrap

Scrap Prices, Page 90

Pittsburgh—The past week has been quiet in the scrap market here, with No. 1 heavy melting holding at \$18.50 to \$19 per ton. Strike uncertainties, closing of railroad lists and other factors have contributed to inactivity. Some dealers trying to cover \$19 orders report that good material is none too free at \$18.50. Railroad specialties have been sold at \$25.50. Cast grades are quiet.

Cleveland—A chill was thrown into the iron and steel scrap trade by the CIO strike at various plants of the Republic Steel Corp. and the

Coke By-Products

Coke By-Product Prices, Page 87

New York—Sulphate of ammonia

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Buffalo—Actual scrap prices are being established in representative sales with dealers asking \$19 for tonnage of No. 1 heavy melting steel and some consumers claiming to have satisfied their needs at \$18. There is a similar range on No. 2 heavy melting steel and other substitutes, with \$16 bid and \$17 asked. Malleable has dropped after a long period of firmness. Dealers find machine shop turnings hard to move and prices have been further depressed although probably not to the extent some dealers contend. Fear of impending strikes is causing consumers to buy with extreme caution. The market's undertone is weak and uncertain although there are many orders still to be filled at prices much higher than those now prevailing.

New York—Scrap prices for domestic shipment have a weaker tendency with demand light, uncertainty prevailing as to the mill labor situation. Heavy melting steel is off \$1 for domestic shipment but prices for dock delivery are unchanged.

Philadelphia—Further declines are noted in scrap with steel grades off about \$1 and revision in most other descriptions, with the notable exception of leading cast grades. Most reductions are nominal with little business to afford a test. Of the two leading steel grades No. 1 heavy melting steel shows the greater resistance as some foreign business is still being covered at some eastern ports.

Detroit—Although scrap prices appear to be leveling off near the low point of the current slump, a few further reductions of about 50 cents per ton are noted in the better-moving grades such as compressed sheets, loose clippings and machine turnings. No large lists have been up recently, but next week will mark the appearance of June lists from auto plants.

Cincinnati — Quotations on iron and steel scrap, although unchanged, are considered nominal in the current unsettled mill conditions. Mills in this district, unaffected so far by labor disturbances, are taking scrap steadily on contract, but buying is desultory and without future coverage.

St. Louis—While the market for iron and steel scrap has developed more stability than for several weeks, weakness is still present. While most prices were nominally unchanged, markdowns of 50 cents to \$1 were made in several grades. Buying is chiefly in small scattered lots, with the only sale of any moment being 3000 tons of No. 2 heavy

melting steel to an east side melter for delivery over the next 60 days. The price paid was said to be at the low figure of the recent decline and \$1.50 below the last previous purchase of like material by this consumer. The latest quoted range on No. 2 heavy melting for Granite City delivery is \$13.50 to \$14.

Birmingham, Ala.—Dealers have apparently sufficient old material to meet all demands. Consumers are buying actively as since before the turn of the year. Quotations are somewhat weaker.

Seattle—Import restrictions, curtailing Japanese buying, have weakened the market which has dropped to \$12. In addition, letters of credit are unsatisfactory, unrest in Japan making the situation more difficult. Local mills continue to buy freely but so much material is coming from the interior that dealers have asked shippers to delay in order to avoid congestion here.

Toronto, Ont.—Demand for iron and steel scrap continues heavy with consumers showing interest in material for immediate needs. Mills are taking delivery of heavy melting

steel, turnings and most other steel grades whenever available and yard holdings have been reduced to a large extent in recent months. Montreal dealers also report active demand for steel scrap for local consumption. Machinery cast is in good demand with supplies light. Stove plate also has a ready market but no large stocks are available. Dealers have made no revision in prices.

Warehouse

Warehouse Prices, Page 89

Pittsburgh—Warehouse sales in May were slightly under April but there are no indications of a sharp drop. Galvanized sheets, mechanical tubing, plates, and structurals are in fair demand. Nail and bolt shipments continue steady.

Cleveland — Warehouse distributors report order volume and aggregate tonnage during May considerably below April, with little prospect of any substantial improvement through June. Most consumers are well stocked as mill deliveries have improved and shipments from warehouse have been well



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above normal through March and April.

Chicago—Sales are fairly active despite some recession from the year's peak. Improvement in mill deliveries of certain products is diverting some tonnage which for a time was going to warehouses.

Philadelphia—Warehouse selling in May was less than in April with a downward trend over the past fortnight increasingly pronounced. Prices are firm.

Cincinnati—So far steel jobbers have seen no sign of a recession from the high levels established in March and April. Normal industrial buying was well sustained in May, augmented by sales attributable to slow mill deliveries on sheets and plates.

St. Louis—While the usual seasonal recession is noticed volume holds up well, and May is expected to show a total tonnage approximately one-fourth greater than for the same period last year. Sheets of all descriptions are active, despite easier mill deliveries.

Seattle—Business has improved with a greater volume of orders from private sources. Federal and state buying has decreased but industrial activity is stimulating demand. Prices are being generally maintained although there is some complaint of irregular discounts, particularly in reinforcing bars.

Little Giant Inc., Mankato, Minn., successor to Little Giant Co., has recently been incorporated. Officers

of the new firm are: L. J. Fazendin, president; Charles R. Butler, vice president and treasurer; and George J. Hodapp, secretary. The firm manufactures power hammers and other machinery and machine tools.

Nonferrous Metals

Nonferrous Metal Prices, Page 88

New York—Nonferrous metal markets weakened last week following a display of strength on Monday and Tuesday. Factors contributing to easiness included Premier Mussolini's proposal that President Roosevelt call an armament parley and the strikes in the steel industry. Tin prices declined here while other major metals held unchanged.

Copper—Due to a rapid advance in prices abroad copper consumers in this country bought heavily when an advance appeared possible bringing sales for the first two days alone to 8084 tons. From a high 14.77½c export copper eased to around 14.30c, c.i.f. by the weekend which checked the buying movement in the domestic market. All first hands continued to quote electrolytic firm at 14.00c, Connecticut.

Lead—Fresh buying here maintained a fairly active pace despite the decline in prices abroad after midweek. Opening of July books met with considerable buying support. Prices held unchanged on the basis of 6.00c, New York, and 5.85c, East St. Louis.

Zinc—Despite continued active

consumption new business in zinc again was light and unfilled orders declined further. Producers anticipate a gradual improvement in the tight supply situation. Prime western held at 6.75c, East St. Louis.

Tin—Straits tin prices moved steadily downward to close below the previous week's level. Inquiry was not active even at the lower levels established with spot quoted around 55.50c.

Antimony—American spot advanced ½-cent during the week to close at 15.00c, New York. The recovery was attributed to the advance in Chinese futures to 13.00c, c.i.f. New York.

Steel In Europe

Foreign Steel Prices, Page 89

London—(By Radio)—Great Britain has exempted iron and steel products from all additional import duties. Most business now being booked is for delivery during second half, some being for October. Stocks of pig iron are almost nonexistent as increasing production is absorbed immediately. The position is slightly easier in scrap. Imports of semifinished steel from the Continent are increasing. All steel producers are operating all departments at capacity.

The Continent reports export trade continues active and premiums now offered above cartel prices range from 10 to 25 gold shillings.

A report from Vienna is to the effect that Great Britain has strengthened its position in the Danube basin through the purchase by British steel interests of 44 per cent of the stock of the Witkowitz Iron & Steel Works, in Czechoslovakia, and is seeking further purchases to obtain an actual majority. This producer is the source of special steels of value in armament manufacture. The world political implications of this purchase involve France, Italy and Germany and are said to give Great Britain a strong position in the armament race.

Ferrous Alloys

Ferrous Alloy Prices, Page 88

New York—May shipments of ferromanganese are running well ahead of last month, as stock stored in March before the price advance at that time have been worked off in most cases. June is expected to see a still heavier movement, for contract customers appear to be confronted with higher prices for third

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quarter, comparable to the \$102.50, duty paid, price which now prevails on spot tonnage. However, books are not expected to be opened until around June 15, so the outlook with respect to third quarter prices is not definite. Domestic spiegeleisen, 19 to 21 per cent, is steady at \$33, Palermton, Pa., and 26 to 28 per cent, at \$39.

Ore Imports Heavy

Baltimore—Iron ore arrivals here recently have been particularly heavy. May 3, 11,000 tons came in from Daiquiri, Cuba and 9258 tons from Narvik, Sweden; May 5, 21,200 tons were received from Cruz Grande, Chile; May 6, 5250 tons from Whyalla, Australia; May 7, 22,000 tons from Cruz Grande, Chile; May 8, 6767 tons from Narvik, Sweden; and May 10, 9296 tons from Narvik.

Other importations included 3500 tons of chrome ore from Beira, Portuguese East Africa, May 3, and 1963 tons from the same port May 9.

Manganese ore arrivals included 8750 tons from Poti, Russia, May 5; 80,440 tons, from the same port May 7; 200 tons, from Carrizal Bahl, Chile, May 8; 8740 tons, Takoradi, Gold Coast, West Africa, May 11, and 2350 tons, Poti, Russia, May 12.

Other arrivals included 1000 tons of pig iron from Rotterdam, Holland, May 12; 8497 tons of ilmenite sand from Koilthottam, India, May 5; and 35,017 bags of magnesite from Trieste, Italy, May 12.

Philadelphia—Iron and steel importations here during the week ended May 22 involved 201 tons of sponge iron, 94 tons wire rods, 91 tons steel billets 70 tons steel forgings, 61 tons steel bars and 46 tons steel tubes, all from Sweden; and 187 tons of structural shapes and five tons of steel bars from Belgium. A lot of 10 tons of ferrochrome arrived from Japan.

Steel Corp. To Exhibit At Water Works Meeting

Two booths, each covering 100 square feet, will house the display of United States Steel Corp. subsidiaries at the convention of the American Water Works association, Buffalo, June 7-11 at Hotel Statler, Buffalo. The exhibit will contain various forms of electric welded and seamless pipe, steel bearing piles and sheet steel piling. Photomurals and dioramas will illustrate applications of steel bearing piles and sheet steel piling.

The pipe exhibit will include vari-

ous special types, dominated by a giant piece of seamless seven feet long. Welded pipe 36 inches in diameter and smaller will be shown on sample boards. Photographs of wharf and bulkhead construction, deep trenching operations, powerhouse foundations and latest types of power rigs for driving will be shown.

Improvements Are Made at Toy and Specialty Plant

Steel Stamping Co., Lorain, O., manufacturer of toys and specialties, has added several new items to its line. It has added about 16,000 square feet to its manufacturing space, to be used for spot welding, for washing and enameling. It also will house a tool and die department and warehouse space. The company is installing two No. 8 Consolidated geared presses equipped with Marquette air cushions and having 7-inch stroke, a Blakeslee, automatic, continuous type washing machine to be used for washing stampings before they are enameled and several electric spot welding machines and other small tools necessary with this equipment. The program of improvements is expected to be completed by about July 15.

Steelmaking Processes Presented by Pictures

Photographs and brief nontechnical descriptions give a comprehensive outline of the steel industry in *The Picture Story of Steel*, published by the American Iron and Steel institute, New York. Important steps in mining and manufacturing are illustrated. The booklet contains 48 pages and more than 60 photographs.

It points out that 1,230,000,000 tons of steel have been made in the past 70 years, that more than 1,000,000,000 tons are still in use. The industry offers its 500 major products in 100,000 different sizes, finishes and compositions, "tailor-made" to meet user's requirements. Despite the five billion dollar investment required and the billion dollar annual payroll, steel remains the cheapest of metals.

Steel plant photographs in the booklet are mainly the work of John P. Mudd and Walter Bartz.

J. S. Fanning has been named assistant to Roger A. Martin, Yarrow sales representative in the Atlanta, Ga., territory for Yarnall-Waring Co., Philadelphia.



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Norway Seeks Steel From Makers in United States

Norwegian demand for iron and steel products was maintained through 1936 and industries consuming such materials were extremely active, according to a report from American Vice Consul Brockholst Livingston, Oslo, made public by the bureau of foreign and domestic commerce.

Shipbuilding and house construction on a large scale marked this period and at the close of the year 63,000 tons of ships were under construction in the yards of Norway, compared with 16,000 tons at the end of 1935.

The extremely high world demand for iron and steel manufactures, with consequent pressure on European mills, have made it difficult for Norwegian consumers to obtain prompt delivery from usual import sources of these materials. Consequently Norwegian producers have become more interested in the United States as a source of all classes of steel mill products.

Brazilian Manganese Ore Shipments Show Increase

A noteworthy increase in exports of manganese ore from Rio de Janeiro, Brazil, during March, 1937, is shown in a report by American Consul Odin G. Loren, to the bureau of foreign and domestic commerce.

Aggregate shipments of manganese ore from Rio de Janeiro during March were reported at 28,454 long tons, of which 14,549 tons were con-

signed to Baltimore, 1600 tons to Belgium, 6005 tons to France, and 6300 tons to Scotland. This compares with 15,042 tons shipped from this port during January and 4600 tons during February.

Develops a New Line of Agricultural Tools

Minneapolis-Moline Power Implement Co., Minneapolis, has developed and placed in production a new harvesting machine known as Harvester Jr. It has engine and power takeoff drive in 6 or 8-foot sizes. The company has developed a complete system of tools for farming wheat in the arid regions of the Southwest. Included is an 8-row lister seeder designed for use only with the MM universal tractor made by this company. Similar equipment for use with all makes of tractors is part of the new MM Uni-tiller system of farming.

The company has developed a complete new set of hay tools including an all roller bearing tractor mower driven by a power takeoff which fits any tractor, an all roller bearing horse mower, a side delivery rake and tedder and a combination raker bar and cylinder hay loader. The company also has developed a new, all steel beet drill which seeds six rows, has fluted feeding mechanism and can be furnished with either hill drop or chechrow attachment.

Otis Steel Co., Cleveland, reported net profit of \$702,396 for the first quarter after depreciation, bond interest and amortization of bond dis-

count and income tax. Net in first quarter, 1936, was \$148,676.

Steelworkers' Jargon Puzzles Mill Visitors

Puzzling to mill visitors is much of the lingo commonly used by steelworkers. Special meanings are given ordinary words, producing, to the outsider, unintelligible phrases. Many devices and products are named after animals.

"The keeper says to turn the water off at the jumbo and open up that bleeder" suggests the elephant run at the zoo but actually is steel mill cant. Translated by the American Iron and Steel institute, the order means "The man in charge of this blast furnace says to shut off the cooling system at the spout through which the molten slag runs, and open up that valve to relieve pressure within the furnace."

"Bears" are sometimes "horses" in the argot, both designating the infusible cinder mass which forms on blast furnace hearths. The "bug" or "fly" is the small ball of steel which forms on the ladle nozzle. "Goose eggs" or "snowflakes" are small silvery spots visible in broken alloy steel bars and indicate internal strains and tears. A "cat's eye" is a bubble of gas in molten crucible steel. Even "necking" has a special meaning, describing how a bar stretches and thins out like a piece of taffy in a strength testing machine.

American Steel Workers Toil Less for Food

American steel workers earn enough to fill their food baskets in only a fraction of the time required by foreign steel workers, the American Iron and Steel institute has calculated. A dozen eggs, a pound of bacon, a loaf of bread, a bottle of milk and other items can be bought by American steel employes with money earned for working only 1½ hours.

Workers in other steel-producing nations would have to work much longer to buy the same quantity and kinds of foods at wage levels and food prices in their own countries. In England time required would be 3¾ hours, in Germany 7 hours, in Belgium 14 hours.

Higher wages paid American steel workers, which last year were 140 per cent higher than average hourly earnings of foreign steel workers, more than compensate for any differences between domestic and foreign food prices. American wage earners can spend a smaller proportion of their earnings and yet enjoy a wider variety of foods.

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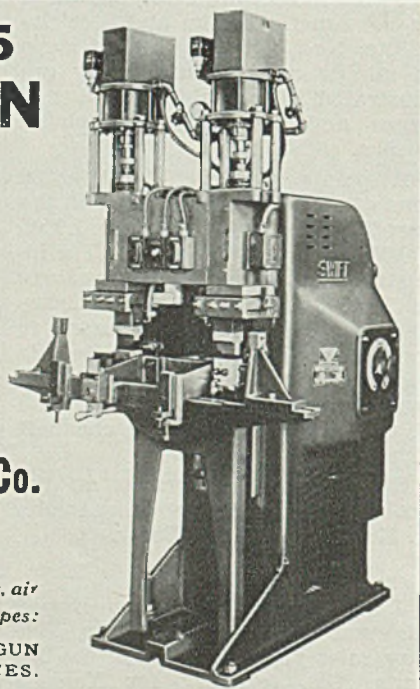
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Equipment

Cleveland—Anticipation of labor disturbances by independent steel companies in this district slowed new equipment and machine tool buying last week. Dealers' May volume was under that of April. Manufacturers' business generally is holding up well. Decline in new buying has eased delivery situation and deliveries are expected to continue to improve during next several weeks.

Chicago—Machinery and plant equipment demand still is active despite a slowing down from March and April volume. While the rush that characterized buying during the earlier period of price advances is lacking, inquiries continue in good volume. Some further letdown in orders is anticipated, though marked gains compared with activity of recent years is looked for. Machine tool inquiries for Nash Motors Co.'s improvement program are awaited. Equipment purchases also are in prospect in connection with proposed plant expansion by Electro-Motive Corp.

Seattle—Inquiries and sales are well sustained both for new and used machinery. Mining, road building, ship repairs, logging and lumbering are active and requirements are above normal. Electrical equipment continues in strong demand while pumping machinery is moving easily.

Mirrors of Motordom

(Concluded from Page 34)

der development for two years . . . Pontiac attributes sale of 40,346 used cars by its dealers during April to concentration of newspaper advertising effort on used cars, confining new car advertising to sections where used car stocks were low . . . Eyeing fair weather ahead, Graham has introduced a new convertible coupe on three chassis styles. Incidentally, the Graham die program for 1938 models is at the hot stage and will be closed any day . . . Deliveries of Packards in April totaled 14,665, well over twice the figure for April, 1936, which was 7042. Factory shipments for the month reached 15,164, indicating difficulty in building up dealers' stocks . . . It is understood one of the specially-built Ford racing cars, impounded last year by Henry Ford who will have no part of racing, mysteriously made an appearance at the Indianapolis speedway the other day . . . Conservative estimate puts unfilled orders of General Motors divisions at 125,000. . . . George A. Ball of Muncie, Ind., has purchased 50,000 common shares of Graham-Paige Motors Corp.

Construction and Enterprise

Ohio

BUCYRUS, O.—Crawford Steel Foundry Co., newly organized, has leased the foundry building of the former W. A. Riddell Corp., which it will remodel.

CLEVELAND — Dobeckmun Co., T. F. Dolan president, is considering erection of a one-story steel factory addition, to cost approximately \$50,000. Plans were drawn by G. S. Rider Co., engineer and architect, Terminal tower.

CLEVELAND—American Steel & Wire Co. plans expenditure of about \$4,000,000 for rehabilitation at its Cuyahoga works, East Forty-seventh street and Harvard avenue S. E. Work will include erection of two factory additions and installation of new machinery.

COLUMBUS GROVE, O.—Village is having engineer start survey at once on proposed improvements to municipal electric light plant. Earl Anderson is light plant superintendent; Burns & McDonnell Engineering Co., 307 East Fourth street, Cincinnati, is consulting engineer.

HEATH, O. — Pure Oil Co., 35 East Wacker drive, Chicago, has awarded contract to Lummas Co., 50 Church street, New York, for alterations and improvements to crude oil refinery here. Total cost including equipment estimated at \$50,000.

LORAIN, O. — Linde Air Products Co., 30 East Forty-second street, New York, subsidiary of Union Carbide & Carbon Corp., plans to build a plant near here. S. R. Donnell, of Union Carbide, is in charge of construction.

NEWARK, O.—Licking county rural electrification association is working on plans and specifications for construction of approximately 140 miles rural electric lines estimated to cost about \$142,000. W. R. Cutnaw, Pure Oil build-

ing, Columbus, O., is engineer. Farm Bureau co-operative project.

NEWCOMERSTOWN, O.—Tuscarawas county rural electrification association is preparing plans for construction of 170 miles electric power lines estimated to cost about \$178,000. Carl Frye, Pure Oil Co. building, Columbus, O., is consulting engineer. Farm Bureau co-operative project.

OSBORN, O.—Village has plans completed for construction of sewage disposal plant. Maturity is dependent on final WPA approval. Cost is estimated at about \$140,000. F. J. Cellarins Engineering Co., 36 East First street, Dayton, O., is consulting engineer.

ST. MARY'S, O.—City is having plans prepared for construction of light plant improvements to cost about \$80,000. Bado Hoewischer is service director; Carl F. Lambert, Miami, Fla., is consulting engineer.

WELLSVILLE, O.—City plans construction of waterworks improvements, including filtration plant, reservoir, standpipe and water meters, at an estimated cost of \$149,422. R. H. Hunter, Wooster, O., is consulting engineer.

WOODSFIELD, O.—Village has approved plans for construction of sewage and garbage disposal plant. Eugene Smith is mayor; Jennings & Lawrence, 538 Rowlands building, Columbus, O., are consulting engineers.

New Jersey

CAMDEN, N. J.—MacAndrews & Forbes Co., Third and Jefferson streets, has awarded contract to Barclay White & Co., 22 North Thirty-sixth street, Philadelphia, for construction of a new generator building. Estimated cost \$37,000.

HARRISON, N. J.—Harrison Bolt &

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IN 2 TO 60 TON PACKS

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ABOVE—2 ton capacity Lifter for handling small sheets and tin plate varying in widths from 12" to 36" and up to 40" long. Available in sizes from 2 to 6 ton cap.



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LOCOMOTIVE CRANES - CAR PULLERS - BUCKETS - CONVEYORS

Nut Co., 207 Railroad avenue, has plans for two-story addition, 50 x 100 feet, to cost about \$50,000. Joseph W. Baker, 111 North Fourth street, is architect.

HARRISON, N. J. — Harrison Bolt & Nut Co., 207 Railroad avenue, is planning to build a two-story addition to its plant, 50 x 100 feet, costing about \$50,000 with equipment. Joseph W. Baker, 111 North Fourth street, is architect.

NEWARK, N. J. — Sun Machinery Co., 35 Van Buren street, plans to remove its present works to the new one-story building it has leased at Hanford and Van Vetchen streets, and will increase capacity.

NEWARK, N. J.—Sun Machinery Co., 35 Van Buren street, has leased one-story building at Hanford and Van Vetchen streets and will remove present works to that location and increase capacity.

UNION, N. J. — Hind Steel Co., 2145 Stanley terrace, will soon let contracts for construction of an addition to its plant, Frederlek & Elsasser, 1000 Stuyvesant avenue, architects.

Massachusetts

BOSTON — Thompson Wire Co., 41 Mildred avenue, has awarded contract for two-story addition to annealing department, 54 x 60 feet, to Clark & Smith Inc., 1372 Hancock street. Estimated cost \$50,000, including equipment.

Connecticut

MERIDEN, CONN. — Cuno Engineering Corp., 80 South Vine street, has plans completed by L. Hamilton, 22 Church street, for two-story, 45 x 100 foot, plant addition, costing approximately \$42,000. Will soon let contracts.

New York

BUFFALO — Metal & Alloy Specialty Co. has begun construction of an addition to its foundry on Elmwood avenue.

NEW YORK — Niagara Hudson Power Corp., 15 Broad street, plans five-year period of construction of generating plant and distribution facilities throughout the state of New York. Estimated cost of project is \$100,000,000.

NEW YORK — New York Steam Corp., 130 East Fifteenth street, has had plans drawn by W. H. Palne, for altering the company's two-story steam plant at 407 East Thirty-fifth street. Estimated cost is \$40,000, with equipment.

ROCHESTER, N. Y. — General Motors Corp., Detroit, has had plans prepared by A. Kahn Inc., New Center building, Detroit, for erection of a one-story steel factory, containing 360,000 square feet of floor space, at Mount Read boulevard and Lexington avenue. Cost will exceed \$500,000.

Pennsylvania

CALIFORNIA, PA. — Commonwealth of Pennsylvania, Harrisburg, Pa., is having sketches prepared for a heating and power plant at California State Teachers college, here. Approximate cost \$175,000. S. Lloyd Beall, Washington Trust building, Washington, Pa., architect.

DUNMORE, PA. — Erie Railroad Co., Scranton, Pa., has plans for expansion of facilities at its car rebuilding shops here. One or more new buildings will be erected and considerable new machinery and equipment installed.

MT. GRETN, PA.—Construction of a new \$2,000,000 penitentiary here will be started early this summer, according to Maj. Henry Hornbostel, Allegheny county parks director and co-architect of the plan.

PITTSBURGH — Corning Glass Co. recently announced selection of Port Allegheny, Pa., as the site for its new \$500,000 factory for the manufacture of glass brick products for building purposes. Work on the structure will begin at once.

READING, PA. — City has retained Burns & McDonnell Engineering Co., Kansas City, Mo., to make a survey on the feasibility of constructing a municipal electric light and power plant. Project may be voted on at November election. C. V. Webber, city engineer.

UPLAND, PA.—J. Wallworth Sons' Mill, Eighth street, was severely damaged by fire. Heavy damage was caused to warehouse and considerable equipment was destroyed.

Michigan

DETROIT — Michigan Die Casting Co. has been formed by Louis W. Blauman, 253 St. Aubin avenue, to deal in die casting machinery.

DETROIT — LaSalle Screw Products Co., 227 Iron street, has been organized to manufacture screw machine products. Harry Adjemian is correspondent.

DETROIT—C. E. Phillips Co., 543 Twelfth street, is having \$16,000 factory building erected on Poplar street by Rudy-King Co., Detroit.

DETROIT—Advance Glove Mfg. Co., 1352 East Vernor highway, suffered severe damage to factory on West Jefferson avenue by fire, May 10.

DETROIT—Accurate Screw Products Co. Inc., has been organized by Edward S. Bilek, 1155 Bellevue avenue, Detroit, to deal in screw machine products.

DETROIT—Stanley Products Corp., 3006 Union Guardian building, has been formed by Harry Lindberg, 11801 Mack avenue, to manufacture abrasives.

GRAND RAPIDS, MICH.—Grand Rapids Wholesale Grocery Co. has building permit for construction of \$94,000 warehouse.

MONROE, MICH.—City is applying to PWA for aid in financing construction of sludge digestion tanks at municipal sewage disposal plant. Cost is estimated at about \$32,000. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are consulting engineers.

PONTIAC, MICH.—City is considering construction of sewage treatment system. Preliminary sketches have been prepared and report will be submitted to city council. W. P. Edmundson is city manager; H. P. Jones Engineering Co., 2012 Second National Bank building, Toledo, O., is consulting engineer.

SAGINAW, MICH.—Herzberg & Byron Inc. has been organized by Charles F. Byron, 2215 James street, to conduct a general foundry business.

Illinois

CHICAGO — R. B. Kurzen, 134 North LaSalle street, has prepared plans for S. K. Smith Co., 2851 North Western avenue, for erecting a one-story warehouse building at 2857 North Western avenue. Cost estimated at \$40,000.

EAST ALTON, ILL. — Winchester Repeating Arms Co., New Haven, Conn.,

and Western Cartridge Co., East Alton, will soon let contracts for constructing steel boiler plant, cost of which will probably be over \$40,000. A. L. Nelson, 31 St. James avenue, Boston, is architect.

EAST MOLINE, ILL.—John Deere Spreader Works, Carl H. Gamble manager, has awarded contract to Jens Olesen & Sons Construction Co., Waterloo, Iowa, for erecting a one-story foundry, 72 x 260 feet, a two-story service building and a one-story core building. Estimated cost \$100,000.

ENGLEWOOD, ILL. — American Can Co., 104 South Michigan avenue, Chicago, has had plans prepared for erection of a warehouse building on a 429 x 622 foot site on Sixty-first avenue, east of Western avenue. Estimated cost \$500,000.

MADISON, ILL.—American Car & Foundry Co., St. Louis, plans to re-open its plant here. Remodeling will start immediately. S. S. Eagle is district manager.

ROCK ISLAND, ILL.—International Harvester Co. is taking bids for construction of a one-story tractor shipping building, 110 x 320 feet, and loading platform of 30-car capacity, to cost about \$125,000.

Indiana

KOKOMO, IND.—Chrysler Corp., Detroit, has purchased Davis building, unit of former Haynes Automobile Co., for \$75,000 and will remodel into plant for production of axles and transmission shafts. It is expected to be in operation by Sept. 1. (Noted May 24.)

MUNCIE, IND.—Fuller-Warren Co. Inc., 500 Kilgore avenue, has been organized by Kenneth J. Stanford and associates, to manufacture stoves and other household appliances. Clyde A. Retherford was named resident agent.

Alabama

CENTER, ALA. — Cherokee County Electric Membership Corp. has been authorized by REA to use \$235,000 for construction of 228 miles of rural transmission lines. A generating unit costing about \$75,000 will also be built.

District of Columbia

WASHINGTON — District commissioners, District building, receive bids June 16 for rehabilitating New Jersey avenue sewage pumping station.

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids June 4 for tool steel, schedule 803, delivered Philadelphia; one all-steel motor driven shear machine, schedule 805, delivered Washington; one electric crane truck, schedule 715, delivery Pensacola, Fla.; June 8 for one motor driven automatic metallographic polishing machine, schedule 842, delivery Boston; tool post, drill, drill point thinning and two wheel pedestal type grinders, schedule 765; turbogenerator sets, diesel-generator sets and distribution switchboards, delivery Brooklyn, N. Y., schedule 751; nickel-copper alloy, schedule 812, delivery Portsmouth, N. H., and Mare Island, Calif.; 4500 feet steel wire rope, schedule 797, delivery San Diego, Calif.; punching and shearing machines, schedule 805; June 11, steel tubing, schedule 772; one welding machine, schedule 830, delivery Mare Island, Calif.; 30,000 pounds nickel-chromium alloy, schedule 832, delivery Mare Island, Calif.; July 20, portable

(Please turn to Page 108)

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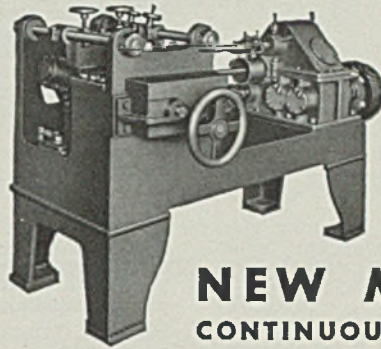
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(Concluded from Page 106)

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Florida

JACKSONVILLE, FLA.—City receives bids June 7 for turbogenerator and accessories to be installed in Talleyrand avenue power station. P. M. Ulsch is chairman of city commission.

Mississippi

TUPELO, MISS.—City is taking bids, due June 8, for furnishing chlorinator for municipal waterworks. J. H. Merritt is city clerk.

South Carolina

CHARLESTON, S. C. — General Asbestos & Rubber Co., North Charles street, division of Raybestos-Manhattan, 61 Willett street, Passaic, N. J., will install \$50,000 equipment for manufacture of rubber hose in its North Charleston plant. The company is considering construction of additional plant building for manufacture of rubber rollers, and is completing work on steel and sheet metal warehouse. Ernest H. Jeffords is plant manager.

Tennessee

MEMPHIS, TENN.—Babcock & Wilcox Tube Co., Beaver Falls, Pa., is considering construction of warehouse and branch here. J. F. Davis is traffic manager. Company is a subsidiary of Babcock & Wilcox Steel Corp.

Missouri

WARRENTON, MO.—Binkley Mfg. Co., maker of furnaces, has completed erection of a new addition to its factory, at a cost of \$13,000, and plans to increase production. In addition to furnaces the company manufactures stokers, air conditioning equipment and numerous small metal items.

Arkansas

LITTLE ROCK, ARK. — First Electric Co-operative Corp. has loan contract approved by REA for construction of 211 miles power lines in Pulaski, Prairie and Lonoke counties. John A. Sherrill, Southern building, is attorney for the corporation.

Texas

SMITH'S BLUFF, TEX.—Pure Oil Co., 35 East Wacker drive, Chicago, plans addition to refinery here at an estimated cost of \$2,125,000.

Wisconsin

DELAVAN, WIS. — George W. Borg Corp., 467 East Ohio street, Chicago, maker of electric automobile clocks and other accessories, is enlarging its parts production facilities here by leasing the old Bradley dormitory building from the Delavan Industrial foundation. Some new machinery is being purchased.

EAU CLAIRE, WIS.—Gillette Rubber Co. is starting work on a one and two-story machine shop addition, 70 x 120 feet, costing about \$50,000, including new tools and other equipment. R. W. Hutchens is president.

FREDONIA, WIS.—Gilson Bros., founders and machinists, are building a machine shop addition, 40 x 60 feet.

MARINETTE, WIS.—Ansul Chemical Co. will soon take bids for a two-story

laboratory and manufacturing building, 40 x 81 feet.

WISCONSIN RAPIDS, WIS.—Consolidated Water Power & Paper Co. plans \$1,500,000 expansion and improvement program, including additions to sulphite, addition to bleach plant, addition to machine shop, three new filter beds, two new digesters, three chlorinators, two new final stage bleachers, additional washers, tanks and piping. (Noted May 24.)

Minnesota

MINNEAPOLIS — Western Alloyed Steel Casting Co., 2833 Grand avenue, has begun construction of a one-story pattern building, 50 x 52 feet.

MINNEAPOLIS — Minneapolis & St. Louis Railway Co. plans construction of a track shed and warehouse of metal construction 90 x 200 and 100 x 245 feet, to cost about \$100,000.

Kansas

MARION, KANS.—C. F. Pantle, mayor, is planning construction of a sewage disposal plant. Paulette & Wilson, 311 Farmers Union building, Salina, Kans., are consulting engineers.

WICHITA, KANS. — Wichita All-Steel Products Co., 801-5 South Wichita avenue, plans one-story addition, 60 x 133 feet, costing about \$35,000, with equipment.

WICHITA, KANS. — Missouri-Central Type Foundry, 705 East Murdock avenue, is building a 25 x 80-foot addition to its plant, and is remodeling the original factory building.

WICHITA, KANS.—Wichita All-Steel Products Co., 801-5 South Wichita avenue, plans construction of one-story factory addition, 60 x 133 feet, to cost about \$35,000 with equipment.

North Dakota

WALHALIA, N. DAK.—City, A. J. Allen, city auditor, voted a \$58,000 bond issue for the construction of a municipal light and power plant. E. L. Lium, Grand Forks, N. Dak., is consulting engineer.

South Dakota

CHEYENNE RIVER AGENCY, S. DAK. — Department of Interior, office of Indian affairs, W. B. Fry purchasing officer, Eighteenth and F streets, Washington, will take bids June 17 for construction of a power plant and furnishing power plant equipment at the Cheyenne River Indian agency.

MARTIN, S. DAK.—C. Bird, city clerk, will purchase and install new 200-horsepower diesel engine in light plant and 7500-gallon tank in ice plant.

Iowa

DAVENPORT, IOWA—Shell Petroleum Co., St. Louis, plans construction of a bulk plant terminal, costing about \$75,000, including wharf, three large tanks, docks, and warehouse.

DUBUQUE, IOWA—Dubuque Boat & Boiler Works is low bidder at \$124,700 for construction of a steel, diesel-propelled lighthouse tender to be used for maintenance of river lights and other aids to navigation on inland waters.

LAKE MILLS, IOWA—J. C. Olson, mayor, is taking bids until June 21 for improvements to the municipal light plant and for purchase and installation of diesel engine generating unit, with auxiliary equipment.

MARSHALLTOWN, IOWA—City council is contemplating construction of a modern water softening plant. Plans are not complete.

PRIMGHAR, IOWA—City will hold special election on construction of a municipal light plant, costing \$125,000. J. M. Metcalfe, city clerk.

WATERLOO, IOWA — Chamberlain Corp., F. L. Chamberlain president, manufacturer of washing machine wringers, is building additions to its factory, 40 x 80 and 40 x 90 feet, and will install about \$20,000 worth of new machinery and equipment.

WEBSTER CITY, IOWA—E. R. Compton, city manager, is taking bids until June 21 for equipment for electric light and power plant, including one 2000-kilowatt condensing steam turbo-alternator unit and appurtenances, one 3600-square-foot surface condenser with auxiliaries, costing about \$110,500. City is also taking bids for construction of one-story addition to its power plant, costing \$22,000.

Nebraska

LINCOLN, NEBR. — W. J. Assenmacher & Co., 625 North Seventeenth street, has been awarded contract by Lincoln Steel Works, 1941 Y street, for a two-story plant unit, costing approximately \$100,000, with equipment.

Montana

GREAT FALLS, MONT. — Western Mines Corp., B. E. Flynn president, plans construction of an ore mill.

HUNTLEY, MONT.—Yellowstone Valley Electrification association, J. E. Pickens president, will take bids in state capitol, Helena, June 8 for construction of 135 miles of rural transmission lines to cost about \$155,000. J. M. Garrison, Helena, Mont., is state rural electrification engineer.

PHILIPSBURG, MONT.—The manganese mill owned by Thomas, John and Jack Harrah, of Missoula, Mont., sustained severe damage by fire.

Arizona

BISBEE, ARIZ. — Phelps-Dodge Corp., 40 Wall street, New York, plans improvements and purchasing of equipment for Copper Queen unit, costing \$2,500,000, and miscellaneous buildings and additional machinery for fabrication division of company, costing \$3,573,000.

Pacific Coast

BAKERSFIELD, CALIF. — J. and D. B. Parkinson, Title Insurance building, Los Angeles, have completed plans and will soon take bids for erection of a warehouse and office building for Republic Supply Co. Cost will probably exceed \$40,000.

ANACORTES, WASH.—Anacortes Plywood Inc. will remodel the lumber plant of the Fidalgo mill and plans installation of machinery and equipment within 60 days.

CHELAN, WASH.—Winston Bros. Co. has the contract for constructing dock and warehouse for Howe Sound Co.'s mine development project. Dock will be 18 x 600 feet and steel warehouse 30 x 100 feet. Mill and shop buildings will be constructed of steel.

ROSEBURG, OREG. — George Isaacson Co., Portland, Oreg., has been awarded contract at \$39,995 to construct a shop building at the veterans' hospital.